

TRADE IN ASIAN DRIED SEAFOOD: **Characterization, Estimation and Implications for Conservation**

By Shelley Clarke



This summary report and working paper was prepared for the Wildlife Conservation Society by
Shelley Clarke
Renewable Resources Assessment Group
Imperial College, London

Contacts:
Elizabeth Lauck
Acting Director
WCS Marine Conservation
718-220-2151

Rebecca Cerroni
Program Manager
WCS Marine Conservation
718-741-8199

WCS Working Papers. ISSN 1530-4426

Copies of WCS Working Papers are available from:

Wildlife Conservation Society
International Conservation
2300 Southern Boulevard
Bronx, NY 10460-1099 USA
t: 718.221.5155
f: 718.364.4275
e <http://www.wcs.org/science>

Suggested citation:

Clarke, Shelley. *Trade in Asian Dried Seafood: Characterization, Estimation and Implications for Conservation*. WCS Working Paper No. 22, December 2002

Available for download from <http://www.wcs.org/science/>

Cover photo:

© Shelley Clarke

Copyright:

The contents of this paper are solely the property of the author, and cannot be reproduced without the permission of the author.

TABLE OF CONTENTS

Acknowledgements	5
Summary	7
Section 1: Introduction: The Need for Trade Characterization and Monitoring	9
Section 2: Product Selection and Historical Background	15
Section 3: Analysis of Hong Kong Import/Export and Re-Export Statistics	23
Section 4: Comparison with Customs Statistics of Key Trading Partners	33
Section 5: Comparison with Global and Regional Dried Seafood Databases	43
Section 6: Hong Kong Market Observations and Trader Interviews	55
Section 7: Conclusions	73
References	84

Appendices A, B, C, D and E are available at
<http://wcs.org/science/workingpapers>

ACKNOWLEDGEMENTS

This study would not have been possible without the support of the David and Lucile Packard Foundation and their encouragement of this type of research is gratefully acknowledged. Dr. Ellen Pikitch, of the Wildlife Conservation Society, was instrumental in initiating and coordinating the study, and her continued interest in this work is greatly appreciated.

Priscilla Leung To-Yan provided invaluable linguistic and research skills to the market interviews, as well as to the Hong Kong customs statistics data gathering and literature review. Dr Yvonne Sadovy of the Department of Ecology and Biodiversity at the University of Hong Kong kindly contributed her expertise and time to the design of the interview survey, identification of dried fish products, and review of this report.

In Hong Kong, Frazer McGilvray of the International Marinelife Alliance is warmly thanked for the background he provided on Hong Kong's live reef fish trade. The staff of TRAFFIC East Asia, WWF-Hong Kong and Project Seahorse-Hong Kong are also acknowledged for helpful information and advice. This project would not have been possible without the cooperation of Hong Kong dried seafood traders. Those who were particularly helpful prefer to remain anonymous but are appreciated for their openness and patience.

The author also wishes to express her gratitude to the following persons and organizations who contributed to the major information and data gathering effort conducted under this study:

- In Hong Kong, the many helpful staff of the Hong Kong SAR Government Census and Statistics Department; Mrs Stella Jiang of PaHuma; Ms Noel Chan; Mrs Albe Lee; Mr Max So of China Goodwill Business Information Ltd; the staff of the Japan External Trade Organization (JETRO) Library; and the staff of the Run Run Shaw Library, City University of Hong Kong, who allowed access to otherwise unavailable materials;

(Continued on next page)

Acknowledgements (continued)

- In Taiwan, Drs Liao Yih-Yia and Joung Shoou-Jeng, and Mr Li Hsien-Hao, Mr Hsiu Hwa-Hsiun, and Ms Liu Shou-Chu of National Taiwan Ocean University; Dr James Leu and Ms Joyce Chung of ERM Taiwan; Mr Hu Chi-Hsiang of the Department of Fisheries Regulation, Fisheries Administration of Taiwan; and Ms Mindy Wei Ming-Yu of the Taiwan Directorate General of Customs;
- At FAO Rome, Ms Adele Crispoldi, Mr Luca Garibaldi, Ms Helga Josupeit and Ms Stephania Vannuccini;
- At SEAFDEC Bangkok, Mr Suriyan Vichitlekarn;
- At INFOFISH in Kuala Lumpur, Mr Sudari Pawiro;
- In Singapore and Malaysia, Ms Lee Ju-Shen of ERM Singapore, Dr Almah Awaluddin, and Mrs Radha Yogendran; and
- In Japan, Mr Yoshihiro Koda.

SUMMARY

As one component of a larger effort to better understand the pressures of global seafood demand on marine resources, this study explores the implications of the dried seafood trade centered in Chinese and Southeast Asian markets. Using Hong Kong, the region's largest entrepôt, as a focal point, products selected for study included those that could be identified and to some extent quantified in available trade records, and those that were not being studied by other researchers. This report presents a pilot study characterizing the trade in shark fins, abalone, bêche-de-mer, fish maw and dried whole fish in terms of volume, source locations, species composition, price, trade structure, and trader attitudes. An assessment of the usefulness of existing information and the data gaps that most critically limit understanding is also provided.

Trade statistics compiled by the Hong Kong Special Administrative Region Government were used to identify trends in imports and re-exports between 1996 and 2000. Shark fin trade statistics were found to require adjustment to account for double counting of shipments and water content of frozen fins, but nevertheless showed an exponential rate of growth of 5% per year. It was also discovered that shark fins from European exporters now dominate the import market. In contrast, imports of abalone, bêche-de-mer and dried fish products have either remained stable or diminished, in some cases reflecting a decline in consumer demand.

Hong Kong customs records were compared with those from key trading partners (Mainland China, Taiwan, Singapore and Japan) to identify any consistent bias and assess the magnitude of variation (i.e., error). A meta-analysis was conducted and revealed that Hong Kong's declared quantities are almost always higher, and thus are assumed to be more accurate. Major discrepancies were identified between Hong Kong and Mainland China records for shark fins, suggesting that Mainland imports may be severely under-reported. The tendency for under-reporting in the Hong Kong data was also noted but cannot be evaluated using any available data.

In contrast to national customs statistics, global and regional databases aggregate the data at a higher level which provides a broader perspective on the trade but may over-simplify product categories and mask small-scale patterns. A comparison of national and regional/global statistics aimed to link the two

types of databases, allowing national features to be tracked upward to regional or global levels, and international trends to be traced to individual country's contributions. Findings indicated that regional and global databases often perpetuate under-reporting biases and thus do not accurately portray traded volumes. Therefore, estimates of global trade volumes are best based on product-specific compilation of appropriately adjusted national statistics.

This study also investigated the business practices of the dried seafood industry in Hong Kong through market observations and trader interviews. The results of this effort, which provide unique insights into trade operations and sentiments, are based on market reconnaissance surveys and 23 structured and numerous unstructured interviews with dried seafood traders during the period December 2000 to July 2001. Information on market structure and the attitudes and outlooks of traders assists in interpreting the behavior of the market in response to harvest, economic and regulatory factors and suggests leverage points where conservation influence can be exerted. In the case of dried seafood products, consumer education campaigns appear to be particularly promising means of achieving marine conservation.

Identified biases in trade data and potential correction factors developed in this study can be applied to provide a more realistic portrayal of extraction rates, particularly when catch or harvest rates are unavailable from source countries. Recommendations for improved trade monitoring can be implemented to provide important tools for future marine resource management and conservation decisions.

Section 1:

INTRODUCTION

The Need for Trade Characterization and Monitoring

Unlike most of our dietary choices, consumption of seafood has direct implications for global biodiversity. Across the globe, marine populations are under siege as harvest pressures decimate stocks, degrade ecosystems and ensnare communities and businesses in a spiral of extraction and depletion. In the majority of cases, management systems have failed to stem this decline, and one of the only areas of consensus is that existing systems must be improved if biodiversity is to be maintained and sustainable use achieved.

Management of marine populations faces many of the problems inherent in management of other animal populations but the further complications arising from a vast, transient and technically challenging ocean environment are particularly formidable. Catch and effort statistics, long the foundation of stock assessment and management, are absent or lacking in many areas and for many species. Incidental mortality, arising from discarding bycatch or habitat damage, can be substantial, particularly as harvest pressures increase, but is largely unquantifiable. Many recent advances in marine resource management have focused on improving management tools, including treatment of uncertainty in models, ecosystem management approaches, and greater involvement of local stakeholders. However, the extent of the threats to some species still cannot be assessed on the basis of existing data and systems, and problems with under-reporting and illegal, unreported and unregulated (IUU) fishing, will not be solved in the near future.

Trade data are often dismissed as inaccurate and not related to biological management units such as stocks or species, but these drawbacks are similar to those inherent in other available data (e.g., some catch data). This study

This study aims to explore and assess trade-based sources of information, that can facilitate future monitoring of species of concern and provide a foundation for necessary conservation actions.

sets aside these traditional criticisms of trade data in order to conduct a pilot test of several market characterization and estimation methods for a specific seafood sector to determine if otherwise unavailable and management-relevant information can be generated. As documented in other trade-based studies, such as those undertaken by TRAFFIC, in the absence of reliable catch statistics from many areas of the world ocean, compilation and analysis of trade data at a minimum provides a useful means of tracking relative extraction rates over time. A trade-based analysis can also provide an estimate of the numbers of organisms utilized, particularly in cases where organisms are marketed in whole form, and where provenance is documented, area-specific extraction rates can be derived. Market-based studies also have the advantage of providing insight into the pressures exerted by traders and consumers. This allows more informed projection of future trends as well as identifies areas where influence can be exerted through, for example, enforcement, labeling or education.

This study therefore aims to explore and assess trade-based sources of information, and propose new methods and analytical tools, that can facilitate future monitoring of species of concern and provide a foundation for necessary conservation actions. While trade assessment may never be a substitute for current resource management tools, the consequences of failing to implement more effective management systems require that all potentially useful methods be thoroughly examined.

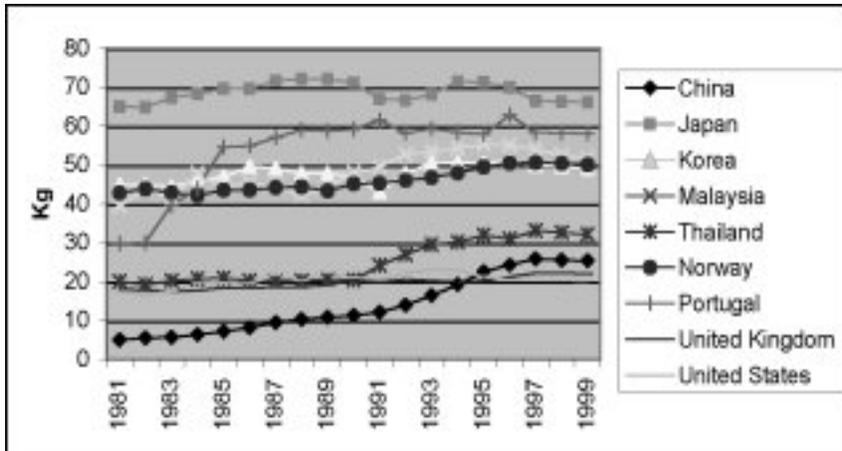
Changes in the Global Seafood Trade and the Role of East Asian Demand

Recent decades' innovations in food processing technology, improvements in cargo transport, and incentives toward an increasingly globalized economy have radically transformed the world's seafood trade. In most developed countries, distinctly local seafood products reflecting regional supplies and tastes have been augmented by an impressive array of species from far-flung fisheries. While a boon to adventurous gourmets, this increasing diversity of fisheries products has in many cases disguised stock declines in once-common seafood species, thus cushioning consumers from the scarcity and price effects of over-fishing. To keep pace with the demands for this wide variety of seafoods, suppliers scour the oceans for additional harvest capacity in present and potential fisheries, deploying capital, technology and political leverage. Meanwhile, in developing countries, local fisheries resources previously used only as subsistence protein or ignored altogether, are now being fished to supply international markets, resulting in gains in foreign currency but losses to the local food base and ecosystem.

East Asia strongly influences this global seafood demand. The traditional importance of fisheries products in the diet and as health tonics/medicines, as well as the increasing buying power and standards of living as its economies develop, have resulted in some East Asian countries ranking amongst the world's highest in per capita seafood consumption. Examination of consumption rates in a selection of East Asian and Western countries with known affinities for seafood (Figure 1.1) reveals that while levels of consumption have remained steady in developed East Asian and Western countries (e.g., Japan, Norway, the United Kingdom and the United States), a substantial increase in

seafood consumption has occurred in East Asian countries (e.g. China, Malaysia, and Thailand) undergoing rapid economic expansion in the mid to late 1990s (FAO 2001a).

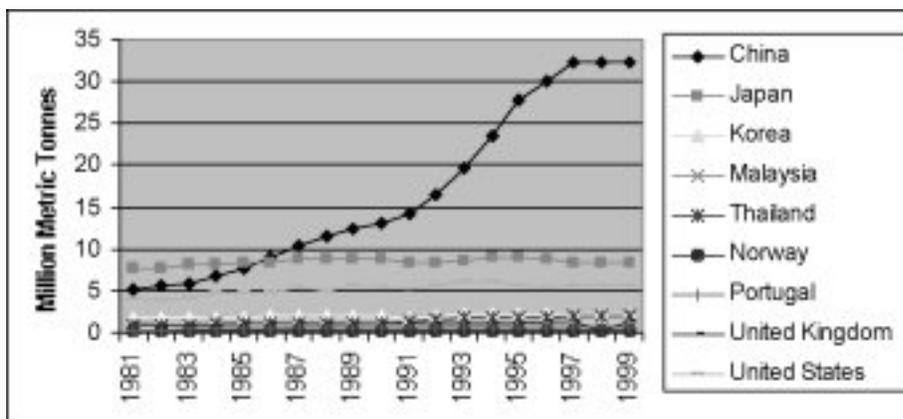
Figure 1.1 Seafood Consumption per Capita per Year



When these trends are combined with population growth patterns (Figure 1.2) (FAO 2001a), particularly in the People’s Republic of China (PRC), the extent of the current and potential future East Asian demand for seafood is striking. A recent analysis of the PRC’s national fisheries statistics, as reported to the United Nations (UN) Food and Agriculture Organization (FAO), indicates that catch rates may be inflated by as much as double the actual amount in order to meet national production targets (Watson and Pauly 2001). While it is not clear whether seafood consumption figures may also be over-reported to FAO, the scale of China’s demand is such that even a 50% reduction would still exert tremendous market pressures.

A substantial increase in seafood consumption has occurred in East Asian countries undergoing rapid economic expansion in the mid to late 1990s.

Figure 1.2 Total Seafood Consumption per Year (per capita x population)



Some dried marine organisms are consumed in the belief that they will convey a health benefit and/or because consumption is traditionally auspicious.

In parallel with the increase in consumer demand in East Asian countries, local resources have suffered from overfishing, as well as the effects of coastal development and associated pollution (Pitcher et al 2000). Although China (including Taiwan) and Japan still rank within the top 5 seafood-producing countries of the world (FAO 2001a), the fisheries resources in waters surrounding these countries are under severe pressure: 58% of fish stocks of the Western Central Pacific (Gulf of Thailand and the Philippines to Fiji) and 70% of fish stocks in the Northwest Pacific (northern South China Sea to Siberia) are considered to be exploited at, or beyond, their maximum sustainable yield (FAO 2000). As a result, East Asia's growing demand for fish protein is increasingly being met through a combination of aqua/mariculture and distant water fishing (FAO 2000, Conover and Dong 1998b, pers. ob.¹).

Characterization of the East Asian Seafood Market

East Asian tastes in seafood vary widely but can be broadly split into a Northeast Asia market, based in Tokyo and supplied by Japanese, Taiwanese and Korean fleets, and a Southeast Asia market with key entrepôts in Hong Kong and Singapore. The key products in these two markets are easily distinguished. While the upper end of the Northeast Asia market focuses on tuna, usually transported in fresh or frozen form and served raw, the Southeast Asian markets, particularly Chinese consumers, find this fish too oily and coarse for their taste. Instead, Chinese and Southeast Asian haute cuisine values large reef fishes, such as groupers, which are usually transported in live form and steamed to maintain the delicate flavor. With depletion of both tuna and reef fish stocks near the major markets, supplies are now dependent on capital-intensive, distant water fishing operations and dedicated product handling chains to maintain quality during extended transport.

In contrast to these high profile seafood products, dried seafood products are usually cheaply sourced and transported, and require little special care. The popularity of these products, particularly in the Southeast Asian market, dates back to the time when consumers could not afford expensive seafoods. In addition, refrigeration was not commonly available and sun drying of seafood provided a low-cost means of preserving quality during shipment and prior to use. Chinese and Southeast Asian cuisine utilizes dried fish in whole form and as filets, fish maws (swim bladders), skin and bones; dried mollusks such as abalones, scallops, and oysters; dried crustaceans including several species of shrimp; and dried echinoderms (sea cucumbers or *bêche-de-mer*). Today dried seafood is considered a traditional or even old-fashioned taste, and it appears that in more urban and cosmopolitan environments, fresh, frozen or ready-prepared seafoods are gaining in popularity. Regional databases confirm the percentage of marine fish catches processed into dried forms has dropped in recent years from 20% to 5% (SEAFDEC 1999, 2000, 2001).

Some dried marine organisms are consumed in the belief that they will convey a health benefit (either as a medicine or tonic) and/or because consumption is traditionally auspicious. Seahorses and pipefishes, both belonging to the family Syngnathidae, are a common ingredient in Traditional Chinese Medicine (TCM) remedies for a variety of ailments (Vincent 1996). Although traders and consumers sometimes cite health benefits associated with the consumption of

shark fins, and the use of shark products within TCM has a lengthy and well-documented history (Rose 1996), shark fins are more commonly served in restaurants than dispensed by TCM practitioners. This is also true for sea cucumbers and fish maws. Therefore, while these products may be placed at varying distances along the spectrum of foods, tonics and medicines they share a common derivation (ie marine fisheries), and raise similar management and sustainable use issues, regardless of the motivation for consumption.

Scope and Purpose of this Study

For the reasons described above, the Southeast Asian seafood market is highly distinctive due to its preferences for live reef fish and the range and quantity of dried seafood items. The trading center of Hong Kong is at the heart of both these trades. Hong Kong and Singapore annually vie for the accolade of world's busiest port, but it is Hong Kong's ability to serve as a conduit of goods to the Mainland China hinterland that allows it to dominate these seafood trades. Several recent and ongoing studies have chosen Hong Kong as a base from which to study the live reef fish trade (Lee and Sadovy 1998; Lau and Parry-Jones 1999; Chan 2000), and both Project Seahorse and TRAFFIC East Asia are currently engaged in studies of the marine medicinals trade in Hong Kong.

The purpose of the research described in this report is to conduct a pilot study of the production, distribution and marketing of dried seafood products using the Hong Kong trade as a focal point. The study was designed to be undertaken as a supplement to an ongoing research project on the shark fin trade in Hong Kong and as such, was structured to capitalize on opportunities presented by the larger study and thereby maximize limited resources. The products of this research may be used in conjunction with a broader parallel study, entitled 'Mapping the Global Fisheries and Seafood Sectors', also sponsored by the David and Lucile Packard Foundation, to identify opportunities for positive and constructive change in marine fisheries management.

The specific objectives of this study are as follows:

- Characterize selected dried seafood products in terms of:
 - volume of trade
 - species utilized and types of uses
 - source locations and fisheries
 - business structure of the fisheries
 - purchasing and distribution chains including transshipment points
 - location of markets
 - pricing and trends in demand
 - trader and consumer attitudes;
- Describe the usefulness of existing data sources;
- Highlight the data gaps which most critically limit current understanding of the trade; and
- Explore the extent to which sourcing and distribution of each product overlaps with other seafood products.

It is then intended that this trade assessment can be used, in conjunction with information on population abundance and dynamics available from other

The Southeast Asian seafood market is highly distinctive due to its preferences for live reef fish and the range and quantity of dried seafood items.

This trade assessment can be used, in conjunction with information on population abundance and dynamics, to better understand the threats to dried seafood species arising from market extraction.

studies, to better understand the threats to dried seafood species arising from market extraction. With the communication of more definitive methods and findings for trade characterization to appropriate management bodies, and potentially traders and consumers, the basis for sustainable management and conservation of marine biodiversity is thus strengthened.

Format of this Report

The study methods, findings and conclusions are presented according to the following format in the remainder of this report:

- *Section 2* describes how the key products were selected and provides historical background on their use.
- *Section 3* presents an analysis of the Hong Kong Customs Statistics, by product, and lays the foundation for describing and quantifying the trade flows in the region.
- *Section 4* compares the quantities in Section 3 with import-export data from key trading partners and illustrates the discrepancies in national customs databases.
- *Section 5* describes and synthesizes data available in other global and regional databases to assess the proportion of the trade transiting Hong Kong in recent years.
- *Section 6* provides the results of 23 detailed surveys of dried seafood retailers, and reconnaissance visits to another 46 shops/warehouses during June – August 2001.
- *Section 7* presents a discussion of the relevance of the findings for marine conservation, an exploration of the potential overlaps between the dried seafood trade and other trade in seafood products and marine medicinals, a review of data sources' usefulness and reliability and associated data gaps, and recommendations for improved trade monitoring and documentation.
- *Section 8* lists the references used in preparing the report.
- Appendices A,B,C, D, & E appear at www.wcs.org/science/workingpapers

¹ The Hong Kong SAR Government commissioned a study in 1999 to examine the feasibility of converting its local fishery to a distant water fleet, based in part, on depletion of local fisheries resources and indications of Mainland China's success in a similar program.

Section 2:

PRODUCT SELECTION AND HISTORICAL BACKGROUND

This study uses the trade in dried seafood products in Hong Kong as a basis for examining regional characteristics and trends. In scoping the study it was therefore necessary to select products, which are sufficiently common, and can be identified and to some extent quantified, in the Hong Kong market. Since the primary source of quantitative data was expected to be the Hong Kong Special Administrative Region (SAR) Government's customs records, it was also essential to select products which were sufficiently distinct within Hong Kong's commodity classification system. Based on a review of the commodity codes, a number of dried marine products were readily distinguished and thus selected for study including:

- Sharks' fins ('Dried');
- Abalone ('Dried, salted or in brine');
- Bêche-de-mer ('Dried, salted or in brine');
- Seahorses ('Dried');
- Pipefishes ('Dried').

Preliminary interviews with shark fin traders indicated that frozen shark fins are imported to Hong Kong under the category 'Salted or in brine' and are immediately transshipped to Mainland China for drying and processing. Since these fins are ultimately destined for a dried product form, Sharks' fins ('Salted or in brine') were added to the product list. Two other categories of dried seafood: Fish ('Dried'); and Shrimps and Prawns ('Dried, salted or in brine, or

The product list was finalized to include dried and associated forms of sharks fins, bêche-de-mer, abalone, and dried fish.

cooked by steaming or boiling in water, not frozen) were not initially selected for study due to the lack of differentiation within the commodity codes on either a taxonomic or product form basis.

This product list was, however, further modified prior to the initiation of data gathering. The first modification comprised the inclusion of Dried Fish in the list of products to be studied. Despite the lack of customs' records detail on taxonomy or product form (e.g. whole, fillets, fish maw, etc.), the study team decided that, given the lack of information on the dried fish trade, its inclusion in the study was warranted even if the level of detail of the analysis for dried fish could not match the other products. The second modification comprised the exclusion of seahorses and pipefishes from the study. This modification was made at the request of Project Seahorse who are in the process of updating their previous trade study (Vincent 1996) and expressed concern that inclusion of Syngnathids in the surveys might confuse traders who had already been interviewed for their study or otherwise complicate their ongoing activities. The treatment of seahorses and pipefishes in this study is thus confined to a brief discussion of the overlap between trade in these products and other forms of dried seafood investigated by this study (see Sections 6 and 7). Readers interested in updated and comprehensive information on the trade in Syngnathids are referred to Project Seahorse's forthcoming monograph.

Based on the considerations discussed above, the product list was finalized to include dried and associated forms of sharks fins, bêche-de-mer, abalone, and dried fish. The following sections introduce each product in terms of its history of use, the role of Hong Kong in the trade and associated conservation issues or concerns.

Shark Fin

Shark fin, known in China as *yu chi* (pronounced '*yu chur*' in Mandarin and '*yu chee*' in Cantonese, English equivalent 'fish wing'), is the key ingredient in the eponymous celebratory dishes of shark fin soup and shark fin casserole, prized by Chinese communities throughout the world (Figure 2.1).

Records of shark fins as a delicacy date to the Sung dynasty (960-1279 AD)¹ and the dish was established as a traditional component of formal banquets by the Ming dynasty (1368-1644 AD) (Anon. 1995, Rose 1996). Shark fins have long been sourced through foreign trade and are recorded as one of the components of the traditional economy of Borneo where Chinese merchants have been trading for many centuries (Payne et al 2000). Within China, Guangdong and Fujian provinces were the centers of shark fin culinary development, from which evolved the technique of removing the golden-colored collagen fibers lying between the cartilage (Figure 2.2) and forming '*chi pian*' or fin cakes. These fin cakes were subsequently boiled in chicken stock to produce the distinctive flavor of the dishes (Anon. 1995).

Serving shark fins at Chinese banquets remains today a very common custom: a recent survey of Hong Kong residents revealed that 85% of respondents were served shark fin soup more than once per year, with 46% consuming the delicacy more than 5 times per year (Ng 2000). Hong Kong, which serves as an entrepôt for Mainland China, has been the center of the world trade in shark

fins for many decades, with a large portion of the remaining trade transiting Singapore (Kreuzer and Ahmed 1978, Parry-Jones 1996, Vannuccini 1999). Estimates of Hong Kong's share of world imports have varied between 50% (Tanaka 1994, based on data through 1990) and 85% (Hooi in Vannuccini 1999, based on 1992 data). In either case, the global scope of the Hong Kong trade is underscored by the finding that 125 countries or areas export shark fins to Hong Kong (Parry-Jones 1996). Given the continuing economic development and rising standards of living in Mainland China, it is expected that demand for shark fin will grow over time and Hong Kong will continue to capitalize on its close trading links with the Mainland.



Figure 2.2
A partially processed shark fin showing fin rays lying between the cartilage.



Figure 2.1 Typical shark fin display in Hong Kong's Sai Yin Pun district. The large fins against the wall are basking shark (*Cetorhinus maximus*) fins. The processed fins in boxes are sold for up to \$2,980 HK per catty² (\$633 US per kg).

The low demand for shark meat, and the fluctuating markets for other shark products (i.e. skin, liver oil, cartilage, and teeth), with changes in fashion, medical knowledge and the availability of substitutes (Clarke, in prep.), make it likely that the demand for fins is increasingly driving shark mortality. Shark fins, particularly those from highly desirable species, are some of the most expensive seafood products in the world and commonly retail for over \$400 US per kg in Hong Kong (Parry-Jones 1996). No definitive study of the species composition of the trade has been published, although knowledgeable traders in Hong Kong indicate that approximately 30-40 species' fins are useable (Hooi in Vannuccini 1999; Clarke, pers. comm. with several traders, 2001). Documentation of the proliferation of finning (i.e., removing the fins and discarding the carcass at sea) in some fisheries (Camhi 1999) and concerns regarding wastage in shark fisheries (WildAid 2001) have recently led to national bans on shark finning in United States waters (U.S. Public Law 106-557) and the tuna fisheries of Australia (Rose and McLoughlin 2002).

Regardless of finning prohibitions, there are very few jurisdictions worldwide which limit the numbers of sharks caught. Trade regulations for shark products under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) were first implemented in 2000 when the basking shark (*Cetorhinus maximus*) was listed by the United Kingdom, and



Figure 2.3 Dried abalone for sale in Hong Kong. The product in the jar on the left retails for \$781 US per kg.

subsequently in 2001, the great white shark (*Carcharodon carcharias*) was listed by Australia on CITES Appendix III. These listings require export/import licenses between the listing state and any other country party to CITES for trade in that species. In 2002, the basking shark and the whale shark (*Rhincodon typus*) were listed on CITES Appendix II which requires trade monitoring and permitting by all parties to CITES. The 2002 IUCN Red List includes 1 species of elasmobranch in its Critically Endangered category, 9 species in its Endangered category and 12 species in its Vulnerable category (IUCN 2002).

Abalone

Natives of coastal China have undoubtedly consumed local species of abalone (*bao yu* in Mandarin and Cantonese) for millennia, but the first historical account of this seafood dates from the Han dynasty (206 BC – 220 AD). Records state that while pursuing a coastal campaign against General Xiang Yu, Emperor Liu Bang noticed fishermen eating an unfamiliar greenish mollusk. Emperor Liu Bang developed a taste for the dish and incorporated it into official Han dynasty cuisine, as a result of which its fame and popularity spread. Abalone is still widely enjoyed in Chinese cuisine, particularly at banquets and special occasions. Recipes utilizing dried abalone (Figure 2.3) require 1-2 days of product pre-soaking, followed by at least 12 hours of simmering, which may explain the popularity of other forms, such as canned abalone, which require less preparation.

International trade in abalone dates as far back as at least the 1880s in Tasmania where Chinese merchants were reported to be harvesting, drying and exporting abalone to China (Prince and Shepherd 1992). South Africa began canning abalone for the East Asian market as early as 1953 (Tarr 1992), and Oman's most expensive seafood product, the Omani abalone, has been dried and exported for the Chinese market since at least the 1970s (Johnson et al 1992). As of the early 1990s, Japan and China were said to consume over 80% of the world catch of abalone, with Japan demanding the premium products in live, fresh and frozen form, and China, with Hong Kong as its entrepôt, importing the bulk of canned and dried production (Oakes and Ponte 1996). Commercial abalone products derive from at least 25 species (and subspecies) of the genus *Haliotis* (Huang 1998). For the Chinese market, products are identified by brand name rather than species, and particular brands, which may include a mix of species, are distinguished by product size, texture and meat color (Oakes and Ponte 1996).

Conditions for abalone production are most favorable in temperate and subtropical waters off Australia, Japan, Mexico, South Africa, the United States, Canada, New Zealand, China and Taiwan. In most of these countries, however, overexploitation has occurred and strict management measures have been implemented to sustain the remaining, limited harvests (Huang 1998, Prince and Shepherd 1992, Tarr 1992, Oakes and Ponte 1996). The resulting declines in supply are increasingly being met by cultured abalone products (Huang 1998) which generally command higher prices (Oakes and Ponte 1996), but the difficulties in differentiating between legal wild-caught, poached, and cultured products in trade statistics (Gordon 2000), complicate assessment of the relationship between trade quantities and population status. Although the United States recently listed the white abalone (*H. sorenseni*) on the federal endangered

species list, and several other species worldwide are proposed for similar listings and/or protected by regulations, no abalone species are listed on the IUCN Red List of Threatened Species.

Bêche-de-Mer

The origins of bêche-de-mer (the common name for the dried body wall of sea cucumbers) in Chinese cuisine are not well known. However, the history of their commercial harvest dates back at least 1,000 years, and they were reportedly exported to China by Papua New Guinea and New Caledonia as early as the 18th and 19th centuries, respectively (Conand and Byrne 1993). Bêche-de-mer are known as *hai shen* in Mandarin, *hoi sam* in Cantonese, (English equivalent ‘sea ginseng’) and served as a health tonic³ as well as common celebratory dish at banquets (Jenkins and Mulliken 1999). There are several steps involved in preparing the bêche-de-mer for transport and storage, including repeated boiling and drying (Conand and Byrne 1993), and several days of soaking and washing to prepare the dried form for consumption (Jenkins and Mulliken 1999).

Hong Kong has long been recognized as the world’s largest entrepôt for bêche-de-mer (Sant 1995), and although Singapore and Taiwan also participate in the trade, Hong Kong currently controls 80% of the global supply (Jaquemet and Conand 1999). Traditionally, the lower-value products were shipped to Hong Kong for re-export to Mainland China (Conand and Byrne 1993) but there is some evidence that the price differentials are leveling as the high-end market in China expands (Jaquemet and Conand 1999). While there are approximately 1,200 species of sea cucumbers, only 300 of these can be utilized as bêche-de-mer (Sant 1995). Due to this wide diversity, there are many different countries supplying the Hong Kong, Singapore and Taiwan markets, with significant contributions from Indonesia (Conand and Byrne 1993), the Philippines (Schoppe 2000) and a number of South Pacific island nations (Sant 1995). Collection of bêche-de-mer is accomplished by hand or using spears in shallow water, and via free diving or SCUBA in deeper waters (Sant 1995). Despite some observations that the most expensive species in the Hong Kong market is the spiked Japanese sea cucumber, *Stichopus japonicus*, there is no clear consensus on consumer preferences for spiked or non-spiked product forms (Jenkins and Mulliken 1999).

Factors such as the ease of collection, and the absence of a local history of utilization and accompanying traditional resource management practices, have caused many bêche-de-mer fisheries to suffer from overexploitation. Examples include declining production in Tuvalu (Conand 1996), Mexico (Perez-Plasencia 1996), and Kenya (Samyn 2000), local depletions and/or size reductions in the Philippines (Schoppe 2000) and the Solomon Islands (Sant 1995), repeated failures to meet exploitation quotas in Vanuatu (Jimmy 1996), and overfishing with apparent recovery in Papua New Guinea (Lokani et al 1996). Although depletion of sea cucumbers may be only a minor concern from an ecosystem perspective, bêche-de-mer fisheries have evolved to be an important source of income for many otherwise resource-limited communities. For this reason, increasing attention is being focused on monitoring the bêche-de-mer trade and on sustainable management of sea cucumber resources.



Figure 2.4 Dried bêche-de-mer displayed in a Hong Kong retail shop. Two sizes of white teatfish (*Holothuria fuscogilva*) are sold for \$228-\$298 HK per catty (\$48-63 US per kg), two sizes of sandfish (*H. scabra*) are sold for \$288-\$328 HK per catty (\$61-70 us per kg), and spiked bêche-de-mer (*Stichopodidae*) are sold for \$1,180 HK per catty (\$251 US per kg).

Whole dried fish products were only favored by the older generations of Chinese and those at lower income levels who maintain their traditional diet.

Dried Fish

The term ‘dried fish’ is used in this study to refer to dried products of teleost (bony) fishes other than Syngnathids. Even by limiting the term in this way there is a broad diversity of product forms (whole, skinless headed and gutted, fillets, maws (literally fish stomachs but used in the trade to refer to fish swim bladders), skin, bones) and wide range of species represented in the trade.

A recent market reconnaissance study in Hong Kong (Conover and Dong 1998a) found that the only form of dried fish product, excluding shark fin, abalone and bêche-de-mer, still commonly sold was fish maws (Figure 2.5). A similar study of the Mainland China market found that whole dried fish products were only favored by the older generations of Chinese and those at lower income levels who maintain their traditional diet (Conover and Dong 1998b). While data collection under the present study encompassed both whole dried fish and fish maws, the trade in Hong Kong concentrates primarily on maws (Conover and Dong 1998a, and this study) as does the remainder of this background discussion.



Figure 2.5 Dried fish shop in Hong Kong displaying a variety of product forms.

In Mainland China and Hong Kong fish maws are most commonly referred to as ‘*yu du*’ in Mandarin, ‘*yu to*’ in Cantonese, English equivalent ‘fish stomach’. However, the terms ‘*yu biao*’ in Mandarin, ‘*yu piu*’ in Cantonese, English equivalent ‘fish air bladder’⁴ or ‘*yu jiao*’ in Mandarin, ‘*yu kau*’ in Cantonese, English equivalent ‘fish glue’⁵ may also be used. One of the oldest and most famous dishes utilizing fish maw is ‘The Eight Immortals Crossing the Sea Gamboling around the Arhat (Buddhist saint)’ dating from the Han dynasty (206 BC – 220 AD). According to legend eight noble characters were asked to swim across the East Sea in the company of an Arhat as a final test before gaining immortality. The eight heroes are symbolized in the dish by fish maw, shark’s fin, abalone, sea cucumber, shrimp, fishbone, asparagus and ham, and they are steamed and served in eight sections with chicken in the center, representing the

Arhat (Yu 2001). In most modern dishes, the fish maw is simply gently boiled with other ingredients, often chicken, to prepare a soup or broth. As for many other traditional foodstuffs, fish maws are believed to have medicinal properties and are commonly recommended, particularly in winter, as a tonic for those recovering from, or attempting to ward off, an illness (Lin 1939).

Foreign trade in fish maws to, or through, Hong Kong has been thriving for many decades. In the 1930s, source countries were recorded as the East Indies (Indonesia), Indo-China (Vietnam and Cambodia), Siam (Thailand), India and America (Lin 1939) (Figure 2.6). Even earlier records indicate that fishermen off Baja California were harpooning giant croaker or totoaba (*Totoaba macdonaldi*), harvesting the swim bladders for the China market, and discarding the carcasses, often as large as 100 kg, to rot in the sun (Kira 2000). The continuation of Hong Kong as a trading center for fish maws is likely due to two factors: the inability of local stocks to keep pace with demand, therefore requiring trade; and the value of maws used as a tonic as well as a food, which provides an incentive and sufficient income for middleman traders. (In contrast, the market for dried whole fish (mainly in Mainland China) is supplied largely by domestic and PRC-flagged far seas fisheries (Conover and Dong 1998b), thus bypassing trade in Hong Kong.)

Fish maws are produced from a variety of species, with species of croaker being the most common. In general, the larger the species and individual, the more valuable the fish maw will be. Maws from male fishes are more valuable than those from female fishes, and those harvested in winter are also preferred (Lin 1939). Early processing involves splitting open the maw, washing it and drying it in the sun. During final processing maws will be re-washed and bleached and the smaller maws will be fried for direct sale to restaurants. In food preparation, a general guide to required quantities is that 1 catty of maw is adequate for 30 servings of most dishes that require it. Prices for individual fish maws in 1997 ranged from \$101 US for a small maw to \$127 US for a large maw (Conover and Dong 1998a). At least one particularly large specimen of a particularly valued species, the giant yellow croaker or Chinese bahaba (*Bahaba taipingensis*) is said to be kept in a personal safe by an elderly Hong Kong resident as a form of wealth storage akin to gold (Sadovy and Cheung, In press).

Given the difficulty of determining the species of fishes used to produce fish maws and whole dried fish (in part due to lack of taxon-specific documentation of international trade), it is not possible to provide a detailed discussion of the conservation status of all species used in the dried fish trade. However, at least two species have been granted some measure of protection, in part, due to trade pressure. These include the totoaba (*Totoaba macdonaldi*) which was listed under CITES Appendix I in 1977 and the giant yellow croaker or Chinese bahaba (*Bahaba taipingensis*) which has been listed as a 'State Protected Species' by the Peoples' Republic of China since 1988.



Figure 2.6 Dealers grading unsorted fish maws in Hong Kong.

-
- ¹ There are even earlier records (Tang Dynasty, 618-907 AD) of the use of shark products such as bile and skin in traditional Chinese medicine (Rose 1996).
- ² The catty (*'jin'* in Mandarin) is a unit of weight originating in Malaysia and originally equal to 604.79g. While this original equivalency is still used in some countries including Hong Kong and Malaysia, other countries have simplified the conversion to various degrees: 1 catty in Taiwan and Thailand equals 600g, while in Mainland China 1 catty equals 500g to facilitate conversion to kilograms (see www.unc.edu/~rowlett/units). All catty to metric conversions in this report use 1 catty = 604.79g.
- ³ Health benefits of *bêche-de-mer* are said to include lowered blood pressure and aphrodisiac properties (the latter reportedly arising from its 'distinctly phallic appearance') (<http://chinesefood.about.com/library/blchineseing6.htm>)
- ⁴ This term is said to refer to the swim bladder of eel-like fishes only (see Section 5).
- ⁵ This term is also translated as 'fish isinglass', 'isinglass' being a transparent form of gelatin found in the air bladders of certain fish, such as sturgeon, which is used to make glue and other jellies.

Section 3:

ANALYSIS OF HONG KONG IMPORT/ EXPORT AND RE-EXPORT STATISTICS

Introduction

As an entrepôt for many types of goods, trade is an essential component of Hong Kong's economy, and its importance is reflected in the attention devoted to the compilation and maintenance of its trade statistics. The Hong Kong SAR Government's Census and Statistics Department is the repository of all customs data. Import, export and re-export data in many different tabular formats can be accessed free of charge in hard copy or on microfiche. Data are summarized by month and by year to indicate quantity, value, country of origin, country of consignment, and mode of transport. Importer/exporter and consignee for each declaration are recorded, but public disclosure of these data is prohibited.

Hong Kong is a duty free port and thus, in theory, there should be little incentive to underreport quantities or values of imports. However, many imports are destined for re-export to Mainland China which does impose trade tariffs on a wide variety of goods. Given that re-export may be immediate, there may be some underreporting in Hong Kong customs documentation in order to maintain consistency between import and re-export records and minimize re-export duties. The Hong Kong SAR Government's Customs and Excise Department (CED) does not disclose audit or inspection rates or corrections for shipments of any seafood products. The most relevant available data on the incidence of smuggling are the CED published statistics on smuggling of meat (likely to be mainly pork) across the main border crossing at Lo Wu (CED Information Officer Ms Chow, pers. comm., 2001 and CED website, <http://www.info.gov.hk/customs/statis>). Although the Lo Wu crossing is known

Hong Kong's customs statistics represent one of the most accurate and detailed data sources for quantifying trends in dried seafood trade.

to be a route for smuggling of shark fins, it is difficult to identify any relationship between the two products and thus further comparisons and investigations of smuggled quantities were not attempted.

Despite these shortcomings, Hong Kong's customs statistics represent one of the most accurate and detailed data sources for quantifying trends in dried seafood trade. The following sections describe and analyze these data for the products of interest.

Commodity Codes

In 1998 Hong Kong adopted the Harmonized Commodity Description and Coding System of the World Customs Organization, and also periodically revises or adds commodity codes to their system. As a result, imports and exports of the products considered under this study, during the timeframe 1996-2000, may be classified under a number of different commodity codes. The relevant commodity codes for the products investigated under this study are as follows:

Shark Fins (1996-1997)

0305-5920	Sharks' fins, dried whether or not salted but not smoked
0305-6920	Sharks' fins, salted or in brine but not dried or smoked

Shark Fins (1998-2000)

0305-5950	Sharks' fins with or without skin, <u>with cartilage, dried</u> whether or not salted but not smoked
0305-5960	Sharks' fins with or without skin, <u>without cartilage, dried</u> whether or not salted but not smoked
0305-6930	Sharks' fins with or without skin <u>with cartilage salted or in brine</u> but not dried or smoked
0305-6940	Sharks' fins with or without skin <u>without cartilage salted or in brine</u> but not dried or smoked

One of the key issues in analysis of shark fin customs data reported prior to 1998 is that in the older datasets there is no means of determining whether imported shark fins are raw (with cartilage) or processed (without cartilage). This is particularly important because fins are typically imported in raw form to Hong Kong, shipped across the border (re-exported) to Mainland China for processing, and then re-imported to Hong Kong for wholesale or retail sale. Since imports and re-imports are not distinguished, if raw and processed fins are not classified under separate codes, a large number of imported fins may be double counted (counted as imported in raw form and then again when imported in processed form). Therefore, although pre-1998 data can be adjusted to minimize double counting, post-1998 data provide a more accurate estimation of true import quantities of raw fins.

Abalone (1996-2000)

0307-9920	Abalone, dried, salted or in brine
-----------	------------------------------------

The commodity code for abalone has remained consistent throughout the period of interest (prior to 1992 the code was 0307-9930.9). However, the code

does not allow for dried abalone to be distinguished from those which are salted or in brine, and is ambiguous with regard to canned abalone which conceivably could be categorized under this code or under 1605-9010 ‘abalone, prepared or preserved’.

Bêche-de-Mer (1996-2000)

0307-9930 Bêche-de-mer, dried, salted or in brine

A similar situation exists for bêche-de-mer in that the code has remained consistent but the dried form of the product cannot be clearly distinguished from other forms. Other codes for bêche-de-mer not considered under this study include 0307-9940, ‘bêche-de-mer and other aquatic invertebrates, frozen’ and 1605-9090 ‘bêche-de-mer and other crustaceans, mollusks and aquatic invertebrates, prepared or preserved’. (Prior to 1992 the only code available for bêche-de-mer was 0307-9940.) The existence of these other codes for bêche-de-mer is less of an issue than for abalone, since most bêche-de-mer are imported in dried form.

Dried Fish (1996-2000)

0305-5990 Fish, dried

This highly generalized commodity code has been used in Hong Kong customs documentation for several years, although prior to 1992 separate codes were available for freshwater dried fish (0305-5910), dried eels (0305-5920) and other dried fish (0305-5990). As discussed in Section 2, dried fish may take a variety of forms but based on observations in the Hong Kong market the most common forms would be, in decreasing order by weight, fish maws, dried whole fish, and dried fillets.

Analysis of Trends in Hong Kong’s Dried Shark Fin Trade

The introduction to the shark fin commodity codes in the previous section has discussed why an analysis of recent shark fin import and export data will be more accurate than analyses based on pre-1998 data. Since the change in commodity codes was initiated in the midst of the time series being examined in this study, it was decided to utilize a longer time series and data from Parry-Jones 1996 were used to extend the time series backward to 1984 (Appendix A at www.scw.org/science/workingpapers). The figures for imports reflect the reported imports into Hong Kong less the dried fins imported from Mainland China through 1997 (which were believed to be processed fins); from 1998 onward imports reflect the sum of the reported ‘raw’ fin imports from all countries.

In addition to the analytical complexities introduced by the change in commodity codes, there are remaining difficulties associated with normalizing ‘dried’ versus ‘salted or in brine’ shark fins. Discussions with traders have indicated that raw fins are only imported in dried or frozen form, and thus it is expected that fins recorded under 0305-6930 (and perhaps 0305-6940) are in frozen form. Therefore, when comparing these two types of fins, frozen weights must be normalized to dried weights. Anecdotal information from Hong Kong shark fin traders (Vannuccini, 1999; Clarke, pers. obs., 2000) suggests that the

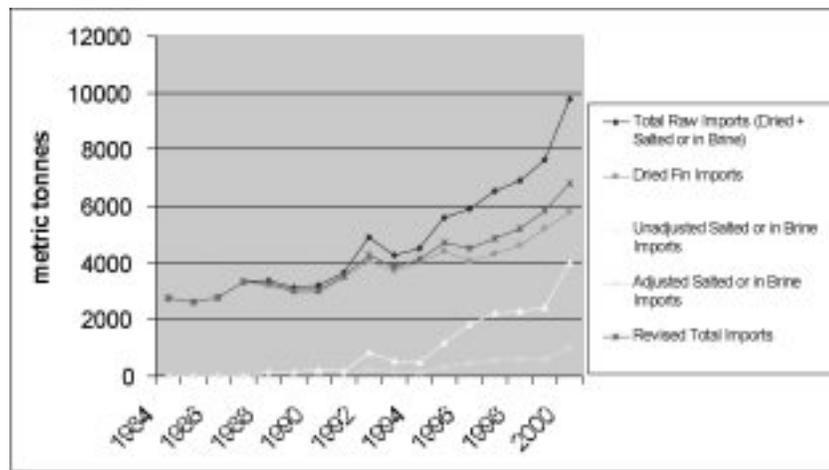
weight of frozen fins may decrease by 70-79% when dried, thus a factor of 1 kg salted or in brine (ie frozen) = 0.25 kg dried fins has been used to normalize data in this study.

Imported Quantities and Values

Shark fin imports to Hong Kong from 1984 through 2000 are shown in Figure 3.1. All pre-1998 data in the figure have been corrected for double counting of re-imported processed fins from the Mainland per the method in Parry-Jones 1996¹. Further adjustments have been made to normalize the data for frozen (salted or in brine) fins to produce a time series for adjusted salted or in brine (ie 0.25 x reported salted or in brine), and the resulting revised total (dried + adjusted salted or in brine). The adjusted data show that the total import quantity of shark fins has risen steadily over time but has recently begun to increase at a faster rate (e.g., 1999-2000).

Shark fin imports are increasing annually at an exponential rate of growth of 5.3%.

Figure 3.1 Shark Fin Imports to Hong Kong 1984–2000



This time series does not provide any evidence for a scarcity in supply of shark fins, although it is possible increased fishing effort may be compensating for dwindling shark populations, or that certain common and prolific species (eg blue shark, *Prionace glauca*) are being substituted for other overfished shark species. Regression analysis for the revised figures indicates that shark fin imports are increasing annually at an exponential rate of growth of 5.3%². The relatively slow growth in imports in 1996-1998 may be, in part, a reflection of the region-wide economic downturn of late 1997-early 1999 given that shark fin is a luxury product for which demand would fall when the economy is performing poorly (see Section 6).

Customs datasets typically report quantities alongside their declared values. These data on value, while likely to be biased to an unknown degree, can provide an indication of the change in unit value of the commodity over time. In the case of shark fins, data were evaluated for 1998-2000, which does not provide a lengthy timeseries but avoids problems associated with comparing unlike quantities. Average declared values of all four types of fins (ie dried raw, dried processed, salted raw, salted processed) increased by a substantial amount between 1999 and 2000 (Table 3.1). The reason for this increase is not known. It is, however, worthwhile considering that the declared value of

‘salted’ products varies between 21 and 43% of similar dried products, thus lending more evidence to the conversion factor of 1:0.25 for salted to dried fin weights.

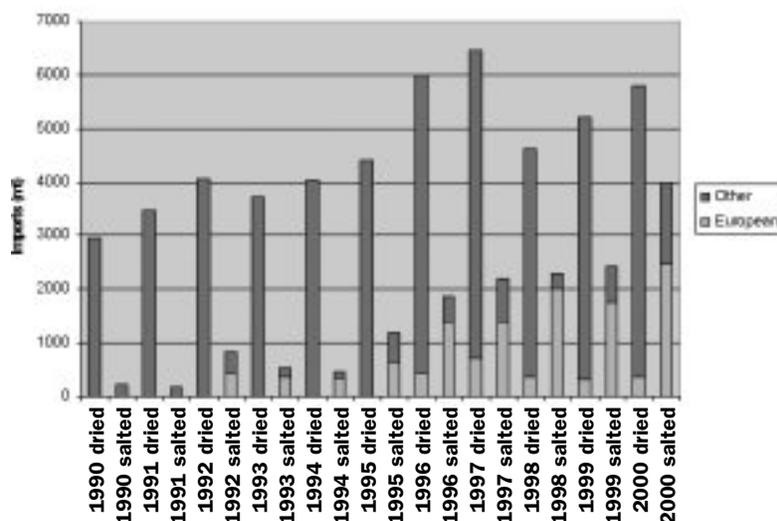
Table 3.1. Average Declared Values per kg in Hong Kong Dollars (US Dollars) for Various Types of Shark Fin Products Imported to Hong Kong, 1998-2000³

Product Type	1998	1999	2000
Dried Raw	273.69 (35.18)	271.13 (34.85)	358.89 (46.13)
Dried Processed	237.26 (30.50)	233.66 (30.03)	309.67 (39.80)
Salted Raw	58.67 (7.54)	73.53 (9.45)	128.84 (16.56)
Salted Processed	88.12 (11.33)	67.73 (8.70)	134.64 (17.30)

Trends in Sources and Supply Peaks

In addition to the overall trends in import quantities and declared values, noteworthy trends in product form and suppliers were also identified. The discrepancies between the adjusted and unadjusted totals shown in Figure 3.1 have increased with time as a result of the growing proportion of shark fin imports in frozen (‘salted or in brine’) form. This trend toward greater imports of frozen fins is being led by increased imports from European Union countries (Figure 3.2). Examining the quantities of imported shark fins over the last decade clearly illustrates that imports of frozen (salted) shark fins have increased rapidly and that European exporters are responsible for the majority of these imports.

Figure 3.2 European Contribution to Hong Kong Shark Fin Imports 1990–2000



As a result, overall European participation in supplying the shark fin market, measured by imports to Hong Kong, has increased from negligible levels in the early 1990s to 27% by unadjusted weight (13% adjusted weight), almost all of which is exported by Spain. Further exploration and discussion of this trend is presented in Clarke and Mosqueira (2002).

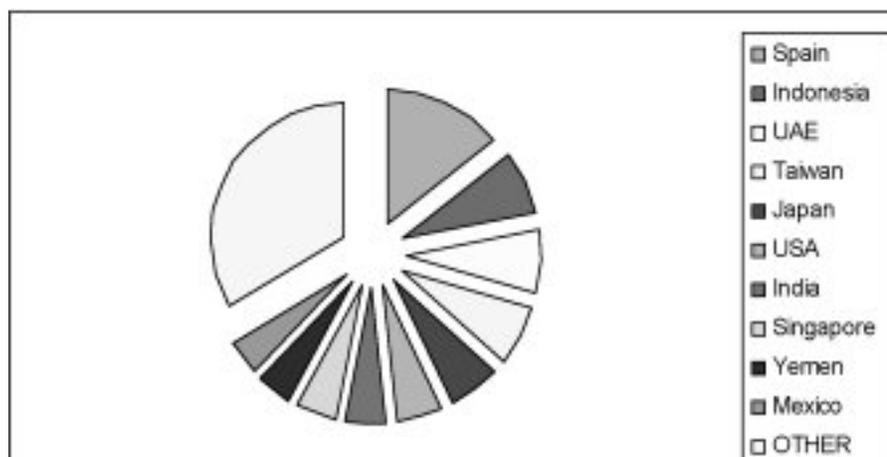
During the period 1996-2000, a total of 110 countries or territories exported shark fins to Hong Kong but by the end of this period this number had narrowed to 85 in 1999 and 86 in 2000. The major suppliers (by adjusted weight)

This trend toward greater imports of frozen fins is being led by increased imports from European Union countries.

A total of 86 countries exported shark fin to Hong Kong in 2000.

are remarkably consistent over the last three years (1998-2000) (Figure 3.3): the ten largest exporters of shark fins to Hong Kong in 2000 were the same 10 countries that were the largest exporters over the aggregate period 1998-2000. Spain, Indonesia, the United Arab Emirates (UAE) and Taiwan are the top four exporters in both calculations, but it appears that Japan's share has decreased (from 425 to 254 mt) and Yemen's share has increased (from 190 to 350 mt) between 1998 and 2000. Of these top exporters, it is believed that all are domestic producers of shark fins except for the United Arab Emirates and Singapore, which likely serve as transshipment points for shark fins from Africa and India/Sri Lanka, respectively (see below). In addition to the 10 exporting countries shown in Figure 3.3, Brazil, Oman, South Africa, Ecuador, Senegal, Panama, Costa Rica, Peru and Canada also exported more than 100 mt of raw shark fin to Hong Kong in 2000 (Appendix B at www.wcs.org/science/work-papers).

Figure 3.3 Adjusted Contribution to Hong Kong Shark Fin Imports 1998-2000



Shark fin importers in Hong Kong claim that business peaks annually just prior to the Chinese Lunar New Year (a 3 day holiday occurring in late January to mid February). Other sources state that shark fin retail business cycles in sequence with holidays and auspicious months for weddings, such that demand is highest in February, April, August and October and lowest in March, May, July and September (Chan 1997). Monthly data for 1998-2000 were obtained and plotted (1996-1997 data excluded for consistency) to examine whether any apparent seasonal patterns emerged. The most apparent trend was expected to be a surge in raw imports in November-December, accompanied by a rise in processed imports in January. Examination of these points on the plots did not support this trend since higher raw imports are recorded during various other months in each year, and processed imports appear reasonably stable throughout the period. It is possible that stockpiling of raw or processed fins in warehouses, processing factories and/or retail shops obscures seasonal patterns that might otherwise be visible in import statistics, but this hypothesis cannot be verified due to lack of available information at this time.

Export Data

To assess the role of Hong Kong in distributing shark fin for processing and consumption, export statistics were also examined. Since Hong Kong does not domestically produce shark fins, the only relevant statistics are re-export statistics (i.e., export statistics record nil amounts), and re-export statistics by country of consignment provide the destinations for exported sharks fins. For consistency, data from 1998-2000 were assessed. In each year 90-95% of all re-exported dried raw fins and 97-98% of all re-exported 'salted or in brine' raw fins were shipped to Mainland China. This is expected given that China is known to process most of the raw fins transiting Hong Kong.

However, China it would not necessarily be expected to receive the largest share of processed fins re-exported from Hong Kong. Nevertheless, Mainland China did dominate re-exports for dried processed fins in 1999 and 2000 and for 'salted or in brine' processed fins in 1998. Other countries receiving more than 30 metric tonnes of processed fins from Hong Kong during this period included Canada (which received 145 mt of dried fins in 1998), Singapore, Japan, Taiwan, Macau and South Korea (which received the majority of 'salted or in brine' processed fins, nearly 50 mt, in both 1999 and 2000).

Summary

This discussion of shark fin imports to Hong Kong has identified an exponential growth in the imports of shark fins to Hong Kong. This trend is in spite of an observed increase in frozen fins which tends to over-inflate the estimates of imports. In parallel with increased imports of frozen fins, the participation of European countries in the trade through Hong Kong, namely Spain, has been a major development in recent years. No seasonal patterns were observed in either raw or processed imports when data were examined on a monthly basis. In addition to supplying local demand, Hong Kong serves as a distribution center for raw fins destined for processing in Mainland China, and for processed fins to other large local markets in Japan, Taiwan, South Korea and Canada. Through examining the pathways by which fins reach Hong Kong, further insight is gained into the locations and parties involved in shark fin production and trade.

Analysis of Trends in Hong Kong's Dried Abalone Trade

Hong Kong's imports of dried, salted or in brine abalone have hovered near 175 mt per annum throughout most of the 1990s. Imported quantities rose substantially in 2000 due to a disproportional increase in exports from Australia. In the first half of the decade, average declared value of abalone remained steady at approximately \$1,000 HK (\$128.53 US) per kg, but in the latter half of the decade average declared values fluctuated between \$1,219.20 and \$1,757.94 HK (\$156.71 to \$225.96 US) per kg⁴.

Over the past five years leading exporters to Hong Kong have included major abalone producing countries such as Japan, South Africa, Australia and Oman (the latter focusing on dried abalone), but also other trading centers such as the United Arab Emirates and Singapore. Of the remaining countries export-

No seasonal patterns were observed in either raw or processed shark fins when data were examined on a monthly basis.

Leading exporters to Hong Kong have included major abalone producing countries such as Japan, South Africa, Australia and Oman.

ing more than 10 mt of abalone to Hong Kong only the Philippines reports any wild or cultured abalone production during this period (i.e. 183-448 mt between 1996 and 1999 (FAO 2001b)). Therefore, the other exporters, Indonesia, Mozambique, Swaziland, China and Canada are either producing abalone but not reporting the production to FAO, or transshipping abalone produced in another country to Hong Kong. In the case of Mozambique and Swaziland, it is possible that dealers in Mozambique are either producing abalone or obtaining it from South Africa and then shipping it to Hong Kong through their sea port at Maputo or using the airport at Manzini in Swaziland. Exploring the origin of exported abalone would be particularly of interest for Indonesia which is the largest exporter of abalone to Hong Kong in recent years.

Hong Kong's redistribution of abalone through re-export has also remained relatively constant at approximately 50 mt per year during the 1990s. The exception to this trend is re-exports for 1992 when 111 mt were re-exported, the bulk of which (74 mt) was shipped to Japan. In contrast to the distribution of re-exported shark fins, re-exported abalone are primarily destined for the United States, and to a lesser extent to Canada, Singapore and China. The explanation for this pattern could be that Hong Kong serves as a preserved abalone distributor for overseas Chinese communities in western countries, but that Asian countries have their own direct suppliers and do not need to include Hong Kong dealers in their supply chain.

Analysis of Trends in Hong Kong's Dried Bêche-de-mer Trade

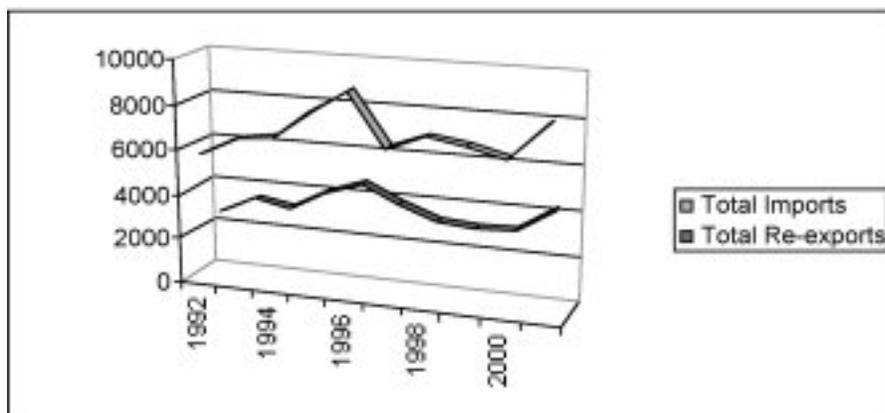
Long-term trends in Hong Kong's imports of bêche-de-mer indicate a relatively steady decline from 7,884 mt in 1991 to 2,922 mt in 1999. During this period, the quantity of re-exports was consistently on the order of 4,000 mt until 1998 when re-exports decreased to 3,174 mt and then further declined to 2,657 mt in 1999 as imports dropped. Re-exports continued to track imports even as the latter rose in 2000 to 4,759 mt. The difference between imports and re-exports is presumably domestic (ie Hong Kong) consumption. These figures thus reflect that Hong Kong's domestic demand for bêche-de-mer has fallen considerably in the last decade such that domestic consumption only accounts an average of 535 mt per year (based on 1998-2000 data). Declared values of bêche-de-mer imports increased from \$34.97 to \$90.92 HK (\$4.49 to \$11.69 US) per kg from 1991 to 2000⁵. Countries supplying more than 500 mt to Hong Kong during the period 1996-2000 include Indonesia, the Philippines, Papua New Guinea, Singapore, Fiji, Madagascar, the Solomon Islands and Tanzania. The major exporters of bêche-de-mer to Hong Kong are, with the exception of Singapore, producers rather than traders and the range of exporters to Hong Kong reflects the global bêche-de-mer producing countries (FAO 2001b). The share of each supplier of bêche-de-mer to Hong Kong has been relatively stable during this period with no major fluctuations in quantities imported. While Indonesia and the Philippines were overall the largest suppliers in both 1999 and 2000, the upturn in Hong Kong imports in 2000 was led by large annual increases in exports by these countries between 1999 and 2000. The United States also substantially increased bêche-de-mer production in 2000 although the quantity was small compared to other producers⁶.

Shipments to Mainland China dominated re-exports of bêche-de-mer from Hong Kong. In 1996-2000, 87% of re-exports were headed for the Mainland, with substantially smaller quantities consigned for Taiwan, Singapore, South Korea, the United States and Thailand. Therefore, despite the apparent decline in domestic consumption, Hong Kong's role as an entrepôt for sea cucumber remains intact.

Analysis of Trends in Hong Kong's Dried Fish Trade

Hong Kong's imports of dried fish over the past decade, which are expected to include whole dried fish, fillets, maws and possibly other products, show a pattern of increasing quantity until 1995, followed by a sharp drop in 1996 and a gradual recovery to levels nearly as high as 1995 in 2000 (Figure 3.4). The timing of this decline does not appear to be linked to the Asian financial crisis which occurred in 1997-1999, and other explanations are not apparent. During this period, re-exports closely tracked imports with the difference (i.e., domestic consumption) remaining between 3000 and 4000 mt. Average declared value of dried fish imports was very stable during this period: in 1991 the average declared value was \$51.88 HK (\$6.67 US) per metric tonne and in 2000 this had risen to only \$75.80 HK (\$9.74 US)⁷.

Figure 3.4 Total Imports and Re-exports of Dried Fish, Hong Kong 1991-2000 (mt)

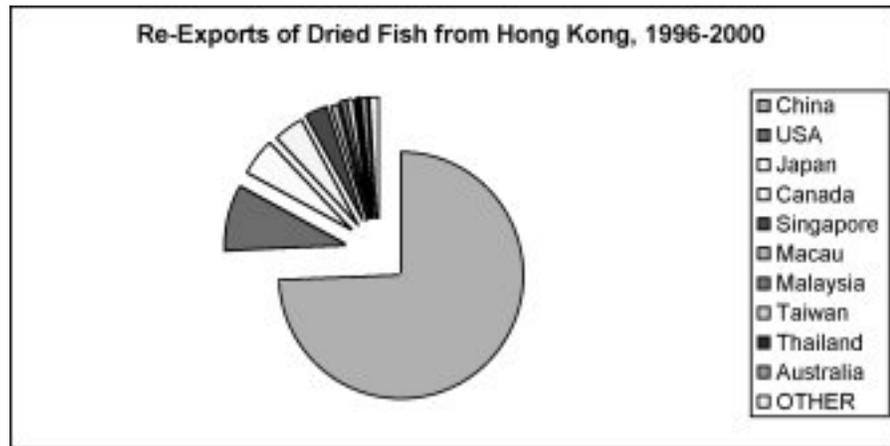


Countries exporting more than 2000 mt of dried fish to Hong Kong between 1996 and 2000 include Mainland China, Bangladesh, Vietnam, India, Indonesia, Thailand and Kenya (Figure 3.5). Similar to shark fins, the number of countries exporting dried fish to Hong Kong is large (73) and represents a broad geographical range. As the commodity code used by Hong Kong does not distinguish between types of dried fish it is difficult to relate Hong Kong's major suppliers to existing production data (e.g., the FAO dataset).

Despite being the largest exporter of dried fish to Hong Kong, Mainland China is also the country receiving the greatest quantity of re-exports of dried fish from Hong Kong. The explanation for this dichotomy may lie in the trade flows of different products classified under the dried fish commodity code. For example, Mainland China may be supplying local, small whole fish to Hong Kong and importing from Hong Kong large fish maws that cannot be sourced locally. Some traders also report that Shantou, in Guangdong Province, is a

Similar to shark fins, the number of countries exporting dried fish to Hong Kong is large (73) and represents a broad geographical range.

Figure 3.5 Re-exports of Dried Fish from Hong Kong, 1996–2000



Mainland China may be supplying local, small whole fish to Hong Kong and importing from Hong Kong large fish maws that cannot be sourced locally.

major center for the trade in fish maws and thus there may be some flow of fish maws southward to Hong Kong. Without further differentiation of products within the commodity code, it is very difficult to interpret which products are following which routes. The re-export of dried fish products to the United States, Japan, Canada and Singapore, though in smaller amounts, indicates Hong Kong's continued role as an entrepôt for these products, mostly probably as a supplier to overseas Chinese communities and/or Chinese restaurants in these countries.

¹ From 1998 onward (in theory) processed fins are assigned to a separate commodity code.

² Calculated using an exponential regression algorithm where $y = a * \exp(b^x)$, $a = 2406$, $b = 0.05268$ and $x = (\text{year} - 1983)$. The F-test indicates the relationship is significant ($p < 0.001$). It is not standard practice to calculate an R^2 for a non-linear least squares regression (Zar 1999).

³ All Hong Kong dollar values converted to US dollar equivalents using August 2001 conversion rate, ie 1 USD = 7.78 HKD.

⁴ See note 3 above.

⁵ See note 3 above.

⁶ The imports are recorded as being from the Mainland United States, rather than insular U.S. ports or flag areas. FAO statistics indicate that bêche-de-mer production in the U.S. is concentrated in the Northwest Atlantic.

⁷ See Note 3 above.

Section 4:

COMPARISON WITH CUSTOMS STATISTICS OF KEY TRADING PARTNERS

The customs statistics which form the basis of the discussion in the preceding section are often criticized as being an unreliable source of quantitative information on trade volumes since errors and biases in customs data may originate from intentional underreporting, inaccurate recordkeeping and/or use of non-official, and often illegal, trade channels (e.g., smuggling). While such discrepancies are difficult and potentially impossible to quantify and rectify, they should be acknowledged whenever customs data are used to describe quantities in trade.

The purpose of this chapter is to compare quantities in the Hong Kong customs records with those from key trading partners. This comparison is useful in determining whether there is any consistent bias in the Hong Kong database, and in assessing the magnitude of variation (i.e., error) in the statistics on the same shipments from export and import reports. The national customs statistics analyzed in this chapter were selected to include key trading partners in dried seafood with Hong Kong, and with consideration of the feasibility of access to data. The following sections present a comparison with Hong Kong customs statistics for each country in the analysis. Conclusions are then drawn regarding potential biases in various national customs statistics.

People's Republic of China (PRC)

Customs data for the People's Republic of China (PRC, or Mainland China) are published in a highly aggregated form in the China Customs Statistics Yearbook. These volumes, which have been published annually since 1990, are

There are large discrepancies between Hong Kong declared re-exports and PRC declared imports in the northbound trade.

sold to libraries and private parties for a substantial sum. If data other than those published in the yearbook are sought (ie monthly tallies, shipment routing or other declaration form data), a price for the information can be negotiated with China Goodwill Business Information Ltd which acts as the distributor for official PRC trade statistics in Hong Kong. However, such special data purchases are limited to records dating back to 1997. Earlier records cannot be accessed via this channel, but may be available through Mainland government offices (not pursued during this study).

The commodity codes used in Mainland China generally correspond well with those used in Hong Kong, although the PRC system does not separate domestic exports from re-exports. The relevant Mainland China codes for dried seafood are as follows:

- 0305-5920: Dried sharks fin, not smoked
- 0305-5990: Other dried fish
- 0307-9910: Abalone frozen, dried, salted or in brine
- 0307-9920: Sea cucumber, frozen, dried, salted or in brine

Hong Kong and the Mainland have enjoyed intimate trading relations for many years, and thus it is expected that a thriving two-way trade in each product would exist. This expectation is supported by a preliminary assessment of the data which shows that one or both parties reports imports and re-exports of each product in each year except in the case of abalone in 1999 when both the Mainland and Hong Kong agree there were no re-exports from Hong Kong to the PRC and no imports from the PRC to Hong Kong.

Extensive trade links between Hong Kong and Mainland China, and the similarity of commodity codes between the two jurisdictions, provide for an interesting comparative exercise. Despite having to overcome difficulties associated with the aggregation of dried, salted, processed and raw shark fin into a single category in the PRC database, the comparison of shark fin quantities provided the key to understanding the trade flows. It is believed that import tariffs in the PRC and the ability to avoid these tariffs by classifying imports as 'for processing' are the key factors suppressing PRC declared imports. Goods classified as 'for processing' appear to be removed from aggregated import tallies in the PRC and so create large discrepancies between Hong Kong declared re-exports and PRC declared imports in the northbound trade. This hypothesis was given support by a close match in quantities in the southbound trade (where tariffs do not apply) and by anecdotal information from Hong Kong shark fin traders. Similar patterns in the northbound trade of bêche-de-mer and dried fish, which may also qualify for tariff exemption if imported for processing, were observed. In most cases, Hong Kong customs statistics appeared to be more realistic approximations of the quantity traded than did PRC statistics. However, anecdotal evidence of product smuggling to the Mainland suggests that the Hong Kong figures are also likely to be underestimates of the true quantities.

Taiwan

Customs statistics for the Republic of China (Taiwan) were accessed free of charge from the Directorate General of Customs headquarters in Taipei. The

relevant commodity codes were as follows:

- 0304903000-8: Sharks' fin, edible, fresh, chilled or frozen
- 0305592000-8: Sharks' fin, dried
- 0305692000-6: Sharks' fin, salted or in brine
- 0305300090-7: Other fish fillets, dried, salted or in brine, but not smoked¹
- 0305491000-3: Fish maws, heads, tails, lips and skins edible, smoked
- 0305593000-6: Fish maws, heads, tails, lips and skins edible, dried
- 0307992200-6: Abalone (*Haliotidae*), dried other than abalones
(*Haliotis diversicolor*)²
- 0307992400-4: Sea cucumber, spiked, dried
- 0307992500-3: Sea cucumber, not spiked, dried
- 0307992610-0: Other sea cucumber, dried

As is evident from the list of codes and descriptions above, Taiwan has a very detailed classification system for seafood commodities. Taiwan's system expands on the Hong Kong system by providing a separate code for fish maws, three different codes for various dried sea cucumber products, and a particular code for dried abalone. However, while it distinguishes between frozen, salted/brine and dried shark fins, it does not provide for separation of raw and processed shark fins.

The Taiwan commodity codes listed above were examined to determine which were exported to, and imported from, Hong Kong during the 1996-2000. Other fish fillets were not exported to or imported from Hong Kong. Of the remaining commodities, shark fin, *bêche-de-mer* and dried abalone exports can be summed and compared with Hong Kong imports, but there is no practical means of normalizing between the Taiwan fish maw (etc.) exports and Hong Kong imports of dried fish as the latter presumably includes fish maw but also dried whole fish fillets (see Sections 2 and 3) and thus would not be expected to show a high concordance.

Although Taiwan's commodity code system is highly detailed, direct comparisons between Taiwan and Hong Kong customs statistics are complicated by the lack of clear relationships between commodity codes. Nevertheless, shark fin, abalone and *bêche-de-mer* imports and exports/re-exports were compared for 1996-2000 and some correspondence between outbound and inbound quantities was observed.

For shark fins, the declared quantities of dried fins exported from Taiwan and imported to Hong Kong (westbound route) matched closely (percentage difference of 14% or less) and in 3 of 5 cases the Taiwan declared quantity was higher. The correspondence between Hong Kong re-exports and Taiwan imports (eastbound route) was poorer (percentage difference of 8 to 48%) with Hong Kong quantities always higher. For *bêche-de-mer* and abalone, Hong Kong declared quantities (whether for import or re-export) were always greater than the comparable quantities in the Taiwan database. It is hypothesized that import duties on seafood, in this case shark fin, abalone, and *bêche-de-mer*, may encourage underreporting of imported quantities to Taiwan in the eastbound trade. In contrast, the westbound trade shows a closer concordance likely due to Hong Kong's status as a duty free port.

Import duties on seafood may encourage underreporting of imported quantities to Taiwan.

In 27 of 30 comparisons between Singapore and Hong Kong statistics for abalone, bêche-de-mer, and dried fish, Singapore's declared quantities were less than Hong Kong's.

Singapore

Trade statistics for Singapore are made available to the public for a nominal charge through the Singapore Trade Development Board (TDB). Quantities used in the following comparisons were obtained through manual compilation at the TDB Business Library in Singapore and via the electronic STATLINK service (www.tdb.gov.sg/e_services/statlink). As was the case for the Mainland China commodity codes, Singapore's codes closely follow Hong Kong's thus facilitating comparison between import and export records of traded quantities of dried seafood. Relevant codes include:

- 030559100: Sharks' fins dried whether or not salted excluding smoked
- 030559900: Other dried fish, whether or not salted excluding smoked (e.g., ikan belis and fish maws)
- 030799210: Bêche-de-mer dried, salted or in brine
- 160420100: Sharks' fins prepared ready for use
- 160590100: Abalone prepared or preserved

Given that Hong Kong and Singapore are the two largest entrepôts in Asia for dried seafood, it is not surprising that there is a two-way trade in each of the above commodities. As in the Hong Kong system, Singapore records domestic exports and re-exports separately. Quantities used in this analysis represent the sum of the two export categories, ie total exports.

Biases in import/export data between Hong Kong and Singapore were not apparent for shark fins but were observed for other dried seafood products. For shark fins, aggregation of raw and processed fin quantities was required to achieve an improved concordance between Hong Kong and Singapore statistics. In most cases the agreement between figures was close, and neither Hong Kong nor Singapore appeared more likely than the other to underreport quantities. There was also no apparent bias for Singapore to minimize declared quantities of imports. In contrast, in 27 of 30 comparisons between Singapore and Hong Kong statistics for abalone, bêche-de-mer, and dried fish, Singapore's declared quantities were less than Hong Kong's. The absolute differences, expressed as a percentage of the Hong Kong quantity, were also larger for these three products, although this is potentially due to the smaller overall volumes being traded.

Japan

Statistics on Japan's imports and exports of dried seafood products were compiled at the Japan External Trade Organization (JETRO) library in Hong Kong. Japan's commodity code system is less detailed than Hong Kong's system in terms of dried seafood, although Japan provides a large number of codes for other types of seafoods not covered by this study. The relevant codes for dried seafood vary by import and export and are as follows:

Export

- 0305.59-920: Fins of dogfish and other sharks, dried but not smoked
- 0305.30-000: Fish fillets, dried salted or in brine, but not smoked
- 0305.59-100: Fish, boiled and dried but not smoked

- 0305.59-990: Other dried fish but not smoked
- 0307.99-900: Other mollusks and aquatic invertebrates; flours, meals and pellets of aquatic invertebrates and crustaceans, fit for human consumption, dried, salted or in brine

Import

- 0305.30-090: Fillets of other fish dried, smoked, salted or in brine
- 0305.59-090: Other fish, dried, excluding smoked
- 0307.99-239: Sea cucumbers, including flours, meals and pellets of sea cucumbers, dried salted or in brine
- 0307.99-249: Other mollusks and aquatic invertebrates; flours, meals and pellets of other aquatic invertebrates, fit for human consumption, dried, salted or in brine

For comparison between Japan’s exports and Hong Kong’s imports, the only product for which sufficient data exist in both customs databases is shark fin. Abalone and bêche-de-mer are presumably included under code 0307.99-900 but cannot be sufficiently distinguished. Similarly, it is not possible to ascertain from the data which of Japan’s codes would be used to declare exports of fish maws (if any), and the separation of other dried fish products is difficult to relate to Hong Kong’s dried fish codes.

Japan’s imports are also difficult to reconcile with Hong Kong’s re-exports, with the important exception of a specific code for sea cucumber (bêche-de-mer). According to the customs records reviewed, Japan does not import shark fins from any country (or at least does not have a separate commodity code for such imports). Based on this assessment, the comparisons between Japan and Hong Kong customs data are limited to southbound trade in shark fins and northbound trade in bêche-de-mer. In both cases, and in every year examined (1996-2000), Japan’s reported quantities were lower than Hong Kong’s, and for shark fin, at times by margins of up to 89 mt. Although Japan’s exports of shark fin to Hong Kong are on the order of, but slightly lower than, Taiwan’s (except for 2000), the discrepancies between Japan-Hong Kong records are larger than those observed in Taiwan-Hong Kong records. The trade in bêche-de-mer is reported by both Japan and Hong Kong to be minor and thus observed discrepancies are difficult to interpret.

Comparative Conclusions

Hong Kong’s status as a duty free port is thought to render it a relatively robust source of data on the quantity of commodities traded. This hypothesis was tested for dried seafood products by comparing pairs of inbound and outbound quantities recorded crossing the border of Hong Kong en route to the PRC, Taiwan, Singapore and Japan (Figure 4.1).

For shark fins, the best concordance was observed with Singapore when all fin types were aggregated. Singapore’s trade flow was approximately double that of Taiwan and Japan, yet its discrepancy with Hong Kong figures by percentage difference (29%) and absolute value (89 mt) was nearly equal to those of Taiwan and Japan. Also, Singapore was the only jurisdiction to report higher quantities than Hong Kong in the majority of cases examined. The key drawback to the

In every year examined (1996-2000), Japan’s reported quantities of shark fin were lower than Hong Kong’s.

Shark fin: The largest discrepancies were evident in the northbound trade with the PRC where Hong Kong's reported quantities exceeded those of the PRC by up to 139 times.

Singapore system was considered to be the very poor concordance in quantities of processed fins when compared with Hong Kong (up to 268 mt per annum difference probably as a result of product misclassification), thus leading to shark fin commodity aggregation in order to obtain the improved figures cited above.

As mentioned, Taiwan and Japan show a poorer correspondence with Hong Kong figures although they maintain only approximately half the trade volume of Singapore (Japan only in the outbound (southbound) direction). Maximum percent discrepancies of 48% and 24% were observed for Taiwan and Japan, respectively, and absolute differences of 58 mt and 89 mt, respectively. Furthermore, in 5 of 5 cases examined for Japan and 9 of 10 cases examined for Taiwan, Hong Kong's reported quantities were higher. Neither Taiwan and Japan attempt to segregate raw and processed fins and thus aggregation of Hong Kong commodity types was required before comparison.

The largest discrepancies were evident in the northbound trade with the PRC where Hong Kong's reported quantities exceeded those of the PRC by up to 139 times. This is postulated to be due to a lack of customs reporting on non-dutiable goods in the PRC, since the opposite (southbound) trade's concordance is strong (maximum 22% difference and 535 mt absolute difference). In all 10 cases examined, Hong Kong reports higher quantities than the PRC.

Comparisons of abalone data were examined for the PRC, Taiwan, and Singapore. In the case of Mainland China, small discrepancies on the order of several thousand mt or less were observed. In 8 of 10 cases examined, the importing country reported lower quantities, sometimes by a considerable amount, even when the importing country was Hong Kong which is a duty free port. The abalone trade with Taiwan is effectively eastbound only and the reported quantities by both jurisdictions were small resulting in minor (<2 mt) absolute discrepancies. Hong Kong's quantities were always higher than Taiwan's. The abalone trade with Singapore is also only small-scale, but in contrast two-way, and in all 10 cases examined Hong Kong's reported quantities were larger.

Bêche-de-mer statistics were compared between Hong Kong and the PRC, Taiwan and Singapore. In 90% of the comparisons with the PRC data, Hong Kong's declared quantities were higher, and discrepancies were enormous in the northbound route. This may be due to the same exemption from duty, and possibly customs reporting, as applies to shark fins. In the Taiwan trade, all 10 comparisons showed Hong Kong reporting higher quantities. This trade is relatively large only in the eastbound direction and shows high percentage-based, and sometimes absolute, discrepancies. Singapore's two-way trade in bêche-de-mer with Hong Kong is voluminous in both directions but maintains percentage discrepancies within 68% and absolute discrepancies within 113 mt. In 8 of 10 cases, Hong Kong reports higher quantities. Hong Kong's trade with Japan in bêche-de-mer is only in the northbound direction and is negligible in magnitude compared to other regional routes. However, once again Hong Kong's reported quantities are always higher.

Dried fish statistics could only be compared for the PRC and Singapore. Since a wide variety of products may be classified under a single code, discrepancies in this category are less meaningful to interpret. For the PRC, the observed pat-

tern was that the exporting country always reported a higher quantity than the importing country, even when the importer was Hong Kong. In Singapore trade, Hong Kong's declared quantities were higher in 9 of 10 cases.

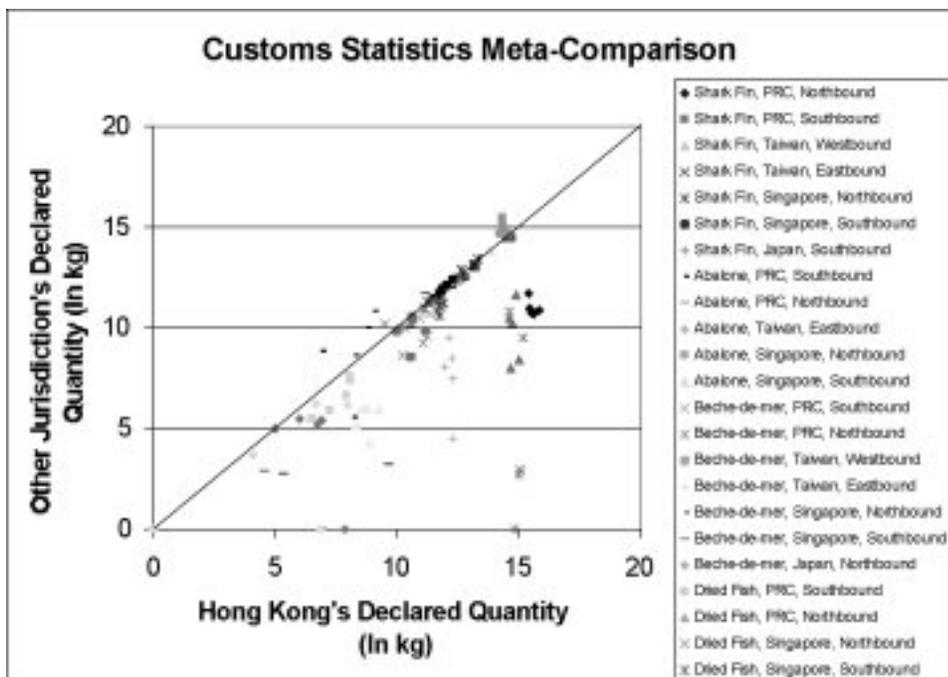


Figure 4.1 shows a composite scatter plot for all of the pairwise comparisons discussed in this Section 4. The dependent (X) axis shows the Hong Kong reported quantity in each pair, and the independent (Y) axis shows the PRC, Taiwan, Singapore or Japan reported quantity. All values have been transformed using the natural logarithm (ln) to allow for plotting on the same scale. If the points in each pair were identical, the plot would consist of a series of points along a straight 'reference' line running through the origin and points (1,1), (2,2) etc. It should be noted that the ln transformation radically reduces the apparent deviation from this line such that even minor offsets from the upper portion of the line may represent discrepancies of thousands of mt when backtransformed.

Use of National Customs Statistics in Estimation of Dried Seafood Trade Volumes

Throughout this analysis, the tacit assumption has been that the higher the reported quantity in a clearly demarcated trade commodity, the more accurately that quantity will reflect the true volume of trade. In this respect, Hong Kong, as a duty free port, would appear to have an advantage over other locations in compiling trade statistics as there would be little incentive to minimize declared quantities to reduce imports (although there may be such incentives for received goods immediately transhipped to the PRC). The following discussion examines this assumption in light of the data analyzed in this study, and the degree to which observed discrepancies allow for quantification of error in trade estimates based on customs data.

There are only two datasets which lie primarily above the reference line (Figure 4.1). These are the southbound trades with the PRC for dried fish and abalone. Discrepancies in these trades' customs reports might be expected given the range of products classified under the commodity code for dried fish and potential confusion between dried and canned abalone (possibly 'in brine').

A far greater number of points lie below the reference line, indicating that Hong Kong's reported quantity was higher.

Greater displacement from the reference line for the PRC southbound abalone figures indicates higher percentage differences between X and Y in the pair. However, the position of the southbound PRC dried fish points in the upper right corner of the chart indicates that while their percent differences between X and Y are lower than for abalone, their absolute differences are much higher.

A far greater number of points lie below the reference line, indicating that Hong Kong's reported quantity was higher. Particularly egregious discrepancies are noted for PRC northbound trade in shark fin, dried fish and bêche-de-mer potentially due to lack of customs reporting for goods destined for processing in the PRC and thus non-dutiable. Other extreme, but isolated, points occur when Hong Kong's declared quantities are paired with zero or near zero values from the other jurisdiction. This occurs for abalone traded to Taiwan and to the PRC, and bêche-de-mer to the PRC and to Japan.

While the results shown in Figure 4.1 encourage the use of Hong Kong trade data over other sources of customs data, these results do not directly address the degree to which the Hong Kong statistics are an accurate reflection of the trade. Since it is unlikely that customs declarations regarding quantity would be overestimated except by mistake, it is assumed that reported quantities are underestimates of the actual traded quantities. (Traders acknowledge that they underreport quantities to Hong Kong and Mainland China customs authorities, though they claim to underreport shipment values to an even greater extent; this issue is discussed further in Section 6). However, even though it is recognized that the Hong Kong figures probably underestimate actual quantities, there is no quantitative basis for upwardly adjusting the figures.

With regard to potential underestimation in other countries, the analysis in this chapter has shown that four other jurisdictions with voluminous trade in dried seafood report declared quantities which are biased toward underreporting (under the assumption that higher quantities are more accurate). Since it is possible that discrepancies in the other commodities may be due to improper product form differentiation, average percentage discrepancies between Hong Kong figures and the other jurisdictions were calculated only for shark fin and bêche-de-mer where this issue was less pronounced³. For shark fin, the declared quantities from the other jurisdictions were, on average, 24% lower than the Hong Kong statistics. For bêche-de-mer, the average bias toward underreporting was even greater at 49%. While these figures are averages drawn from a limited number of data points and cannot be used directly in estimation, they are important indications of the potential for underrepresentation of trade quantities in customs data. This issue becomes particularly important when Hong Kong's traded quantities are contrasted with global and regional trade figures as discussed in the following chapter.

¹ Other codes relevant to dried fish but not included in this study are 0305300010-4 Sardines fillets, dried, salted or in brine but not smoked; 0305300021-2 Mackerels fillets, dried but not smoked; 0305300072-9 Salmoned (sic) and trouts fillets, salted or in brine but not smoked; 0305410000-3 Pacific and Atlantic salmon, smoked; 0305499040-8 Trout, smoked; 0305499090-7 Other fish, smoked; 0305510000-0, Cod, dried; 0305594011-1 Silver anchovy (*Spratelloides gracilis*) small fish, dried;

0305594090-5 Other small fish, dried; 0305599090-4 Other fried (sic) fish, whether or not salted but not smoked; 0305691000-8 Fish, salmon, salted or in brine; 0305693000-4 Carangid fishes, salted or in brine; 0305699090-2 Fish NES (not elsewhere specified) salted or in brine.

² This is the only code for dried abalone in Taiwan's commodity code system.

³ Calculated for each pair of points as difference (i.e., Hong Kong minus other) divided by Hong Kong figure, and then averaged over all trade directions and years for each product.

Section 5:

COMPARISON WITH GLOBAL AND REGIONAL DRIED SEAFOOD DATABASES

National customs statistics provide detailed data on imports and exports of dried seafood commodities based on individual custom declaration forms. In contrast, global and regional databases while based on these national data, aggregate the data at a higher level which provides a broader perspective on the trade but may over-simplify product categories and mask small-scale patterns. A comparison of both national and regional/global statistics aims to link the two types of databases, allowing national features to be tracked upward to regional or global levels, and international trends to be traced to individual country's contributions.

In the context of this study, the main purpose of comparing Hong Kong's trade statistics to global and regional statistics is to estimate the proportion of the trade controlled by Hong Kong. Assuming Hong Kong's trade is representative, the knowledge of quantities and sources generated through this study can be extrapolated to depict a larger portion of the trade (either regional or global), and thus broaden the understanding of implications of the demand for dried seafood on fisheries resources. In the following sections, Hong Kong's trade is compared to Food and Agriculture Organization (FAO) and Southeast Asian Fisheries Development Center (SEAFDEC) statistics on production, imports and export.

Comparison with the Food and Agriculture Organization (FAO) Databases

The FAO presents fishery statistics in various forms within their FISHSTAT system. The data in the underlying datasets are based on information reported to

For some products, differences between the FAO commodity groupings, and those used in the Hong Kong customs database, complicate a direct comparison.

FAO by the participating countries, or in cases where the country does not report, the data are estimated by FAO (and indicated in the dataset as an estimated value). Datasets which have a large proportion of estimated data are expected to be less accurate than those which do not. However, the accuracy of all datasets is dependent on the accuracy of the statistical recordkeeping in the participating countries.

For this assessment, the FAO Commodities Trade and Production dataset (FAO 2001c) was used to compare total production, imports, and exports/re-exports for Hong Kong with the estimated world total according to FAO. Production figures in this dataset include catches and landings, including aquaculture, either within the territory of the reporting jurisdiction or landed by vessels of the reporting jurisdiction in a foreign port. Production data excludes catches taken by small-scale fishermen for home consumption and sport fishing. For some products, differences between the FAO commodity groupings, and those used in the Hong Kong customs database, complicate a direct comparison. The following sections present only those comparisons that appear warranted, and highlight any discrepancies in the compared codes. It is further acknowledged that differences in the compared databases may arise due to product stockpiling spanning a year or more, or in the case of production versus import/export, due to domestic consumption, and these issues are accounted for in the following discussion.

Shark Fin

The quantities of shark fin produced, exported/re-exported and imported worldwide for 1996-1999 are shown in Table 5.1.

Table 5.1. Total Production, Export/Re-export, Import Quantities and Hong Kong Share (in metric tonnes) for 'Shark Fin Dried Salted etc.' and 'Shark Fin Dried Unsalted etc.' for 1996-1999. All data from FAO 2001c.

Trade Flow Category	1996	1997	1998	1999
Total Production Quantity	4,057	6,167	3,775	3,933
Total Export/Re-export Quantity	6,396	6,306	3,760	4,151
Total Import Quantity	7,010	7,048	4,630	4,861
Highest reported Hong Kong Share in any category (value and percentage)	1,794 28.0% (export+ re-export)	2,211 31.4% (import)	13 0.3% (imports)	14 0.3% (imports)

On initial examination, it may be surprising to note that total production figures are usually lower than either imports or exports. The reason for the higher trade figures relative to production may lie in the transshipment process where the same quantity of product would be counted once in the transshipment country and once again when arriving at its destination. Stockpiling of produced goods prior to trade may also be a factor.

A critical feature of the dataset is that in 1996 and 1997 quantities attributed to Hong Kong trade (either import or export/re-export) account for approximately 30% of the global trade, whereas in 1998 and 1999 this per-

centage drops to less than 1%. A potential explanation lies in the amendment of Hong Kong commodity codes in 1998 to separate raw from processed fins (Section 3). However, even if it is assumed that from 1998 onward Hong Kong reported only processed fins to FAO, the reported quantities are still two orders of magnitude less than the actual processed fin quantities in the Hong Kong customs statistics database.

When the FAO figures are compared to the Hong Kong customs statistics for 1996 and 1997 (when there is no distinction between raw and processed shark fins), the underreporting in the FAO figures is also evident. The FAO-reported 1,794 mt exports in 1996 and the 2,211 mt imports in 1997 for Hong Kong were considerably less than the comparable figures of 5,331 mt re-exported and 6,526 mt imported reported in the Hong Kong customs database. Further examination of the Hong Kong customs dataset revealed that FAO-reported quantities in 1996–1997 are based on only Hong Kong’s ‘salted’ shark fin trade (0305-6920) and exclude the larger quantities traded in the ‘dried’ shark fin category (0305-5920).

When these discrepancies were discussed with staff of the Hong Kong SAR Government Census and Statistics Department they indicated that statistics were provided to FAO in tabulated book form and that the error was likely to have been introduced when these statistics were translated into the FAO databases. The discrepancies in 1996-1997 are obviously due to exclusion of ‘dried’ shark fin quantities, but no explanation could be found for the underreporting of traded quantities in 1998-2000.

When the contribution of each country to the overall total for each trade flow category is examined in the FAO database, it is obvious that the total is highly dependent on the contribution of Mainland China. For each year and each trade flow category China’s quantities are the largest and range from 34% to 91% of the total. Furthermore, the quantities reported in the FAO dataset correspond exactly to those reported in the PRC national customs database for the same period (but see Section 4 for a discussion of why these quantities are likely to be underestimates). In comparison to these PRC quantities, the contributions from Hong Kong, Taiwan, Singapore and Japan are negligible. Given that the FAO-reported PRC quantities, though in agreement with official PRC figures, are underestimates of actual trade, and that the FAO reported Hong Kong quantities are much lower than figures in Hong Kong’s own database, we can conclude that the FAO dataset underestimates world trade in shark fins through deflated Hong Kong and PRC estimates at a minimum.

An estimate of the total world trade volume of shark fins which sums Hong Kong imports, PRC and Taiwan imports from countries besides Hong Kong (both expected to be major consumers), and Singapore imports minus quantities imported from and re-exported to Hong Kong (as Singapore is an entrepôt like Hong Kong) is presented in Table 5.2. This estimate is likely to be more accurate than those found in the FAO database, but it still underestimates shark fin consumption by excluding domestic consumption in countries which both produce and consume shark fin. A prime example of this situation is Taiwan which re-exports more shark fins to Hong Kong than it imports from all other countries, but for which there are no trade records available to use as an estimate of domestic shark fin consumption. The figures in Table 5.2 indicate that

The FAO dataset underestimates world trade in shark fins through deflated Hong Kong and PRC estimates at a minimum.

Despite a slowing of growth in 1998, the global trade in shark fins is increasing, particularly between 1999 and 2000, due to increasing imports into Hong Kong and the PRC.

despite a slowing of growth in 1998, the global trade in shark fins is increasing, particularly between 1999 and 2000, due to increasing imports into Hong Kong and the PRC. These calculations indicate that during this period Hong Kong's share of the shark fin trade ranges from 50 to 58% and appears to be increasing over time.

Table 5.2. Alternative estimate of traded quantity of unprocessed shark fins (mt). Data sources are the national customs databases of each country.

Source of Estimate	1996	1997	1998	1999	2000
Hong Kong Imports	4,513	4,868	5,195	5,824	6,788
PRC Imports	4,238	4,330	4,190	4,017	4,591
Taiwan imports	4	11	52	68	131
Singapore Imports	291	210	183	216	145
Total	9,046	9,419	9,620	10,125	11,655
Hong Kong Percentage of Total	50%	52%	54%	58%	58%

Abalone

Comparisons between Hong Kong customs statistics and FAO commodities trade require an assumption that Hong Kong's 'dried, salted or in brine but not fresh or frozen' would be classified within FAO's 'abalones, shucked or not, fresh or chilled' category. While this assumption does not seem altogether appropriate, the other available FAO codes are less appropriate: 'Abalone meat, frozen' and 'abalone shells' certainly do not apply, and 'abalones meat, canned' would presumably correspond with Hong Kong commodity code 1605-9010 which covers prepared (canned) abalone. This lack of a specific code in the FAO system for dried abalone undoubtedly causes confusion among reporting countries producing abalone in dried form and leads to distortions in comparisons between FAO reported world production and Hong Kong's abalone trade figures.

Nevertheless, for reference, FAO production and trade quantities for 'abalone, shucked or not, fresh or chilled' are given in Table 5.3. It is not clear why production figures are so much lower than figures for imports and exports/re-exports. The quantities given in Table 5.3 represent only a small fraction of the total abalone production and trade for all commodity codes (in 1999 3,915 mt produced, 5,669 mt imported and 5,176 mt exported). The largest quantities (approximately 70% of the total production and trade in each year) are reported under the canned commodity code.

Table 5.3. Total Production, Export/Re-export, Import and Hong Kong Share Quantities (in metric tonnes) for 'Abalone, shucked or not, fresh or chilled.' for 1996-1999. All data from FAO 2001c.

Trade Flow Category	1996	1997	1998	1999
Total Production Quantity	7	3	0.5	0
Total Export/Re-export Quantity	1,215	1,007	1,226	1,405
Total Import Quantity	870	823	1,268	1,395
Highest reported Hong Kong Share in any category (value/percentage)	260/30% (imports)	346/42% (imports)	832/66% (imports)	790/57% (imports)

In contrast to the patterns observed above in the shark fin analysis, the reported quantities of abalone (shucked or not, fresh or chilled) remain relatively stable while showing a slight trend of increase over the period of interest. In addition, it is Hong Kong, not Mainland China that has been the dominant importer of this form of abalone (Japan's imports exceeded Hong Kong's in 1996 but have declined since; Australia dominates exports). As a point of interest it is noted that Hong Kong's FAO-reported imports of 'abalone, shucked or not, fresh or chilled' amounted to between 24% and 70% of Australia's FAO-reported exports.

Examination of the FAO-reported quantities for Hong Kong imports indicates that they are higher than Hong Kong's own import records indicate, (ie values of 142-181 mt reported in Hong Kong customs database and values of 260-832 mt reported in the FAO database (1996-1999)). Subsequent checking of Hong Kong's import statistics for 'abalone, live, fresh or chilled' (0307-9110) reveals an exact match with the FAO figures in Table 5.2 and thus confirms that the FAO databases do not reflect Hong Kong's dried abalone trade.

Bêche-de-Mer

Hong Kong's bêche-de-mer commodity code 'dried, salted or in brine' is an exact match with FAO's commodity category 'sea cucumber dried, salted or in brine'. Although FAO also has categories for 'sea cucumber and other invertebrates (dried, salted or in brine, canned, etc), for reasons explained below only the category providing the exact match is employed in this assessment.

Hong Kong's position as a major entrepôt for bêche-de-mer is confirmed by the FAO datasets. Despite the fact that Hong Kong reports no bêche-de-mer production, its figures are the largest contributors to global import and export/re-export totals (Table 5.4). This finding is in contrast to the situation for abalone where Hong Kong only dominates the import category.

It is Hong Kong, not Mainland China that has been the dominant importer of the dried form of abalone.

Table 5.4. Total Production, Export/Re-export, Import and Hong Kong Share Quantities (in metric tonnes) for 'Sea cucumber, dried salted or in brine' for 1996-1999 from FAO Fishstat Plus database.

Trade Flow Category	1996	1997	1998	1999
Total Production Quantity	2,859	4,153	3,379	2,600
Total Import Quantity	5,969	5,274	4,631	3,616
Reported Hong Kong Imports (quantity and % of total)	5,020 84.1%	4,523 85.8%	3,975 80.8%	2,922 85.8%
Total Export/Re-export Quantity	7,230	7,174	4,699	4,888
Reported Hong Kong Exports/Re-exports (quantity and % of total)	3,976 55.0%	3,795 52.9%	3,174 67.5%	2,658 54.4%

Bêche-de-mer figures matched exactly, whereas substantial discrepancies were noted for shark fins and abalone.

It is surprising, given the discrepancies noted above for shark fins and abalone, that the reported Hong Kong imports, exports and re-exports are identical to the figures contained in the Hong Kong customs statistics databases. This clearly demonstrates that FAO is receiving updated and accurate information from Hong Kong in at least some cases, and points to coding complications to explain the discrepancies in the other products.

Dried Fish

As is the case with many of the comparisons drawn in this study, the generic nature of the Hong Kong commodity code for dried fish introduces difficulties. For this reason, most of the comparisons in this study have focused on fish maws, where possible, as this appears to be the most common and valuable dried fish product traded in Hong Kong. The most appropriate code in the FAO database appears to be 'fish heads, tails, maws etc. dried' but given that Iceland is the largest producer and exporter, and Nigeria is the largest importer (and both Hong Kong and Mainland China record no or negligible quantities), it is likely that this code is not an appropriate match for Hong Kong's dried fish category. As no other FAO codes appeared promising matches for an undifferentiated 'dried fish' category, no meaningful comparisons could be effected.

Summary of Comparisons with FAO Databases

Comparisons between FAO's production and trade databases and Hong Kong's own customs statistics were attempted only for shark fins, abalone and bêche-de-mer due to lack of consistency in the dried fish commodity codes used in the two databases. Of the three comparisons, bêche-de-mer figures matched exactly, whereas substantial discrepancies were noted for shark fins and abalone.

The FAO database confirms Hong Kong's position as the leading entrepôt for bêche-de-mer revealing that Hong Kong trade dominated global imports and exports in all four years examined. Hong Kong's share of world imports ranged between 80-86% between 1996 and 1999.

While Hong Kong's imports and exports of shark fins appear to be major contributors to world trade in 1996 and 1997, in the next two years reported

Hong Kong trade dropped to below 1% of the global trade. These figures stand in stark contrast to Hong Kong's own customs statistics which indicate that Hong Kong's trade grew steadily between 1996 and 2000. The amendment of Hong Kong's commodity code system in 1998 to report raw and processed fins separately may be partially responsible for a reduction in the quantities reported to FAO, but would still not explain the severity of the slump. Identified flaws in the FAO reported values led to formulation of a revised estimate of total world trade constructed from the adjusted customs statistics of major shark fin trading nations. These estimates point to a total world trade of over 10,000 mt in 1999 and over 11,000 mt in 2000, with Hong Kong's share of this trade ranging from 50 to 58% and generally increasing year-on-year.

Abalone comparisons were problematic due to the lack of a specific code for the dried form of the product in the FAO database. The most appropriate comparison illustrated that Hong Kong dominates world imports of unfrozen, uncanned abalone, but that the world market is primarily centered on the canned form of the product. From the discussions in Sections 3 and 4 it appears that Hong Kong's entrepôt trade in dried abalone is minor compared to the other dried seafood products since the bulk of Hong Kong's imports are not re-exported.

Comparison with the Southeast Asian Fishery Development Center (SEAFDEC) Databases

SEAFDEC is an international organization based in Thailand with research branches in Malaysia and Singapore. Its member states consist of Brunei, Malaysia, the Philippines, Singapore, Thailand, Vietnam and Japan, the latter providing considerable support to the organization. Each year SEAFDEC presents fishery statistics as the annual Fishery Statistical Bulletin for the South China Sea Area. Statistics on the import and export of fishery commodities are reported for Brunei, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, Taiwan and Thailand based on national customs databases. SEAFDEC uses the International Standard Statistical Classification of Fishery Commodities (ISSCFC) coding system. At the time of writing, the latest available data are for 1997, thus only 1996 and 1997 data can be assessed for this study (SEAFDEC 2000, SEAFDEC 2001).

The usefulness of the SEAFDEC databases for this study lies in their focus on Asian countries, expected to be the primary consumers of dried seafood worldwide, and the opportunity to provide alternative trade estimates to those in the FAO database. Since both databases rely on national reporting for their figures, differences are likely due to the coding systems and categories used. A comparison of SEAFDEC and FAO import and export figures for 1996 and 1997 illustrates the potential differences between the datasets (Table 5.5) for shark fins. In 9 of 11 highly divergent cases, the SEAFDEC quantity is higher. Comparisons between SEAFDEC data and Hong Kong data are explored in the following sections to better elucidate Hong Kong's role in the regional and global trade of shark fin, abalone, bêche-de-mer and dried fish.

These estimates point to a total world trade of over 11,000 mt in 2000, with Hong Kong's share of this trade ranging from 50 to 58%.

Table 5.5. Comparison of SEAFDEC and FAO import and export quantities for shark fins, 1996-1997 (latest available matching data).

IMPORTS (mt)	SEAFDEC 1996	FAO 1996	SEAFDEC 1997	FAO 1997
Brunei	78	1	na	2
Hong Kong	7,846	1,850	8,670	2,211
Indonesia	14	14	na	98
Malaysia	187	396	122	122
Philippines	0	0	0	0
Singapore	931	0	821	0
Taiwan	18	18	56	36
Thailand	138	138	83	83
TOTAL	9,212	2,417	9,752	2,552
EXPORTS (mt)				
Brunei	0	0	na	0
Hong Kong	5,355	1,794	5,771	1,955
Indonesia	894	894	na	676
Malaysia	4	21	31	31
Philippines	35	42	34	34
Singapore	795	0	591	0
Taiwan	207	206	392	257
Thailand	27	27	79	79
TOTAL	7,317	2,984	6,898	3,032

Use of the FAO figures to estimate Hong Kong's share of the global market would tend to slightly underplay Hong Kong's role.

Shark Fin

The SEAFDEC category discussed in this section is '121 – Shark's fin' under the heading 'Fish, dried, salted or smoked'. There are no other SEAFDEC categories for shark fin. If minor allowances are made for figure rounding, the SEAFDEC figures for Hong Kong shark fin imports and exports (Table 5.5) are identical to Hong Kong's customs statistics for import and re-export. Since the Hong Kong customs database is believed to be a more accurate representation of traded quantities than the FAO dataset, this finding indicates that the SEAFDEC figures may reflect a more accurate depiction of trade flows for the countries represented.

For this reason it is instructive to consider Hong Kong's proportional share of the Asian trade as indicated by the SEAFDEC database. However, one of the key drawbacks in using the SEAFDEC database to represent Asian trade is that it excludes Mainland China and Japan, two of the largest contributors to the trade in shark fins. Therefore, the most appropriate use of the SEAFDEC data is to compare the relative proportion of the Hong Kong trade between the SEAFDEC figures and the FAO figures, and thus determine whether Hong Kong's share of the global trade calculated based on the FAO data alone is likely to be biased. According to the SEAFDEC database, Hong Kong's share of imports in 1996 and 1997 was 85% and 89%, respectively and its share of exports was 73% and 84%, respectively. According to the FAO database, considering only those countries reporting to SEAFDEC, Hong Kong's share of imports in 1996 and 1997 was 76% and 87%, respectively and its share of exports was 60% and 64%, respectively. This analysis reveals that straightforward use of the FAO figures to estimate Hong Kong's share of the global market (regardless of the absolute size of that market) would tend to slightly underplay

Hong Kong's role. This study's best estimate of both the size of world trade and Hong Kong's share of that trade is presented in Section 5.

Abalone

There is no separate code in the SEAFDEC database for abalone in any form. The most suitable code would be '145 – Other mollusks fresh, frozen, dried and salted' but as this code would include many types of shellfish, comparisons were not attempted.

Bêche-de-Mer

The SEAFDEC code for bêche-de-mer is '524' – Sea cucumber, fresh, frozen, dried, salted, etc' which is not an exact match for the relevant Hong Kong commodity code used in this study (ie 0307-9930 bêche-de-mer dried, salted or in brine). It is therefore somewhat surprising that SEAFDEC's bêche-de-mer figures are identical to Hong Kong's quantities under code 0307-9930, particularly since Hong Kong offers another code 0305-9940 for 'frozen bêche-de-mer and other invertebrates'.

The SEAFDEC import and export data for 1996 and 1997 indicate that Hong Kong dominates the regional trade (Table 5.6). This would be expected given that Hong Kong was found in the FAO databases to dominate the world trade. Bearing in mind that the SEAFDEC database only includes a small number of countries, it nevertheless produces a higher estimate of total import quantities than does the entire FAO database (for 1996, 7,744 mt in SEAFDEC versus 5,969 mt in FAO, and for 1997, 6,624 mt in SEAFDEC versus 5,274 mt in FAO (see Table 5.4). This is likely due to the concentration of importing countries within the SEAFDEC countries and possibly more accurate (or at least higher) reporting to SEAFDEC. The opposite pattern is true for exports: the SEAFDEC estimates are lower than the FAO estimates. This situation arises because with the exception of the Philippines, the SEAFDEC list does not include major bêche-de-mer producing countries.

The SEAFDEC import and export data indicate that Hong Kong dominates the regional trade in bêche-de-mer.

Table 5.6. SEAFDEC Data for Imports and Exports of Bêche-de-Mer for 1996 – 1997. All data in mt.

Country	Imports 1996	Imports 1997	Exports 1996	Exports 1997
Brunei	na	na	na	na
Hong Kong	5,020	4,523	3,976	3,795
Indonesia	0	na	0	na
Malaysia	606	0	21	0
Philippines	0	0	1,384	1,297
Singapore	1,009	1,016	854	893
Taiwan	1,077	1,014	160	70
Thailand	32	71	8	40
TOTAL	7,744	6,624	6,403	6,095
Hong Kong's Share of TOTAL	65%	68%	62%	62%

Hong Kong's percentage market share for imports is higher in the FAO database (see Table 5.4) but this appears to be due to discrepancies in reported quantities from Taiwan and Singapore, both of which report higher quantities

Hong Kong's imports of dried fish are low compared to Malaysia and, in particular, to Brunei.

to SEAFDEC. If the SEAFDEC import quantities above are summed with the non-SEAFDEC imports listed in the FAO database, the estimates of world trade (based on imports) would be 21-24% higher for 1996 and 1997. For bêche-de-mer, the absence of PRC statistics in the SEAFDEC database does not contribute to the discrepancies between the data sets since Mainland China does not report imports of bêche-de-mer to FAO (although it may indeed import bêche-de-mer from producer countries).

Dried Fish

Unlike many of the intended dried fish comparisons in this study, the SEAFDEC dataset proved to be highly compatible with the Hong Kong customs statistics database. This is particularly useful since in the absence of comparable FAO quantities, the SEAFDEC data allow at least an assessment of the regional context of Hong Kong's dried fish trade. Given the generic nature of Hong Kong's '0305-5990 Dried Fish' and SEAFDEC's '122 – Fish dried, salted or smoked (not shark's fin)', it is likely that many different types of dried fish are represented in the SEAFDEC dataset. For example, it is believed based on observations in this study, that the majority of 'dried fish' in Hong Kong are fish maws, whereas in Southeast Asia, boiled dried (whole) anchovies (*Stolephorus* spp. or *Spratelloides* spp.) are a key product (SEAFDEC 1991).

Perhaps also due to the lack of specificity in the codes, the quantities in the SEAFDEC and Hong Kong customs statistics databases do not match exactly (Table 5.7). However, the agreement is generally within a few hundred metric tonnes, which is small relative to the size of the trade. These data indicate that Hong Kong's imports are low compared to Malaysia and, in particular, Brunei in 1996². If domestic consumption (imports minus exports) is examined, it appears that Hong Kong is consuming approximately half of its imports (assuming there is negligible domestic production of dried fish in Hong Kong), whereas Malaysia and Brunei are consuming nearly 100% of their imports. Exports in the table may represent either re-exports (ie entrepôt trade) or exports (ie production). Hong Kong and Singapore are likely to be the former, and Indonesia and Thailand are likely to be the latter.

Table 5.7. SEAFDEC imports and exports of dried fish (first 8 rows) and Hong Kong customs statistics (last row) for dried fish for 1996 and 1997.

(mt)	Imports 1996	Imports 1997	Exports 1996	Exports 1997
Brunei	143,425	na	1	Na
Hong Kong (SEAFDEC data)	8,845	8,765	4,552	4,114
Indonesia	117	na	19,609	Na
Malaysia	24,177	11,934	898	1,000
Philippines	22	29	539	720
Singapore	3,346	3,036	1,130	826
Taiwan	618	452	832	233
Thailand	1,376	2,753	18,831	20,993
TOTAL	181,926	26,969	46,392	27,886
Hong Kong Customs Statistics Database	7,694	7,365	3,971 (exports & re-exports)	3,292 (exports & re-exports)

SEAFDEC only presents data on export destinations in terms of declared value (not quantity) but these data were examined to determine the major destinations for dried fish produced in Indonesia and Thailand³. Roughly 12% of Thailand's, and only about 5% of Indonesia dried fish production (by value) is exported to Hong Kong. Both countries are major suppliers of Japan and Sri Lanka. From amongst the SEAFDEC countries, Hong Kong sources most of its dried fish from the other key Asian entrepôt, Singapore.

Summary of SEAFDEC Comparisons

SEAFDEC statistics provide a useful alternative to FAO statistics when assessing the broader context of Hong Kong's dried seafood trade. SEAFDEC data through 1997 was used to compare to Hong Kong and FAO figures for imports and exports of shark fins, bêche-de-mer and dried fish.

Comparisons between SEAFDEC figures and Hong Kong customs statistics for shark fin showed very close agreement. While this finding seems to indicate the SEAFDEC dataset may be more accurate in its representation of the broader fin trade, the SEAFDEC statistics do not include Mainland China or Japan both of which are key players in the trade. A comparison between SEAFDEC quantities and FAO quantities for SEAFDEC countries other than Hong Kong indicated that the FAO dataset may underestimate quantities for these countries, in the same way that it appears to underestimate Hong Kong's quantities (see Section 5).

Examination of bêche-de-mer data revealed that both FAO and SEAFDEC quote figures for Hong Kong which agree exactly with Hong Kong's customs statistics database. This is thought to be at least partially attributable to the similarities in the commodity codes for this product among the three datasets. The SEAFDEC statistics also confirm the importance of Hong Kong as a global entrepôt for bêche-de-mer. Despite these similarities, the quantities reported for the other countries (ie not Hong Kong) in the SEAFDEC database result in SEAFDEC estimates which are 20-25% larger than FAO statistics for imports.

The comparison of dried fish statistics was particularly useful because similar comparisons with the FAO database were foiled by dissimilarities in commodity codes. Assessment of the SEAFDEC regional data indicated that Hong Kong is a major importer but that it re-exports a considerable share of these imports (approximately half), unlike other major importers such as Malaysia and Brunei. Singapore demonstrated similar trade behavior to Hong Kong but at lower levels. Key regional producer-exporters of dried fish appear to be Indonesia and Thailand both of which supply Hong Kong at low levels but primarily export to other major markets such as Japan.

Conclusions Regarding Comparisons with Global and Regional Dried Seafood Databases

The FAO commodities trade and product database is arguably the most comprehensive and useful global fisheries dataset. Given the scope of the dataset and the difficulties involved in liaison and compilation of hundreds of national datasets, inaccuracies are inevitable. This analysis has indicated that for at least one product (shark fin) the FAO trade estimates are substantially underestimated, largely due to what appears to be misrepresentation of Hong Kong

SEAFDEC statistics provide an useful alternative to FAO statistics when assessing the broader context of Hong Kong's dried seafood trade.

data. Discrepancies between coding systems may account for some of the variability in the estimates, but it is not possible to independently trace the assumptions underlying data's presentation.

Comparisons to the SEAFDEC databases provide an interesting counterpoint to the FAO findings. SEAFDEC data more accurately reflected Hong Kong's own data, and in some cases provided higher estimates than those in the FAO database for other countries. The SEAFDEC data was also particularly helpful in contextualizing Hong Kong dried fish trade as FAO's system did not allow dried fish products, especially fish maws, to be easily segregated. Regrettably, however, the SEAFDEC database is limited both in its coverage (i.e., primarily Southeast Asia) and by the lag in statistics publication.

¹ The figure for Brunei appears possibly erroneous but has been checked against the SEAFDEC report. Alternatively Brunei may be acting as the distribution point for the dried fish trade throughout Borneo.

² See Table 10.2 in SEAFDEC 2001 and SEAFDEC 2000.



Section 6:

HONG KONG MARKET OBSERVATIONS AND TRADER INTERVIEWS

In addition to a thorough analysis of all available trade records, this study investigated the business practices of the dried seafood industry in Hong Kong through market observations and trader interviews. The results of this effort, which are reported here, are based on market reconnaissance surveys, and 23 structured and numerous unstructured interviews with dried seafood traders during the period December 2000 to July 2001.

Market Reconnaissance Surveys: Background

The dried seafood trade in Hong Kong is concentrated in the Sai Yin Pun district, also known as the Western District, an area which, prior to reclamation, was located on the Victoria Harbour waterfront and thus convenient for offloading marine-transported goods. Although the district is no longer located directly on the waterfront, and goods are delivered by container trucks from the port and/or by goods vehicles or hand carts from local go-downs (warehouses), traders continue to operate out of this cramped and crowded district. A previous study of the spatial distribution of marine products dealers in Hong Kong concluded that concentrating trade in a small area allows dealers to easily track the business practices of their neighbors and maintain the traditional structure of the community (Lam 1990). Fong (1999) conducted a survey of three districts in Hong Kong to determine the concentration of shops selling shark fin products in each and to identify the various types of supply and distribution networks. The majority of surveyed firms (n=17) imported shark fins and sold them to processors, although wholesale and retail outlets were also

The present study aims to better understand the extent of vertical integration in the dried seafood trade through identifying formal business linkages.

mentioned. Fong (1999) did not define these terms, perhaps because in practice it is often difficult to classify an establishment into a particular category. While acknowledging that several activities may be carried on in parallel, the following definitions are articulated for use in the present study:

Importer: purchases goods in bulk from overseas suppliers.

Processor: primarily engages in cross-border trade with Mainland China involving selling raw products and/or buying back processed products, but may maintain a very small processing workshop in Hong Kong.

Wholesaler: markets goods (processed or unprocessed) to established clients such as processors, retailers or restaurateurs, but not to the general public.

Retailer: markets mainly processed goods to the general public.

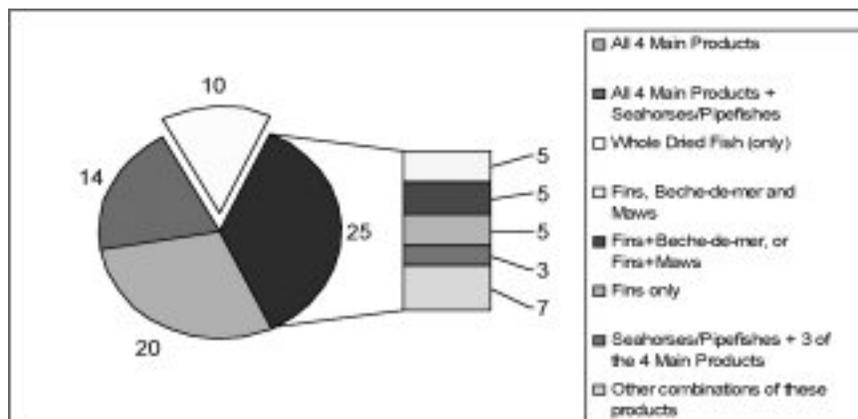
Rather than attempting to quantify the number of businesses operating in each activity, the present study aims to better understand the extent of vertical integration in the dried seafood trade through identifying formal business linkages between those undertaking these various activities in Hong Kong.

Another finding in Fong (1999) concerned the market concentration of shark fin products (ie how many shops sell shark fins) and the shark fin product share (ie how many of the products sold are shark fins). In the Sai Yin Pun district, of the 419 retail/wholesale establishments surveyed, 103 (24.6%) sold shark fins, but on average the types of shark fins available represented only 16% of the total product range (Fong 1999; n=10). One of the goals of the present study was to determine whether there are groups of dried seafood products that are jointly marketed and whether the existence of such groups implies integration of supply or retail demand.

Methods and Results

In the present study, market reconnaissance surveys were conducted while canvassing for potential structured interview participants (see Section 6). In this sense they were randomly conducted along the main dried seafood district thoroughfares in Sai Yin Pun including Des Voeux Road West, Bonham Strand West, and Queen's Road West and the small streets and alleys that bisect these roads. Observations were conducted from inside the shop or business and included limited question and answer exchanges when possible. On occasion, traders became hostile once they understood that no business transaction was planned and in these cases observations were quickly completed. At a minimum, the variety of products handled and the type of operation, ie import, wholesale or retail were noted¹. In other cases, if traders appeared cooperative, an interview was requested. Product information for all businesses observed either in the reconnaissance surveys (only) or in the interviews (which included reconnaissance information) is provided in Figure 6.1.

Figure 6.1 Grouping of Surveyed Dried Seafood Shops by Products Sold (n=69 shops)



All of the 10 shops trading in whole dried fish focused almost exclusively on this product.

A total of 69 businesses were observed and the combinations of products sold were numerous. Approximately half of all establishments surveyed (ie n=34) dealt in all four of the products discussed in this study, ie shark fins, dried abalone, bêche-de-mer and fish maws. Of this number, 14 also marketed seahorses or pipefishes. The vast majority of businesses in this group, ie 32 of 34, were retailers evidently aiming to offer a broad range of products to their customers. These ranges were, however, by no means limited to the products thus far discussed: other products on offer included ginseng, bird’s nest, dried mushrooms, dried scallops and oysters, canned abalone, cuttlefish, dried shrimps, algae, shark skin and cartilage, nuts, seeds and dried fruit.

The other half of the surveyed establishments (n=35) showed more specialization in product ranges and appeared to focus on a subset of the products considered in this study. Importers and wholesalers were usually found to be within this group although some retailers also appeared to specialize. The most distinct set of shops in this group were those specializing in whole dried fish. All of the 10 shops trading in whole dried fish focused almost exclusively on this product (though some sold small quantities of dried shrimps or cuttlefish). The remaining 25 establishments (i.e., not whole dried fish traders) dealt in various combinations of the main products of interest to this study, including three shops which also sold seahorses/pipefishes. Shark fins are acknowledged by traders to be one of the most, if not the most, lucrative dried seafood product and thus it is interesting to note that 18 of these 25 businesses (and 52 of 69, or 75%, of surveyed businesses overall) include shark fins in their range of products.

Discussion of Market Reconnaissance Survey Results

Despite the opportunistic nature of the reconnaissance surveys conducted in this study, it is informative to contrast the findings with previous studies and to draw preliminary conclusions which can serve as the subject of further research. The earliest of existing studies classified the marine products businesses of Sai Yin Pun into ‘salted fish’ and ‘marine delicacies’ categories (Lam 1990). Of the 83 shops surveyed, 23 sold salted fish whereas 60 marine delicacy shops offered shark fin, dried abalone and scallop, dried mushrooms and other products (Lam 1990). Contrasting these results with those compiled in 2001 indicates that the number of establishments specializing in dried and salted fish

**Most retailers
market shark
fins, dried
abalone,
bêche-de-mer
and fish maws.**

has declined from 23 to 10 (assuming that all existing shops were located during the reconnaissance survey), or from 28% to 14% of marine products businesses. This trend of decline in the dried whole fish trade is given further support by the findings of the interviews and recent regional dried fish marketing studies (Conover and Dong 1998a, 1998b).

Other previous studies have focused on shark fin businesses only. Chan (1997) identified 50 businesses dealing in sharks fin and this compares closely to the 52 establishments visited during these reconnaissance surveys. Comparisons with Fong's (1999) figures of 24% of businesses in the district selling shark fins are not appropriate since Fong appears to have included any retail or wholesale business (regardless of whether they appeared to be selling foodstuffs of any sort) in his sampling. In this reconnaissance survey only on those businesses which carried some type of marine product were visited and of these the percentage selling shark fins was substantially higher (75%). The comparison with Chan (1997) indicates that the number of businesses dealing in shark fins has remained relatively constant in recent years.

As it was not possible to determine from a brief visit to each business the number of levels on which it operated (i.e., importer, processor, wholesaler, retailer), information on the level of vertical integration will be presented through discussion of interview results. These reconnaissance surveys have, however, determined that most retailers market shark fins, dried abalone, bêche-de-mer and fish maws, and that a large number also deal in seahorses/pipefishes and other dried products including medicinals/tonics and foods. The question of whether these products are only aggregated at the retail level, or whether they are brought together as sets at a higher level in the supply chain, is explored through the interview data in the following section.

Trader Interviews

Penetration beneath the surface of the dried seafood market structure in Hong Kong requires access to warehouses, store rooms and back offices, as well as an open channel of communication with the personnel working there. This task is difficult in a trade that is largely closed to outsiders and internally secretive, and particularly so when attempted in the midst of potential CITES listings and marine conservation campaigns for the species on which the trade is based. Even when such issues are not explicitly associated with their products (eg bêche-de-mer), dried seafood merchants are often suspicious of any detailed questions about their business due to concerns that information may be disclosed to their competitors. Interviews were designed and conducted with these constraints in mind, and with the goal of eliciting specific information both on products and their supply systems, as well as on the structure of the Hong Kong businesses.

Methods

As described above, the interview participants were identified through the reconnaissance survey and were either interviewed on the spot or by appointment. Interviews were conducted on an informal basis using a conversational manner and no formal record-keeping (i.e., no tape recording or filling in of forms) during the interview. This casual approach was deemed necessary to minimize suspicions and encourage the interview participant to speak freely. Despite this apparent free-

form approach, an interview questionnaire consisting of 48 questions served as the basis for the content of the interview (Appendix C at www.wcs.org/science/workingpapers). Given concerns regarding the amount of time traders would be willing to spend being interviewed, some questions were prioritized so that they could form an abbreviated interview framework if time was short. However, each interview was completed in its full form without abbreviation, although there were usually several questions which traders declined to answer. Several questions were included to test the responses of the traders for accuracy and general knowledge level. A record of responses was compiled after each interview (Appendix D at www.wcs.org/science/workingpapers) and if further clarification was required, a follow-up interview was requested and usually granted.

The goal of the study was to conduct 20 interviews with traders at various operating levels (importers through retailers). Since some of the questions were product-specific and since many of the traders handled more than one product, it was decided that for each establishment interviewed, a single product would be designated and that all product-specific questions would be targeted toward that product. Effort was initially allocated to the product types as follows: six interviews each for shark fins and dried fish, and four interviews each for dried abalone and *bêche-de-mer*. Ultimately 23 interviews were conducted including seven for shark fins, six for dried fish (two fish maws and four dried whole fish), and five each for dried abalone and *bêche-de-mer*. The success rate for interview requests was thus 33% (23 of 69) which compares favorably with the 20% response rate in Fong (1999).

The quality of the interview responses obtained was largely dependent on the knowledge of the staff person interviewed, which in turn depended on that person's position within the company. Although interviewing the proprietor or manager of the business would be expected to provide more comprehensive information, this needed to be weighed against the fact that managers usually had less time and patience for the questionnaire and tended to be more savvy about what information they revealed.

Products, Supply and Prices Issues

The first portion of the interview consisted of 21 questions relating to the range of products sold, at what level the business operates (ie importer, retailer, etc), how the products are sourced, and trends in quantities and prices. The objective of these questions was to determine the structure of the supply chain for the product, and the extent of traders' knowledge of how the product is sourced. Results for each product are described separately below.

Shark Fin

The shark fin interviews were conducted with 7 different firms, which described themselves as importers (3 firms), processors (2 firms), wholesalers (4 firms) and retailers (2 firms), ie several were operating at more than one level. The importers and wholesalers claimed that 50-100% of their business was shark fins, whereas the retailers dealt with a wide range of products and could not specify what percentage of the business was devoted to shark fins. Most respondents did not elaborate on the kinds of dishes that can be prepared using shark fins although soups flavored with chicken was a common answer.

23 interviews were conducted including seven for shark fins, six for dried fish and five each for dried abalone and *bêche-de-mer*.

Long and thick fin rays command the best prices, thus fins which have a high density of these types of fin rays are most preferred.

When asked to explain which types of sharks' fins can be used, most traders were somewhat vague about the species identification claiming that many species can be used. One respondent claimed that 200 different species of sharks can be used, but other information from sources judged to be more knowledgeable (i.e., author of the book Yeung et al (2000)) indicates that only 30-40 species are common. Four traders cited 'whale' shark fins as valuable, three mentioned 'basking' sharks and others mentioned 'tiger' sharks, 'brown' sharks and 'hammerheads'². Most respondents identified that the caudal fins are the most valuable since they contain the densest and thickest fin rays which are used in making soups. Other discussions with traders indicate that long and thick fin rays command the best prices, thus fins which have a high density of these types of fin rays are most preferred. While 'whale' shark and 'basking' shark fins have long and thick fin rays, they are not particularly dense and otherwise lack texture, thus these fins while highly valued on a per-fin basis, are not particularly valuable by unit weight.

The interviewed shark fin traders each cited several, often different, source countries and regions including India, South Africa, Australia, Brazil, South America, the Philippines, the Middle East, West Africa and Fiji³. This diversity of sources reflects both the large number of countries importing shark fins to Hong Kong (see Section 3) and the fact that each company builds and maintains trading links with suppliers in only a few countries. The latter feature of the trade arises from the fact that there are rarely formal contracts between foreign suppliers and Hong Kong importers, thus business is conducted on an ad hoc pre-pay or cash-on-delivery basis. For this reason, Hong Kong dealers are vulnerable both to fraud by unscrupulous foreign suppliers (e.g., who advertise high quality fins but ship poor quality ones) and to price competition from other Hong Kong buyers who try to usurp each others' suppliers by offering higher prices. Consequently, once Hong Kong dealers find a supplier they can trust, they guard the relationship carefully and do not seek to change suppliers. There was strong consensus on the sources of high and low quality fins: South American countries and Australia were thought to be high-end suppliers, whereas Indonesia, Africa, the Middle East and the Philippines produced poorer quality goods. Respondents unanimously considered that the countries supplying shark fin had long been participating in the trade and that there had been no major changes in suppliers in recent years.

Information given in the interviews on the supply chain for shark fin products was not particularly detailed. Most participants simply explained the chain extended from fishermen to foreign collecting agencies who shipped the fins to Hong Kong importers. The importers then sold the fins to processors/wholesalers, who in turn sold them to restaurants or retailers and thus to customers. Despite initial indications that air transport was increasingly being used to import fins, traders reported receiving fins both by sea and by air and were unable or unwilling to elaborate on the percentage received via each route. All seven respondents claimed that the quality of shark fins (presumably including size) had been stable over time and only one of the traders stated that the quantity of supply was decreasing. Only a few of the traders admitted to problems with surplus or shortfalls in supply. Surpluses were handled by additional stockpiling, more frequent auctioning or lowered prices and scarcities were

viewed as an opportunity to raise prices. Surpluses can be particularly troublesome given the lack of storage space in Hong Kong and the need to maintain a steady stream of purchases from overseas suppliers in order to sustain the trading relationship. None of the traders could comment on whether official customs statistics would accurately represent Hong Kong trade volumes although several mentioned that exports to the Mainland were usually underreported in order to minimize customs duties.

Most firms had very little knowledge about, and involvement in, shark fishing and fin handling prior to import. However, two firms mentioned that foreign collecting agencies are taking a more active role in shark fishing by sponsoring their own fishing vessels. One of these firms claimed to be monopolizing 65% of the Brazilian fin trade through their joint venture with a Brazilian company operating a fishing fleet as well as 6 trucks shuttling daily along the entire coast of Brazil buying fins.

Interviewed dealers cited retail prices of \$20 to \$3,500 HK per catty (or \$4.25 to \$744 US per kg) for shark fins. One trader explained that 20 years ago Hong Kong dealers would buy fins for \$12 US per kg and sell them for \$30 US per kg, but that now fishermen could demand up to \$180 US per kg. This trader, who considers himself a medium-sized operator, indicated that margins on shark fins were high and that his monthly turnover was on the order of 6 million HK (\$771,000 US) per month. With profits of between 10-15%, one of the largest shark fin dealers in Hong Kong, which is rumored to have a turnover of 1 billion HK per year (129 million US) would earn an annual profit of at least 12 million US.

There was no clear consensus among the 7 firms interviewed on whether buying and selling prices were rising or falling: some claimed prices fluctuated while others said they were stable; some indicated prices were rising while others stated they were falling. In terms of demand, six of seven dealers complained that sales were down due either to the economic downturn and/or the summer season, which is typically a slow sales period for dried foodstuffs. Only one trader had noticed any trend in the popularity of shark fins and in his opinion they were becoming more popular in restaurants.

Dried Abalone

The five firms dealing in dried abalone usually traded this product as one of many dried foodstuffs in their business, although one respondent claimed that dried abalone comprised 80% of their revenue. This firm was an importer who holds auctions and sells wholesale. Another firm also imports and wholesales, two firms wholesale and retail, and one firm is only involved in retail. One of the wholesalers is allied with two retail shops and one of the retail shops used to be part of a larger chain of 6 shops acting as a major supplier to local restaurants, but has since moved the focus of the business to Australia.

All dealers indicated that a type of dried abalone called '*Kat Pun Bao*', and sometimes one referred to as '*Wo Ma*', from Japan were the most sought after products. Some mentioned South Africa, the Middle East and Australia as high quality suppliers but others considered that South Africa and Australia's production was inferior to the others. Low-grade products were said to be sourced from Indonesia and the Philippines and were classified as such

Six of seven dealers complained that sales were down due either to the economic downturn and/or the summer season.

All dealers believed that product quality was constant, and none had observed any difficulties with declining supply.

because they were difficult to soften for cooking. Traders claimed that supply countries had not changed over time.

Interviewed establishments purchased dried abalone from overseas collectors or dealers in the source country, or from Hong Kong importers who subsequently sold the product on to wholesalers or retailers. Only one trader indicated that ocean freight and air freight were used; the other respondents primarily used air freight. All dealers believed that product quality was constant, and none had observed any difficulties with declining supply. One firm cited strong control of the industry in Japan as a positive factor in maintaining supply. All businesses interviewed indicated they would take the standard commercial response to surplus and scarcity situations: in the former case, products would be stockpiled and prices would be lowered, and in the latter, prices would be raised. One of the retailers appeared wary of overstocking given that they considered demand to be waning. None of the interviewees had any comments on the accuracy of customs statistics. Given that there appears not to be a significant cross-border trade in dried abalone with Mainland China, avoiding tariffs is likely to be less of an issue in abalone trade than it is with the other products in this study.

Interviewed importers (n=2) purchased products from dealers in the source country, not from fishermen directly. One firm conducted purchases on a cash basis while the other claimed to buy on credit. Respondents appeared ignorant of whether these products were wild caught or cultured, and the majority believed abalone were caught using nets⁴. However, traders appeared more knowledgeable about product processing and were able to describe recent technological innovations such as line-based food processing drying in Japan, and factors that contribute to poor processing (eg incomplete drying or post-mortality processing). Dealers believed that given the usual high standard of processing, prices are mainly determined by the type (species) of abalone and that the common consumer would not be able to distinguish between types of dried abalone based on processing quality alone.

Retail price ranges cited for dried abalone covered a wide range from \$400 to \$12,000 HK per catty (\$85 to \$2,560 US per kg). Four of five respondents claimed that abalone was no more or less profitable than the other products they sold. However, one dealer who also trades in all the products considered in the study, and also in sea horses, ginseng and other medicines, stated that in his opinion shark fin profits could be higher, but abalone and bêche-de-mer profits were more stable. Furthermore, he believed that dried seafood products in general were less profitable than ginseng and medicines. Most traders felt that wholesale prices were stable but that retail prices were fluctuating to attract sales, particularly as all interviewees noted that sales were down in the past few months. Two firms noted the rising popularity of canned abalone over the dried form due to its relative ease of preparation, and one businessman indicated that the cheaper products were becoming more popular due to Hong Kong's worsening economy.

Bêche-de-Mer

Five interviews were focused on bêche-de-mer products and respondents included two firms that import and wholesale; one firm that imports, whole-

sales and retails; and one retail-only business. Two of these firms specified that bêche-de-mer represented 30-40% of their business while the others declined to provide exact figures. Only one firm could provide any information on the uses of sea cucumber and indicated only that it was used in soups and other restaurant dishes. Dealers described several species that are valuable in the trade and were aware that some species of bêche-de-mer are inedible. All five traders indicated that spiked forms of bêche-de-mer, particularly *Theleota ananas*, *Stichopus japonicus* and *Stichopus* spp. were the most valuable species. Jenkins and Mulliken (1999) state that while spiked forms command high prices in Hong Kong they do not appear to be popular with consumers. One trader also mentioned White Teatfish (probably *Holothuria fuscogilva*, a non-spiked form) as a valuable species and two others listed it as a common product carried. Traders indicated that the larger sizes and those species from Japan (probably spiked forms) are preferred.

South America, Indonesia, the Philippines, Japan, China, Korea, and Australia were the source countries for the bêche-de-mer dealers interviewed. These traders believed that the highest quality goods originated in Japan, the Pacific coast of South America, South Africa and Australia, and that Indonesia, the Philippines and China were known for poor quality goods due to both species composition and shoddy processing. Four of five respondents stated that these countries had always been important suppliers, but one firm suggested that political instability in Indonesia had substantially interfered with trade in recent years. Although countries such as Papua New Guinea, Fiji, Madagascar and Tanzania appear to be major exporters of bêche-de-mer to Hong Kong (see Section 3), none of the surveyed traders mentioned these sources.

As with shark fin dealers, it was difficult to elicit specific information on bêche-de-mer traders' supply chains but they generally followed the fishermen-foreign collector-Hong Kong importer-wholesaler/retailer-customer model. Most businesses received their products by sea but at least one of the establishments utilized air freight to obtain rapid delivery and minimize the risk of price fluctuation. Aside from the Indonesian supply problem described above, most dealers opined that quantity and quality were stable or increasing. One trader alluded to a decline in supply arising from unusually heavy rainfall in the Philippines, which interfered with product drying. Among the 5 businesses interviewed, only one mentioned any difficulties with surplus stock. This trader mentioned that the product would be stockpiled and perhaps the price lowered; the other traders believed that supplies were quite stable overall. The majority of participants claimed they did not know whether official customs statistics were accurate, but one dealer mentioned that exports to Mainland China would be underestimated in order to minimize import duties.

Bêche-de-mer traders appeared knowledgeable about the product processing that takes place in the supply countries and cited the application of food processing drying in Japan as an innovation that improves product quality. They were also aware that Japan has begun bêche-de-mer mariculture but that in other countries it is still a capture fishery. Species/type and degree of dryness appear to be the key factors in determining price, although products may be spoiled if they are not processed while still alive. None of the dealers were involved in the sourcing of the products in the country of origin and all

All five traders indicated that spiked forms of bêche-de-mer were the most valuable species.

One dealer mentioned that exports to Mainland China would be underestimated in order to minimize import duties.

importers purchased the product on a cash basis. One dealer admitted he was not comfortable trading in shark fins and this is perhaps due to the higher risk involved in cash transactions for a more expensive product.

Trader-quoted retail price ranges for bêche-de-mer products ranged from \$200-\$300 HK per catty (\$42.50-\$64 US per kg) for White Teatfish, to \$1,500 HK per catty (\$319 US per kg) for Prickly Redfish. Respondents characterized wholesale prices as stable or falling, and unanimously agreed that sales were declining in Hong Kong due to the seasonal slowdown. However, one dealer claimed that sales were increasing in China and another that prices could be raised 20-30% as sales were rejuvenated in the run-up to the Lunar New Year. Three firms opined that the expensive spiced bêche-de-mer from Japan is becoming more popular.

Dried Fish

Six dried fish traders were interviewed for this study. Four were specialists in dried whole fish and did not handle other marine products to any significant extent. One of these was an importer who auctions dried fish to wholesalers and the remainder were wholesalers and retailers (and one also processed local fish). The fish maw dealers consisted of one firm which relied on fish maws for 90% of its revenue and one firm which carried all the other products discussed in this study as well as a wide range of other products. Both fish maw dealers were wholesalers and retailers, and one operated a processing factory in China. Respondents did not discuss the use of the products at length but one fish maw dealer indicated they are used in soups, and one dried fish dealer mentioned his products are eaten with rice.

Fish maw dealers did not demonstrate a detailed knowledge of the types or species of fish used in the trade. Nevertheless, both interviewees suggested that marine fishes' maws are preferred to those of freshwater fishes, male fishes' maws are more highly valued than females' maws, and that the most expensive maws derive from 'croakers'. The dried whole fish dealers provided more information on types of fishes used and generally had a more biologically diverse trade. All dealers utilized marine fishes only and described their range of products as consisting of 'croaker' (*Sciaenidae*), 'Polynemidae' (threadfins) 'white herrings' (*Clupeidae*), 'snapper' (*Lutjanidae*), 'Nemipterus spp.' (threadfin breams), 'mackerel' (*Scombridae*), 'jacks' (*Carangidae*) and small 'filefish' (*Monacanthidae*). The traders, by consensus, indicated that the most valuable of these were the 'croaker', 'Polynemidae' and the 'white herrings'.

Source countries for the trade varied considerably between dried whole fish and fish maw dealers, with the latter having to import goods from farther afield. The fish maw dealers interviewed stated they imported from Brazil, India, Venezuela, Ecuador and other South American and African countries. These dealers indicated that the best products derived from India, Brazil and Bangladesh and that this had been the case for many years. In contrast, the dried whole fish trade's supply is mainly drawn from within Southeast and South Asia. Thailand, Malaysia, Singapore, Vietnam, China, Burma, Bangladesh and India were named as source countries and three traders considered that Bangladesh produced high quality products because the valuable croaker species were found there.

The standard supply chain as described above for shark fins, dried abalone and bêche-de-mer also applies to dried fish, but there were a few interesting variations cited. One of the fish maw dealers described an alternative supply chain in which Hong Kong importers would deal directly with fishermen in the supply country and even sometimes oversee the initial processing of the maws prior to shipment. In the case of dried whole fish, one firm indicated they have a direct link with fishermen in Bangladesh whereby they sponsor them to catch fish. Some dried whole fish dealers claimed that purchase of local fish and processing in Hong Kong was another alternative route, although these are small-scale operations which are becoming less common with time. (Respondents did not specify why this is so although declining fish populations in the Hong Kong area are likely a contributing factor (Pitcher et al 2000)).

All dried fish dealers imported their products entirely by sea freight. None were able or willing to make any comment about the accuracy of customs statistics, although one dealer mentioned that Mainland customs are less strict with dried fish than with shark fins so less deception is required in cross-border trade of dried fish. In contrast to the steady supply claimed by the other dried seafood traders, dried fish businessmen consistently referred to declining supplies and some specifically alleged this was due to overfishing. While the majority of dealers felt the quality of their products was stable, one of the fish maw dealers complained that there were increasingly fewer high value maws being traded.

Most traders were more used to dealing with surplus supplies than with shortages. They attributed this to the declining demand for dried fish and their ability to compensate for short term shortages by processing local fishes. The dealer financing the Bangladeshi fishing fleet indicated that if a shortage occurred and prices were high, he would inject more capital into the fleet to expand the fishing effort.

The dried fish industry does not widely utilize food processing drying perhaps due to higher volume and low-priced products. Sun drying is still the most common means of processing both maws and whole fishes, and thus both products are vulnerable to poor weather conditions. For fish maws, the product value is primarily determined by the type of fish, rather than the processing, thus dealers are not particularly concerned with the details of product handling prior to import. Once imported, the maws are sent for further processing, usually in China, involving re-washing, bleaching and frying of small-sized, and female, maws to produce a ready-prepared form. Dried whole fish dealers are considerably more concerned with the drying process as poor processing could cause prices to drop to a small fraction of the original price or pre-empt sales altogether. For this reason, the dealer with the Bangladesh operation sends a senior staff member to the field to inspect the products prior to shipment. Contradictory information was received from the two fish maw dealers concerning the linkage between fish maw and dried whole fish production: one trader claimed there was no connection, whereas the other accurately stated that 'cods' and 'croakers' are sometimes used for both maws and whole dried forms (confirmed by Sadovy, pers. comm. 2001).

Retail prices for dried whole fish were quoted at \$10-\$100 HK per catty (\$2.12 to \$21.24 US per kg). In contrast, retail prices for fish maws began at

Dried fish businessmen consistently referred to declining supplies and some specifically alleged this was due to overfishing.

Although the ‘croaker’ was listed as the one of the most popular fishes, one dealer claimed his imports had declined to half of previous levels.

the upper end of this range but reached as high as \$10,000 HK per catty (\$2,124 US per kg). One of the fish maw dealers claimed to earn a profit of only \$20-\$30 HK per catty (\$4.25 to \$6.37 US per kg) on their common product stock but with monthly sales of 6 mt, this low profit margin is apparently viable. Half of the firms noted that wholesale and retail prices were stable, whereas two firms believed both were rising and one firm stated both were falling. All agreed, however, that consumer demand had dropped: one dried whole fish dealer cited a drop of 80% and one fish maw dealer a drop of 40% (timeframe not specified). There appeared to be no major change in the popularity among products although it was interesting to note that although the ‘croaker’ was listed as the one of the most popular fishes, one dealer claimed his imports had declined to half of previous levels.

Business and Trade Issues

The second portion of the interview consisted of 27 questions pertaining to customer relations, business structure, competition, market share, trade intelligence and future prospects. These questions were designed to better understand how traders position themselves within the dried seafood industry, their awareness of external factors which might impact their trade, and their attitudes toward various future scenarios. Responses to this portion of the interview are discussed for traders as a whole, although points relating only to particular types of products or traders are noted as necessary.

Sales Situation and Strategies

A number of questions dealt with what could be referred to as sales situation and strategies, ie which factors determine sales, who and where are the customers, and how do traders position themselves to attract and maintain key clients. The vast majority of interviewed firms agreed that the two most important factors influencing consumer demand are the overall state of the economy and seasonal cycles which follow the holiday calendar and traditional times for eating certain foods. Although many types of dried seafood are considered to have health benefits, consumer behavior appears to treat the products as luxury goods. When consumer confidence and spending is high, sales increase, and when the economy is rumored to be in crisis (as is now the case in Hong Kong), traders say they acutely feel the effects. Several respondents mentioned other factors influencing sales including product prices and offers to purchase on credit. A few of the shark fin and bêche-de-mer traders noted the importance of import regulations and tariffs on the Mainland which presumably constrain the cross-border trade in these products. Some of the whole dried fish dealers also cited other reasons including changing tastes influenced by the belief that eating salted fish is bad for one’s health, and declining supplies of some products.

When asked about customer profiles, approximately half of the interviewed dealers focused primarily, or totally, on clients in Hong Kong. Dried fish traders (both whole and fish maws) were disproportionately represented in this group, probably due to the Mainland’s ability to source these products domestically. The other half of the firms were engaged, at least in part, in cross-border trade, with a slightly larger number indicating their market in

Hong Kong was larger than their market in Mainland China. Several traders mentioned they served clients from overseas ‘Chinatowns’ in Canada, for example. In deciding whether to buy, respondents suggested that customers weigh quality, price and business relationship with the trader in equal measure. Business in Hong Kong is very much based on *guanxi* (personal relationships) and this serves to moderate open competition within the community for key clients (Lam 1990).

Business Scope and Structure

One of the objectives of this study was to better understand how traders decide to deal in specific products. All respondents who expressed an opinion stated that offering a diversity of products was a good business decision because it minimizes the risks associated with seasonal supply, price and demand changes, and expands the client base. However, several reasons were given for not following a maximum product diversity business model. Some traders, particularly those dealing in shark fins, cited the higher profits in this product as the cause of their focused trade. Other firms, including those involved in the dried whole fish trade, as well as some others, stated that they were only willing to work with those products they knew well. Given that most transactions appear to be conducted on a cash basis, building relationships with distant suppliers and discriminating between unfamiliar product types and grades can entail a substantial risk. Once solid relationships are established with suppliers, many dealers seem to be content to continue with the same business plan year after year. Only one firm suggested that their supplier dictated which products would be sold. In this case, the dried abalone dealer also sold dried scallops, oysters and mushrooms because they were provided by the same supplier.

Several questions were aimed at establishing how the trader entered the business and the degree to which the interviewed firm was connected with other businesses. Only one interviewed firm admitted to being associated with a larger firm handling a broader range of products including bird’s nests and other medicines/tonics. One other firm mentioned it had formerly been part of a larger company but had separated recently. Based on observations of the same staff apparently operating out of various shops and offices in the district, it is likely that there are many more linkages that cannot be verified.

Two different routes of entry to the trade were identified: some traders inherited an interest (literally and/or figuratively) from their family, whereas others entered the trade as apprentice-like workers and eventually branched off into their own businesses. Of the 23 firms interviewed, nine mentioned that the business was family-owned and many of these stated they have been operating for 30-70 years. A few firms (7 of 23) had been in business for less than 10 years and the majority (15 of 23) had been trading for more than 10 years. Since many of the heads of these firms appeared to be older men, one of the questions asked whether the dealers thought their children would continue in the business. None of the participants answered in the affirmative, and though many said they didn’t know or didn’t think about this, several dried fish traders said they didn’t feel the business had a good future, and one said he would not encourage his children in the trade.

When consumer confidence and spending is high, sales increase.

Some traders inherited an interest from their family, whereas others entered the trade as apprentice-like workers and eventually branched off into their own businesses.

Knowledge of the Competition

A portion of the interview questions queried traders on their awareness of the context of their business within the local, regional and global trade. The responses indicated in general that traders are primarily concerned with their niche business and its success; they either do not appear to have much knowledge about or interest in competitors, or were reluctant to discuss competition with the surveyor.

Participants were asked to identify the largest dealers of their product and their key competitors. Most vaguely referred to distribution outlets such as restaurants as the largest dealers, and to non-specific neighboring shops as competing businesses (with the exception of one respondent who named competitors). Observations of the district's shark fin dealers indicate that a handful of dominant traders are easy to identify but based on the survey results, it is perhaps not acceptable within this tight community for traders to reveal a detailed interest in each others' businesses.

The current and future potential for trading through Singapore or Mainland China, instead of Hong Kong was raised, and respondent's opinions on China's accession to the World Trade Organization (WTO) were sought. Only one of the 23 interviewees believed that Singapore had a market edge (and only in abalone and shark fin). The most common answer regarding China was they did not know or that they had not thought about it. Of those firms expressing a view on China and the WTO, six thought that China joining the WTO would hurt their business because the Mainland could provide cheaper ports and labor and thus reduce costs. Three firms believed that when China joined the WTO there would be more opportunities for trade and customs duties would be lowered, and thus their businesses would benefit. One shark fin trader stated there was no particular threat to his business from increased trade with China. He claimed that the personal relationship and cash-based nature of the business rendered it unlikely that Mainland traders would have the travel privileges, language skills, or financial backing to successfully compete for foreign product supplies.

Almost none of the interview participants were able (or willing) to estimate Hong Kong's share of the global trade or their own share of the Hong Kong trade. However, some figures were provided for abalone and bêche-de-mer by a former trade association chief who would be expected to have a better understanding of these matters (Appendix D at www.wcs.org/science/workingpapers). Those traders who did reply on this point, ie dried whole fish and fish maw traders, estimated that Hong Kong controlled most of the world trade in these products, but this does not appear to be the case from regional and global databases (see Section 5).

Opportunities and Threats

This section of the questionnaire was aimed at gaining insight into traders perceptions of the constraints on their businesses and what options they felt were available to them to overcome these constraints. A peripheral objective was to determine the extent to which dealers were aware of potential fisheries management or conservation restrictions on trade.

Participants were given a list of potential constraints (i.e., lack of capital, scarcity of supply, poor quality of supply, lack of demand, other (regulations,

tariffs)) and asked to identify those which apply to their business. Of the 23 firms surveyed, 20 identified 'lack of demand' as the key constraint to their business success. The second most commonly blamed factor was Mainland China regulations and customs tariffs. Four dealers pointed to scarcity of supply as an issue and three of these (one shark fin, one abalone and one bêche-de-mer) claimed it was the most important issue limiting their trade. Only three participants pointed to lack of capital as an issue, although this is likely to be a major constraint to those businesses wishing to expand their market share. One shark fin trader explained that importers have sunk costs at four points in the business cycle: up-front purchase of fins from overseas suppliers, fins en route from overseas, unsold fins in stock, and credit for purchased fins extended to buyers. Under these circumstances, business solvency can be threatened if there is not sufficient capital on hand.

Aside from concerns about Mainland China's import regulations and tariffs, most interviewed traders seemed unconcerned by current or potential regulations. Only two respondents indicated a knowledge of any current regulations applying to their trade (both of these were shark fin traders) and only five firms believed that future regulations could impact their businesses (all of these were shark fin traders). Some shark fin traders claim that they formed a lobbying group with traders from Singapore and representatives of a wise-use non-governmental organization to help defeat the CITES listings of three shark species at the 2000 Conference of Parties. Others, who were not interviewed for this study, are known to use the internet to track the activities of non-governmental organizations advocating protection or management of shark species.

Participants were also asked to indicate what action they would take (ie 'do nothing', 'switch to a different supplier or supply route to work around regulation', 'focus on another product that is not regulated', 'try to change regulation through lobbying or complaints' or 'increase prices') if regulations were imposed on one of their products. Half of the survey participants stated that their preferred option would be to do nothing. The most common answer, although it was not always the respondents' first choice, was to focus on another product that is not regulated. Two dealers said that changing supply routes to work around the regulation would be their first option and three dealers indicated this was their second choice. Three firms expressed an interest in lobbying, although this was a second or third option, and two firms said they would seek to capitalize on the situation by raising prices as their first option.

Questions were also aimed at understanding how the traders organize themselves and disseminate information through their community. Many respondents said they paid dues to one or more of the relevant trade organizations but typically felt that the organizations served more of a social, than an informative, function and that meetings were held only infrequently. Traders indicated they relied most heavily on personal communication with other members of the trade community for their information, and also on television and newspapers. For products which are auctioned (i.e., shark fins, abalone, fish maws and dried fish) auctions serve a practical as well as a social purpose. Most members of the trade community attend regularly to check which items are selling well and to exchange information with colleagues. Hong Kong's dried seafood traders generally maintain contacts with overseas suppliers only as needed, usually via

Only two respondents indicated a knowledge of any current regulations applying to their trade and only five firms believed that future regulations could impact their businesses.

mobile telephone or facsimile, but periodically through personal inspections and visits. Only three firms admitted to using the internet; one of these has a corporate homepage, but the other two only use computers for email and web browsing. Many of the smaller companies still prepare inventory lists, customer invoices and auction sheets by hand.

Attitudes and Outlooks

The final section of the questionnaire focused on trader attitudes and their outlook for the future. Participants were asked if they are satisfied with their business, what is their greatest concern at present, and what they think will determine their future success. The majority of respondents (18 of 23) indicated that they were generally satisfied by the state of their business at present, but in parallel most appeared gloomy about the future. Concerns regarding the economic downturn in Hong Kong were frequently raised, and related effects such as a decline in demand and defaulting on credit repayments were common laments. Several traders also mentioned Mainland China’s customs regulations as a growing concern, particularly as a Mainland crackdown on shark fin imports was in full force during the interview period.

Traders believed their future success is closely tied to the health of the local and regional economy, since if consumer spending increases there is likely to be a greater demand for expensive dried seafood items. The one exception to this was the dried whole fish traders. These firms have weathered a continuous decline in their trade as tastes have changed and the remaining dealers seem to accept that their business will decline further with time.

Traders believed their future success is closely tied to the health of the local and regional economy.

Table 6.1. Dried Seafood Trade Organizations in Hong Kong

Hong Kong Shark Fin Merchants Association	Shark fin dealers who engage in import and/or wholesale and also process fins. Membership is required for participation in daily auctions	Price information (formal); social; mediation between members	Founded in 1960; has an office and a full-time representative
Hong Kong Dried Seafood and Grocery Merchants Association	Dried seafood wholesalers and retailers	Price information (formal); social	
Hong Kong Salt Fish Merchants Association	Traders who deal in dried or salted fish only	Price information (informal); social; mediation between members	Founded 60-70 years ago but not very active now
Japanese Marine Products Hong Kong Traders’ Association	Dried seafood importers	Social	
Hong Kong Shark Fin Importers Association	Nine largest shark fin import companies	Unknown	Membership by invitation only; no office or staff

Summary and Interpretation of Trader Interview Findings

Hong Kong's dried seafood traders share many similarities in the operation of their businesses, despite many variations based on product type. Summarizing these similarities allows for greater understanding of the structure of the trade and its sensitivities to changes in demand, supply, competition and regulation.

Based on the trader interview results, the most salient feature of the Hong Kong dried seafood trade is its pre-occupation with the sales side of the business. Most interviewed firms cited sales issues, primarily the downturn in the regional economy, as their main concern. While many dealers were well-informed about product processing and resulting forms and grades, very few exhibited any knowledge of the biology of the organisms, the methods of capture, or whether stocks (i.e., pre-harvest populations) were stable or declining. Also, as purveyors of luxury foodstuffs, the interview participants generally demonstrated little interest in the use of the products and did not articulate why certain products were desirable (other than commenting on their sales performance) as one would expect in specialty comestibles trades, such as wine, caviar, cheeses, etc, in other countries. This fixation on sales, at the expense of supply issues, assists in explaining why only dried fish dealers mentioned overfishing, and why potential fisheries management or conservation regulation was not cited as a major concern by any of the participants. It also aids in interpreting why only a few of the interviewed firms involve themselves in sourcing supplies overseas. In the cases where this does occur (shark fins and dried fish), traders suggested their motives were to secure a more reliable quantity and quality of supply, or to expand their supply and increase profits, rather than to guard against any current or potential future product shortages due to overharvesting.

Most interviewed firms displayed a high level of vertical integration, with some establishments sending staff overseas to secure supplies, arranging for product processing, and selling finished products to customers. The interviews revealed that the products handled by a particular dealer are a reflection of the proprietor's attitude toward business risk and his ability to establish and maintain trading relationships with overseas suppliers. Certain products, particularly shark fins, were seen as high profit but high risk commodities due to the need to advance large amounts of cash to suppliers and the considerable potential for fraud under such circumstances. While some firms choose to specialize in these potentially high-margin goods, others prefer to spread their risk by offering a range of goods thereby providing a buffer against fluctuating prices and demand cycles. Product importers trade with overseas suppliers on an ad hoc, cash purchase basis. The nature of these business operations dictates that the control of any particular firm over the supply is limited by the number of personal relationships that can be maintained (i.e., this requires frequent foreign travel) and the amount of capital that is available to purchase goods. As a result, there are several major importers, but also a large number of small importers focusing on one or two products. Goods are almost always purchased from overseas suppliers dealing in a single product, and thus it is at the wholesale and retail level that products are combined into sets.

The secretive and competitive nature of the business appears at odds with the concentration of the dried seafood business in one district of Hong Kong. This physical proximity, however, provides a sense of security to traders in that

While some traders are aware of conservation campaigns, only a small portion indicated they would participate in lobbying against potential regulations.

they are able to visually track each other's shipments and customers, while still guarding proprietary information such as prices and supplier names and addresses. The basic nature of the product supply arrangements does not encourage innovation within the trade. Aside from use of the latest communication technologies to allow instantaneous contact with overseas suppliers when necessary (ie mobile telephones), traders rarely use computers for business management or the internet for communication or advertising. The intensive focus on protecting supply contacts and key purchasing clients, leads to a self-focused business outlook: very few traders showed an interest in or were able to estimate their share of the Hong Kong market or to contextualize the Hong Kong market within the world trade.

These characteristics also contribute to a largely passive attitude toward external factors influencing the trade. While some traders are aware of conservation campaigns, e.g., bans on shark finning, only a small portion indicated they would participate in lobbying against potential regulations, and none admitted concerns about negative consequences for their business. When asked to comment on a future scenario of regulatory impacts, the majority of traders indicated they would do nothing, switch to a product that is not regulated or simply raise the price. Traders were also surprisingly unconcerned about the potential for Hong Kong to lose its entrepôt status as more trade is conducted directly with Mainland China.

The trade profile that emerges from these interviews is one of highly independent, conservative, and self-focused merchants who are oriented toward the short-term and largely unconcerned with supply issues including resource sustainability and potential regulation. Apparent passivity in the face of a declining trade is illustrated by the dried whole fish traders who view the demise of their businesses as inevitable, but will continue as long as it remains viable. Younger and less traditional traders' willingness to shift to other products can be interpreted as prioritization of maintaining the business cash flow over any loyalty to the industry per se, despite long family histories in the trade in some cases. These features of the trade suggest that traders would be most directly influenced by shifts in consumer demand, rather than by limits on supply (ie harvest or trade), or calls for voluntary self-regulation.

¹ It is difficult to determine from a reconnaissance visit whether a particular business engages in processing since most processing is conducted off-site, usually in Mainland China.

² The English common names given here are those used by traders (or translations of Chinese names used by traders into the putative matching name used by those traders that speak English). Genetic matching of trader names and species identification is the subject of a parallel study by the author.

³ Another large importer, not interviewed for this study, specializes in importing frozen fins from Spain and Australia, as well as dried fins from the Middle East.

⁴ Abalone are found on rocky substrate and are pried from cracks and crevices by divers.

Section 7:

CONCLUSIONS

This section aims to integrate the analyses and summaries presented in the preceding sections into preliminary conclusions which both depict many features of the dried seafood trade and point to remaining gaps in knowledge. A brief review of existing and potential mechanisms for conservation of traded marine resources is provided as background for specific recommendations for future actions. The utility and limits to using trade information as a component of marine resource management are also discussed.

Summary of Key Findings

Findings based on Customs Statistics

Much of the quantitative data in this report was derived from national customs statistics. In Section 3, Hong Kong customs data were used to describe the scope and magnitude of trade in shark fin, dried abalone, bêche-de-mer and dried fish. An extensive analysis in Section 4 compared declared quantities imported and exported from Hong Kong (a free port) to declared quantities recorded in Mainland China, Taiwan, Singapore and Japan. The purpose of these two types of analyses was to assess the role of Hong Kong as a dried seafood entrepôt, use its data to estimate the volume of trade, and attempt to quantify the biases in regional customs databases, if possible. Developing such findings assists in understanding extraction rates for traded marine organisms, particularly when catch or harvest rates are unavailable from source countries.

Key findings from these two customs-based assessments were as follows:

- Shark fin quantities traded through Hong Kong require several adjustments to avoid over-estimation/double counting, but despite these adjustments,

A meta-analysis between Hong Kong and four key trading partners indicates that Hong Kong's declared quantities are almost always higher.

- imports are increasing annually at an exponential rate of growth of 5%.
- Overall European participation in supplying the shark fin market, measured by imports to Hong Kong, has increased from negligible levels in the early 1990s to 27% by unadjusted weight (13% adjusted weight), almost all of which is exported by Spain.
- As well as supplying local demands, Hong Kong acts as a distribution center for raw fins destined for processing in Mainland China, and for processed fins to other large local markets in Japan, Taiwan, South Korea and Canada, and thus represents an ideal location for monitoring.
- Traded quantities of dried abalone transiting Hong Kong are low relative to the other products in this study, with the market primarily serving domestic demand rather than the re-export trade.
- Domestic consumption of *bêche-de-mer* in Hong Kong has declined in recent years, but Hong Kong's role as an entrepôt for this product, particularly with Mainland China, remains strong.
- In the dried fish trade, which includes several heavily exploited species (Appendix E at www.wcs.org/science/workingpapers), Mainland China is the largest exporter of dried fish to Hong Kong and also the largest importer from Hong Kong. This apparent anomaly may be explained by the agglomeration of fish maws and dried whole fish, which would be likely to be traded in opposite directions, under the same commodity code.
- Hong Kong's declared import and export quantities were reasonably consistent, although generally higher perhaps due to its duty free port, when assessed against records held by Taiwan, Singapore and Japan.
- Large discrepancies between Hong Kong's and Mainland China's customs statistics were observed for shark fins and *bêche-de-mer*. It appears that PRC statistics do not include those products that are imported for processing in the Mainland and thus distort estimates of actual import quantities.
- A meta-analysis of all pairwise comparisons between Hong Kong and these four key trading partners indicates that Hong Kong's declared quantities are almost always higher, and thus, providing commodity codes are coherent, assumed to be more accurate.
- Other jurisdictions may underreport traded quantities by 24-49% compared to Hong Kong quantities, but Hong Kong quantities are also likely to be underreported to an unknown degree.

This assessment has demonstrated the strengths and weaknesses of customs data. In many situations, including those encountered in this study, customs data provide the most standardized, comprehensive and long-standing records of traded quantities. Nevertheless, these data are usually based on self-declarations which are expected to be biased, predominantly toward under-reporting. Free ports such as Hong Kong would appear to remove most of the incentive to minimize declared quantities (i.e., to avoid tariffs), but local traders admit to frequent under-reporting, and Hong Kong customs officials do not maintain any inspection program which would discourage this practice or allow reported quantities to be adjusted. Attempts at quantifying the degree of under-reporting through comparison of Hong Kong's and other jurisdictions' customs databases allow for relative biases to be identified. However, discrepancies between the

Hong Kong quantities and actual traded quantities cannot be directly assessed using any existing data.

Global and regional databases obtained through FAO and SEAFDEC were also examined to determine whether they can contribute to an overall estimate of the global trade. FAO databases provided a clear assessment of Hong Kong's role as a major entrepôt for bêche-de-mer, but were unreliable for similar estimates of abalone and shark fin trade due to differences in commodity codes and other unknown factors causing highly visible discrepancies. Comparison of FAO estimates of world trade in shark fins to an estimate constructed from national trade statistics for the countries considered in this study revealed that in recent years actual traded quantities of shark fin are likely to be more than double the figures given by FAO. In other cases, figures could not be assessed due to differences between national and FAO commodity codes and groupings. SEAFDEC databases showed a closer correspondence with Hong Kong data and in general provided higher estimates of traded quantities for the countries included in its database (than did the FAO data). SEAFDEC data are useful for assessing trade flows and quantities in Asia but include only a limited number of countries and currently lag behind other data sets by several years (i.e., most recent available data is for 1997).

These findings indicate that the global trade cannot be reliably quantified through existing global databases since discrepancies in reporting codes result in underestimation of traded quantities. Therefore, in the absence of better harmonized coding systems, national data from key trading centers should be used to cross-check (and verify or adjust) the global datasets and provide a more accurate estimate of world trade.

Findings based on Market Surveys

Another of the objectives of this study was to assess whether the trade in Asian dried seafood represents a coherent set of products and if so, to what degree the industry is vertically integrated from sources to sales. This type of information can provide insight into the behavior of the market in response to harvest, economic and regulatory factors and suggest leverage points where conservation influence can be exerted. As customs databases will not usually release the name of the importing and exporting parties¹, it was not possible to derive any information on trade structure from customs statistics. Instead, reconnaissance surveys of marine products shops, and interviews with traders in Hong Kong were used to assess the inherent structure of the trade and the degree to which it interacts with and shapes product harvesting.

Key findings regarding business strategies in the dried seafood trade were as follows:

- The number of businesses dealing in shark fin appears to have remained stable over the last 4 years, while the number of firms selling dried whole fish has declined by 50% in the last decade reflecting a shift in consumer demand.
- Half of the surveyed shops handled shark fins, dried abalone, bêche-de-mer and fish maw. Perhaps due to the high profits associated with shark fins, 75% of all surveyed shops stocked this product.
- Many retail shops also offered seahorses and pipefishes, other medicinals/ton-

In recent years actual traded quantities of shark fin are likely to be more than double the figures given by FAO.

The scope and size of the business is limited by the number of overseas supplier relationships that can be maintained and the amount of capital available for advance purchase of goods.

ics (eg ginseng, bird's nest), and other dried foods, indicating a lack of specialization and reliance on particular products.

- Importers and wholesalers specialized in a narrower range of products, probably due to the difficulties associated with maintaining a large number of supplier relationships (see below).
- All of the 10 shops trading in whole dried fish focused almost exclusively on that product. These traders displayed a more pessimistic and resigned outlook than other traders and are considered a distinct sector of the trade.
- In the Hong Kong dried seafood trade, opportunities for vertical integration exist between the activities of sourcing products overseas, importing to Hong Kong, processing, wholesaling and retailing. Key findings concerning business structure and integration were as follows:
 - Vertical integration within firms was common, with most dealers operating at more than one level, and observations suggesting there may be even more integration than was divulged during the interviews.
 - The scope and size of the business is limited by the number of overseas supplier relationships that can be maintained and the amount of capital available for advance purchase of goods.
 - Since the trade is largely conducted without formal contracts, dealers guard information on suppliers and prices to prevent poaching of sources by competitors, and prefer to act independently rather than through trade organizations.
 - A few firms were found to engage in sourcing products overseas in order to sequester a reliable supply of dependable quality product, however, on the whole, traders were not well-informed on the details of product sourcing or status of the marine resource base.

Although the medicinals/tonics trade is considered a separate trade sector in Hong Kong, in practice strict separation of dried seafood from marine-derived medicinal traders and products is not always possible. According to this study, three of the products considered, i.e. shark fins, bêche-de-mer and fish maws, are considered to bestow health benefits to the consumer and there is considerable overlap between dried seafood and other marine medicinals/tonics (especially seahorses/pipefishes) at the retail level. However, at increasingly higher levels in the supply chain, i.e., wholesaling, processing, importing and sourcing, these linkages become progressively weaker as the supply chains fan out to various overseas locations and suppliers.

Based on the results of this study, it appears that the dried seafood trade and the trade in fresh, frozen or live seafood are unrelated. Some dried seafood dealers were observed to carry canned abalone, but none of the interview respondents mentioned fresh, frozen or live seafood. Given that other non-dried product forms would require refrigerated lockers or holding tanks, the observed absence of such facilities in the Sai Yin Pun district lends credence to the interview findings. Further evidence is provided by the location of fresh seafood facilities in other districts. Major live fish holding facilities are located in Aberdeen and Lei Yue Mun, frozen storage facilities are concentrated around the port at Kwai Chung and the airport at Chek Lap Kok, and none of the Hong Kong Fish Marketing Organization markets for fresh fish are based near

Sai Yin Pun. While this conclusion is based only on data from Hong Kong, observations in Singapore, Taiwan and Guangzhou (Mainland China) suggest this is typical in the other major markets for dried seafood.

These conclusions are based primarily on market-level operations, and the possibility of linkages between dried seafood and other seafood businesses at higher levels, eg the financing source of the companies, cannot be dismissed. However, investigation of these linkages was beyond the grasp of this pilot study.

Existing Policy Mechanisms Relating to Seafood Trade and Conservation

The purpose of monitoring the trade in dried seafood products is ultimately to contribute to informed decision-making for managing and conserving the marine populations supporting these trades. This section presents a framework of existing policy mechanisms which can be, and in many cases, are being used to manage marine populations, particularly sharks. Although abalone, bêche-de-mer and dried fishes are not as frequently discussed in this context, these policy mechanisms could equally to be applied to these organisms, and where some instruments have been invoked (e.g., U.S. endangered species status for abalone), these are described below. In each case, improving the quality of information on extraction rates, for example, through trade analysis, would strengthen the effectiveness of each tool.

International Agreements on Fisheries Management

Policy tools for fisheries management in the international arena include treaties, non-binding declarations and international plans of actions. The most relevant treaty mechanisms for fisheries are summarized by Weber and Fordham (1997) as follows:

- The United Nations Convention on the Law of the Sea (UNCLOS), 1982, which allows coastal states to manage resources within their Exclusive Economic Zone toward a goal of maximum sustainable yield, and to cooperate with other states for the conservation and utilization of highly migratory species.
- The Convention on Biological Diversity, 1992, which aims to conserve biological diversity and promote the sustainable, fair and equitable usage of its benefits. The United Kingdom has developed a biodiversity action plan for the basking shark (*Cetorhinus maximus*) and has listed three other sharks as species of concern under this convention (Fowler 1999).
- The Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention'), 1983, which provides a framework for strict protection for migratory species listed on Appendix I as endangered, and multi-lateral agreements for conservation and management of species listed on Appendix II as having unfavourable conservation status.
- The United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995, which calls for Parties to provide accurate reporting of, and minimize, bycatch and discards, and to gather reliable comprehensive scientific data as the basis for precautionary management of high seas fish stocks (Fowler 1999).

In recent months, in preparation for the World Summit on Sustainable Development to be held in September 2002, additional declarations relevant to

Policy tools for fisheries management in the international arena include treaties, non-binding declarations and international plans of actions.

Many fear that the less proactive NPOAs will simply catalogue existing data and reporting practices.

fisheries and the dried seafood trade have been announced. In October 2001, the UN-sponsored Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem adopted a declaration calling for more effective integration of ecosystem considerations in fisheries management in order to improve food security and human development as well as conservation and sustainable use. Japan was the only country to abstain citing concerns regarding the declaration's treatment of the role of marine mammals. In an April 2002 meeting of the 21 member economies of the Asia-Pacific Economic Cooperation (APEC) forum, the Seoul Ocean Declaration was adopted. This declaration embodies a positive step toward combating illegal, unregulated and unreported (IUU) fishing, but several members, including Japan, China, Taiwan and South Korea objected to proposed marine protected areas in the international waters fearing their national fisheries interests would be harmed. Although Asia consumes a large share of the world's marine resources, these recent stances on the part of Asian nations indicate that there is not yet a consensus that harvest levels and practices may need to change in order to achieve sustainability.

Concerns regarding the lack of fisheries management mechanisms for elasmobranchs have recently been articulated in a United Nations Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for sharks (and skates, rays and chimeras) (FAO 1999). The IPOA calls for National Plans of Action to be developed to address issues such as harvest sustainability, improved monitoring, maximum utilization, and minimization of incidental take. National responses to the IPOA vary in scope but even those responses which purport to further shark conservation and management (eg the United States National Plan of Action (NOAA 2001)) have been criticized for failing to provide specific goals, priorities, management authorities and sources of funding to achieve their aims. Many fear that less proactive NPOAs will simply catalogue existing data and reporting practices without proposing any additional measures for improved conservation and management. No similar international management plans have yet been proposed for the other dried seafood species considered in this study.

International Systems for Identifying and Conserving Endangered and Threatened Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which has been ratified by 146 countries, provides the most effective mechanism for controlling trade in products derived from threatened wildlife species. Although three species were proposed for listing on Appendix II at the last Conference of Parties in 2000, none was accepted. Subsequently, the basking shark was listed by the United Kingdom, and the great white shark was listed by Australia, on CITES Appendix III, which requires export/import licenses between the listing state and any other country party to CITES for trade in that species. At the 12th Conference of Parties (November 2002), the basking shark and the whale shark were listed on Appendix II. Of the other dried seafood species discussed in this study, only the totoaba which was listed under Appendix I in 1977, is governed by this treaty.

The IUCN's Red List is another species ranking system which is designed to draw attention to species in need of conservation, regardless of their status in trade. The 2002 IUCN Red List includes 22 elasmobranch species, 1 of which

is in its Critically Endangered category, 9 of which are in its Endangered category and 12 of which are in its Vulnerable category. Many of these species are believed to be used in the shark fin trade (Rose 1996). There are also over 1000 bony fishes on the IUCN's Red List but due to difficulties in identifying traded products to species it is not possible to accurately characterize the degree to which listed species are used in the dried fish or fish maw trade. No abalone or bêche-de-mer species are listed.

Despite the presence of sharks and other fishes on CITES and the Red List, the appropriateness of including commercially exploited populations of fish, and the extent to which fisheries management can substitute for, or obviate, listing is hotly debated (Mace and Hudson 1999; Bersey 2000). Those who oppose the listing of fish species on CITES or the IUCN Red List usually argue that these species are more appropriately conserved through dedicated fisheries management mechanisms.

Policy and Regulatory Tools Implemented by Individual Countries

Another area of recent policy making focuses specifically on harvest practices, ie shark finning. Objections to finning are driven by opposition to wastage of the majority of shark biomass, and cruelty to live-finned sharks (WildAid 2001). There is further concern that finning is escalating mortality rates for sharks which might otherwise be released alive and that the landing or transshipment of fins without the carcasses impedes meaningful tracking of shark catches by species and area. This practice has been the subject of numerous media reports and documentaries, and raised in an increasing number of policy forums in the past two years. A dedicated study of shark finning in Australian waters led to banning shark finning in all Australian tuna fisheries in late 2000 (Rose and McLoughlin 2002). A law banning finning in all United States waters was passed in December 2000 and took effect in March 2002, but like most other shark finning regulations, it does not prohibit trade in fins as long as carcasses are also retained (U.S. Federal Register 2002). Other countries, including Brazil, South Africa, Oman and Costa Rica have banned the retention of fins without the carcasses (Fordham 2001) and similar measures have been implemented in Spain and are under consideration in the European Union (IUCN SSG Chair, pers. comm., November 2001).

Other national management measures may apply to certain dried seafood species. For example, the United States recently listed the white abalone (*Haliotis sorenseni*) on the federal endangered species list and several other abalone species worldwide are proposed for similar status. No shark species have been designated as endangered species in the United States, although several species are managed in the U.S. Atlantic and Gulf of Mexico under a Fisheries Management Plan (Branstetter 1999). Although other countries provide various management measures and proscriptions for the harvest of dried seafood species, the only trade restrictions appear to be the CITES listings for sharks.

Product Certification and Consumer Awareness Campaigns

Leveraging the influence of businesses and consumers to encourage better management of the resources they utilize is a recent development in fisheries. In the

Of the various management measures and proscriptions for the harvest of dried seafood species, the only trade restrictions appear to be the CITES listings for sharks.

Analysis of trade data may be the most viable option for determining global harvest levels and sources for some products.

past five years, various non-governmental organizations, primarily in the United States (ie the National Audubon Society, the Monterey Bay Aquarium), have produced and distributed seafood guides illustrating for consumers the conservation status of the resources, and have advocated reduced consumption of products such as swordfish and caviar. Also seeking to allow consumers to make sustainable choices, the Marine Stewardship Council (MSC), co-founded by Unilever and the World Wildlife Fund, provides a seafood certification scheme whereby fisheries can apply for certification and if successful, market their products using a 'sustainable fishery' logo. To date, the MSC has certified 6 fishery products, and another 8 are under review, all of which derive from temperate areas of the United States, Canada, Australia, New Zealand or the United Kingdom (and do not include dried seafood products). The organization aspires to a greater presence in Asia, but will need to account for region-specific seafood markets and consumer attitudes.

Other campaigns have approached seafood species from the direction of wildlife, rather than fisheries per se. An example of this is WildAid's Asian Conservation Awareness Campaign which aims to educate the public about threatened species and their trade and thus achieve a reduction in demand. WildAid's ongoing shark campaign specifically targets bycatch fisheries and the fin trade, as do the efforts of the Shark Trust and various other smaller marine conservation groups. These groups derive much of their public support and interest through a focus on charismatic species and may not be interested in expanding the scope of their efforts to other dried seafood organisms.

Recommendations for Improved Trade Monitoring and the Use of Trade Information in Marine Resource Conservation

Use of trade data to assess the status and sustainability of marine resources will never be preferred over analysis of catch data or standing stock estimates, due to inherent limitations in trade data. However, short of obtaining standardized and meaningful data from each of the fisheries contributing to the market, analysis of trade data may be the most viable option for determining global harvest levels and sources for some products, if not back-calculating extraction rates for various regions.

If trade data are to be basis of such assessments, customs data will continue to be the primary source of information. Import-export information from tariff-free entrepôts such as Hong Kong provide a constructive starting point since such data would likely have lower biases than those from other trading centers. The utility of the Hong Kong customs data would be dramatically improved by establishing a Hong Kong-based customs inspection program for products of marine conservation interest, even on a very small scale. Data from such a program would provide quantification of biases in declared versus actual quantities and allow Hong Kong figures to be adjusted or bracketed within a confidence interval. The Hong Kong figures could then be used to adjust or bracket data from key trading partners using a pairwise comparison technique for inbound and outbound shipments. In combination with advanced simulation tools, these data would arguably provide the best regional and global estimates of traded quantities for some products and species.

In many cases in this study, traded quantities could not be compared due to

discrepancies in commodity codes. Many systems exist worldwide to harmonize such codes, yet even the subtlest of differences can prevent meaningful tracking. For the products considered in this study, the following recommendations are proposed for consideration by national customs administrations, regional bodies such as the Asia Pacific Economic Cooperation (APEC) forum, or institutions with a global remit such as FAO, the World Customs Organization, and the CITES Secretariat:

- Provide commodity codes to clearly distinguish between raw and processed shark fins and between frozen and dried raw fins (amend ‘salted’ designation to ‘frozen’ where necessary); and
- Establish separate commodity codes for fish maws, including separate codes for perciform fishes and eel-like fishes.

While many other amendments to commodity codes could be suggested, these two are deemed particularly critical to representative monitoring of dried seafood products derived from species of conservation concern.

Beyond improving customs data as the traditional platform for trade analyses, other means of monitoring trade and validating customs records should be pursued. An obvious, though difficult, effort would involve accessing trade records from the industry itself. Quantities and prices of most dried seafood products in Hong Kong are tracked by the traders’ own organizations, and though these data would be difficult to obtain, they would provide a fascinating, and very important, counterpoint to customs data. Another option would involve implementing, on a product-specific basis, a standardized monitoring program of product harvest quantities in the source countries, perhaps through key dealership centers. Such a program could only be accomplished where the supply centers are reasonably concentrated, and freely accessible to monitoring personnel or other designated record-keepers.

All of the above are means of obtaining improved data on trade. Since such data will only provide a sampling of the entire trade, a substantial improvement in estimating total traded quantities and associated harvest rates will require that these improved data sources be matched with improved methods for statistical modeling. Areas in particular need of improved techniques include conversion rates between raw and processed product forms; quantifying and handling uncertainty in estimation of total traded quantities from customs statistics or other datasets where biases are suspected but poorly understood; and synthesizing information from numerous sources and levels of certainty to form a basis for choosing between various management or action alternatives.

The urgency of undertaking any of the recommendations presented above depends on the level of conservation concern associated with the resources utilized in the dried seafood trade. This study has not defined these levels of concern but has investigated, and in most cases clarified, the likely volume of global trade and the role of Hong Kong in these trades.

Of the products considered in this study, at present the greatest concerns surround the trade in shark fin. These analyses have shown that the global trade is likely to be considerably underestimated by the only available global database, and that Hong Kong’s imports are growing year by year. Other findings

Of the products considered in this study, at present the greatest concerns surround the trade in shark fin.

These same results, however, indicate the trade's vulnerability to faltering consumer demand.

concerning the proportional participation in the trade by European countries may be useful for targeted shark fishery management regulations such as bans on shark finning or catch limits in European fisheries. The detailed exploration of customs statistics presented here, and the findings concerning adjustments necessary to correct for overestimation and double-counting, can also guide future monitoring of this trade.

The rationale for management or conservation action on abalone, bêche-de-mer and dried fish products is less clear for various reasons. It appears from this analysis that while Hong Kong dominates the world market for dried abalone, this product form is declining in popularity to other more easily prepared forms. Therefore, the sustainability of abalone harvests is likely to relate more strongly to trade in canned or fresh abalone. In addition, the provenance of abalone, ie wild or cultured, cannot be addressed through existing information, and this would be difficult to achieve without detailed product certification procedures. The bêche-de-mer trade is of conservation concern in some areas and Hong Kong remains the world's largest entrepôt for this dried seafood product. Although Hong Kong's consumption of bêche-de-mer appears to be declining, and world production and trade is also dropping, the trend of demand in Mainland China appears to be the key to both Hong Kong and global trade futures. Although not as widely-publicized as shark fin there are significant conservation concerns associated with some of the fish species, particularly croakers, used in the dried fish trade. Unfortunately, this study has only been able to provide the most preliminary of investigations due to the diversity of species and countries involved and the glaring lack of definition in the dried fish trade commodity codes.

This study's focus on the market places it in an opportune position to comment on the role of market forces in marine resource conservation. The dried seafood trader survey portion of this study concluded that while a small minority of dealers is involved in sourcing products overseas, and several are aware of calls for conservation action, all were primarily pre-occupied with short-term impacts to sales and none considered stock sustainability to be their concern. These results extend little hope for motivating traders to advocate or practice resource conservation as a means of maintaining their trade in the long-term. These same results, however, indicate the trade's vulnerability to faltering consumer demand. While the current decline in sales is likely due to the ominous economic outlook, rather than resource limitations, if this trend of decreasing demand can be reinforced by a heightened consumer awareness, the trader's lack of loyalty to the business may result in a reduction of the global trade and a market-driven conservation benefit.

In summary, the specific recommendations for action arising from this study are:

- Continue monitoring and analysis of customs statistics in Hong Kong (at a minimum) to provide a consistent time series history of extraction rates for dried seafood products of conservation concern (i.e., shark fin at a minimum);
- Approach the Hong Kong Special Administration Region Government to propose a limited-scale customs audit program to allow verification/rectification of dried seafood trade declarations in Hong Kong;

- Inform the FAO and the CITES Secretariat, at a minimum, of the need for additional harmonization of commodity codes and associated national reporting, and of specific discrepancies identified in this study;
 - Publicize, through scientific publication and other dissemination through the marine conservation community, the useful methods explored in this study for future monitoring of the seafood trade and potentially other trades;
 - Develop further methodologies to uncover trade information and explore through statistical modeling both overall extraction rates and the trajectories of the marine resource stocks;
 - Liaise with resource managers to inform them of the potential for trade analysis to provide realistic inputs for models of stock sustainability and conservation, and thus support management actions such as quotas, size limits, protected areas, etc.; and
 - Communicate the characteristics of the trade and the trade community identified in this study to organizations designing consumer awareness programs to allow more accurate and better-targeted campaigns.
-

¹ It is possible to obtain the names and addresses of firms receiving imports in Mainland China, but not the identities of the exporting firms.

REFERENCES

- Anon. (1995). Zhong guo peng ren bai ke quan shu (China culinary art encyclopedia), Zhong guo da bai ke quan shu chu ban zhe (China encyclopedia publishers), Beijing, 840 pp (ISBN: 7500051255, in Chinese)
- Bersey, J. (2000). CITES and commercial fisheries: the relationship between CITES and FAO and RMFOs. IWMC World Conservation Trust Paper downloaded from <http://www.iwmc.org> on 19 May 2001.
- Branstetter, S. 1999. *The management of the United States Atlantic shark fishery*. IN: Case studies of the management of elasmobranch fisheries. FAO Fisheries Technical Paper 378, Volumes 1 and 2, Food and Agriculture Organization, Rome.
- Camhi, M. (1999). Sharks on the line II: an analysis of Pacific state shark fisheries. Living Oceans Program, National Audubon Society, New York, 114 pp.
- Chan, Noel W.W. (1997). Sharks and their parts: a survey of trade in Hong Kong. Unpublished biological project report, Hong Kong University, 76 pp.
- Chan, Noel W.W. (2000). An integrated attitude survey on live reef food fish consumption in Hong Kong. World Wide Fund for Nature Hong Kong, 79 pp.
- Clarke, S.C. (in prep.) 'International Trade in Pelagic Sharks', IN: Sharks of the Open Ocean, E. Pikitch and M. Camhi (eds.) Blackwell Scientific Press.
- Clarke, S. and Mosqueira, I. (2002). A preliminary assessment of European participation in the shark fin trade. Proc. 4th Europ. Elasm. Assoc. Meet., Livorno (Italy), 2000. Vacchi M., La Mesa G., Serena F., & B. Séret, eds. ICRAM, ARPAT-GEA & Soc. Fr. Ichyol, 2002: 65-72.
- Conand, C. (1996). Statistics on Beche-de-mer exports. SPC Beche-de-mer Information Bulletin #8, April 1996, pp 14-15.
- Conand, C. and M. Byrne (1993). A review of recent developments in the world sea cucumber fisheries. Marine Fisheries Review 55 (4) 1-13.
- Conover, S.A. and Y.F. Dong (1998a). Hong Kong dried fish market. Prepared in connection with Saltonstall-Kennedy Grant: Dried Fish Market Investigation and Industry Demonstration Project, March 1998, 29 pp (accessed online at http://www.nmfs.noaa.gov/sfweb/sk/saltonstallken/asian_final.htm)
- Conover, S.A. and Y.F. Dong (1998b). The Chinese dried fish market. Prepared in connection with Saltonstall-Kennedy Grant: Dried Fish Market

- Investigation and Industry Demonstration Project, March 1998, 77 pp (accessed online at http://www.nmfs.noaa.gov/sfweb/sk/saltonstallken/asian_final.htm)
- FAO (1999). International Plan of Action for the conservation and management of sharks. Document FI:CSS/98/3, endorsed February 1999, Food and Agriculture Organization, Rome, Italy.
- FAO (2000). The State of World Fisheries and Aquaculture Report, Part 3 – Trends in world fisheries and their Resources 1974-1999, Figure 38 and Part 1 – World review of fisheries and aquaculture. Accessed on line at www.fao.org on 4 September 2001.
- FAO (2001a). FAO databases accessed on line at <http://apps.fao.org/page/collections> on 31 August 2001. Seafood consumption data from Food Supply database, population data from Population database, and seafood production data from Commodity Balances database (for Fish, Seafood).
- FAO (2001b). FISHSTAT Plus (v. 2.30), Capture Production Database, 1970-1999, released 04.06.2001.
- FAO (2001c). FISHSTAT Plus (v. 2.30), Commodities trade and production database 1976-1999, released 04.06.2001.
- Fong, Q.S.W. (1999). Assessment of Hong Kong shark fin market: implication for fishery management. PhD dissertation, University of Rhode Island, 136 pp.
- Fordham S. (2001). United States Bans Finning. *Shark News* 13:12.
- Fowler, S. (1999). The role of non-governmental organizations in the international conservation of elasmobranchs. pp. 880-903 IN: Case studies of the management of elasmobranch fisheries. FAO Fisheries Technical Paper 378, Volumes 1 and 2, Food and Agriculture Organization, Rome, 920 pp.
- Gordon, H.R. (2000). World abalone supply, markets and pricing from historical, current and future perspectives. *Journal of Shellfish Research* 19(1): 515.
- Huang, G.M. (1998). Abalone Aquaculture (Bao quan cheng jing ji yang zhi). Ji-long: shui chan chu ban she (ISBN: 957859643X, in Chinese), 334 pp.
- IUCN (International Union for Nature Conservation) (2002) IUCN 2002 Red list of threatened species accessed online at <http://www.redlist.org>
- Jaquemet, S. and C. Conand (1999). The bêche-de-mer trade in 1995/1996 and an assessment of exchanges between the main world markets. SPC Bêche-de-mer Information Bulletin #12, September 1999, pp 11-14.

- Jenkins, M. and Mulliken (1999). Evolution of exploitation in the Galapagos Islands: Ecuador's sea cucumber trade. *TRAFFIC Bulletin* Vol. 17, No. 3, pp. 107-118.
- Jimmy, R.A. (1996). Current management policies and problems of the inshore fisheries resources in Vanuatu—sea cucumbers. *SPC Beche-de-mer Information Bulletin #8*, April 1996, pp 11-12.
- Johnson, D.W., A. Ali and A. Mohm'd (1992). The Sultanate of Oman abalone fishery, pp. 448-453 IN: *Abalone of the world: biology, fisheries and culture*, S.A. Shepherd, M.J. Tegner and S.A. Guzman del Proo (eds), Oxford: Fishing News Books, 624 pp.
- Kira, G (2000). The history of the giant Totuava of San Felipe. Accessed online at <http://www.bajadestinations.com/totuava/totuahist.htm> on 30 September 2001.
- Kreuzer, R. and R. Ahmed (1978). *Shark utilization and marketing*. ISBN: 92-5-100654-7. Food and Agriculture Organization, Rome, Italy. 180 pp.
- Lam, David Chi Man (1990). Spatial pattern of marine products shops in Western District and the planning implications. MSc in Urban Planning dissertation, Hong Kong University, 66 pp
- Lau, P. and R. Parry-Jones. (1999). *The Hong Kong Trade in Live Reef Fish for Food*. TRAFFIC East Asia and World Wide Fund for Nature Hong Kong, Hong Kong. 65 pp.
- Lee, C. and Y. Sadovy (1998). A taste for live fish: Hong Kong's live reef fish market. *Naga, The ICLARM Quarterly*, April-June 1998, pp 38-42.
- Lin, S.Y. (1939). Fish air-bladders of commercial value in China. *The Hong Kong Naturalist: a quarterly illustrated journal principally for Hong Kong and South China*, Volume IX:108-118, published by The Newspaper Enterprise Limited, Hong Kong.
- Lokani, P., P. Polon and R. Lari (1996). Management of beche-de-mer fisheries in the Western Province of Papua New Guinea. *SPC Beche-de-mer Information Bulletin #8*, April 1996, pp 7-11.
- Mace, G.M. and E.J. Hudson (1999). Attitudes toward sustainability and extinction. *Conservation Biology* 13(2): 242-246.
- NOAA (National Oceanic and Atmospheric Administration) (2001). *United States National Plan of Action for the Conservation and Management of Sharks (Final)*, February 2001, 88 pp.

- Ng, W.W. (2000). The use of, and attitudes to, shark fin in east Asia: how can we reduce consumption? Oral presentation at Shark 2000 Conference, Honolulu, Hawaii, 22 February 2000.
- Oakes, F.R. and R.D. Ponte (1996). The abalone market: opportunities for cultured abalone. *Aquaculture* 140: 187-195.
- Parry-Jones, R. (1996). TRAFFIC report on shark fisheries and trade in Hong Kong. pp: 87-143 IN: *The World Trade in Sharks: A Compendium of TRAFFIC's Regional Studies (Volume 1)*, 945 pp
- Payne, J., G. Cubitt, D. Lau, and J. Langub (2000). *This is Borneo*. New Holland Publishers Ltd, London, 176 pp.
- Perez-Plascecia, G. (1996). Beche-de-mer fishery in Baja California. SPC Beche-de-mer Information Bulletin #8, April 1996, pp 15-16.
- Pitcher, T. J., Watson, R., Haggan, N., Guénette, S., Kennish, R., Sumaila, R., Cook, D., Wilson, K., and Leung, A. (2000). Marine Reserves and the Restoration of Fisheries and Marine Ecosystems in the South China Sea. *Bulletin of Marine Science*, 66(3): 543-566.
- Prince, J.D. and S.A. Shepherd (1992). Australian abalone fisheries and their management pp. 407-426 IN: *Abalone of the world: biology, fisheries and culture*, S.A. Shepherd, M.J. Tegner and S.A. Guzman del Proo (eds), Oxford: Fishing News Books, 624 pp.
- Rose, D.A. (1996). An overview of world trade in sharks and other cartilaginous fishes, TRAFFIC International, ISBN 1-85850-114-8, 106 pp.
- Rose, C. and K. McLoughlin (2002). Review of shark finning in Australian fisheries. Bureau of Rural Sciences, Agriculture, Fisheries and Forestry, Australia, 86 pp
- Sadovy, Y.S. and Cheung, W-L. (In press). Near extinction of a highly fecund fish: the one that nearly got away. *Fish and Fisheries*.
- Samyn, Y. (2000). Conservation of aspidochirotid holothurians in the littoral waters of Kenya. SPC Beche-de-mer Information Bulletin #13, July 2000, pp 12-17.
- Sant, G. (1995). Marine invertebrates of the South Pacific: an examination of the trade. A TRAFFIC Network Species in Danger Report, TRAFFIC International, 81 pp.
- Schoppe, S. (2000). Sea cucumber fishery in the Philippines. SPC Beche-de-mer Information Bulletin #13, July 2000, pp 10-12.

- SEAFDEC (1991). A survey of boiled and dried anchovy processing in Pangkor, Malaysia. SEAFDEC Newsletter Vol. 14, No. 3, p. 7.
- SEAFDEC (1999). SEAFDEC online fishery statistics for 1991-1995, accessed in September 2001 at www.seafdec.org.
- SEAFDEC (2000). Fishery statistical bulletin for the South China Sea area (1996 data). Southeast Asian Fisheries Development Center, SEC/ST/33 (published March 2000), 159 pp.
- SEAFDEC (2001). Fishery statistical bulletin for the South China Sea area (1997 data). Southeast Asian Fisheries Development Center, SEC/ST/33 (published March 2001), 155 pp.
- Tanaka, S (1994). East Asian Fin Trade. Shark News No. 2, p 6
- Tarr, R.J.Q. (1992). The abalone fishery of South Africa, pp 438-447 IN: Abalone of the world: biology, fisheries and culture, S.A. Shepherd, M.J. Tegner and S.A. Guzman del Proo (eds), Oxford: Fishing News Books, 624 pp.
- U.S. Federal Register (2002). Final Rule: Implementation of the Shark Finning Prohibition Act. Vol. 67, No. 28, pp 6194-6202.
- Vannuccini, S. (1999). Shark utilization, marketing and trade. FAO Fisheries Technical Paper 389, Food and Agriculture Organization, Rome, 470 pp.
- Vincent, A.C.J. (1996). The international trade in seahorses. TRAFFIC International, UK. 163 pp.
- Watson, R. and D. Pauly (2001). Systematic distortions in world fisheries catch trends. Nature 414: 534-536.
- Weber, M.L. and S.V. Fordham (1997). Managing shark fisheries: opportunities for international conservation. TRAFFIC International Species in Danger Report, Cambridge, UK, 61 pp.
- WildAid (2001). End of the Line. WildAid San Francisco/London. 66 pp.
- Yeung, W.S., C.C. Lam and P.Y. Zhao (2000). The complete book of dried seafood and foodstuffs (in Chinese (Cantonese)), Wan Li Book Co Ltd, Hong Kong, 246 pp.
- Yu, R.H. (2001). The eight immortals crossing the sea gambling around the Arhat: history and recipe. Accessed on line at <http://www.china-sd.com/qiluculture/cuisine/cf.html> on 10 September 2001.
- Zar, J.H. (1999). Biostatistical Analysis (4th edition). Prentice-Hall International, Upper Saddle River, New Jersey, 663 pp.

WCS WORKING PAPER SERIES

WCS Working Paper No. 1

Bleisch, William V. (1993) Management Recommendations for Fanjing Mountain Nature Reserve and Conservation of the Guizhou Golden Monkey & Biodiversity. (38 pp.)

WCS Working Paper No. 2

Hart, John A. & Claude Sikubwabo. (1994) Exploration of the Maiko National Park of Zaire, 1989-1994, History, Environment and the Distribution and Status of Large Mammals. (88 pp.)

WCS Working Paper No. 3

Rumiz, Damian & Andrew Taber. (1994) Un Relevamiento de Mamíferos y Algunas Aves Grandes de la Reserva de Vida Silvestre Ríos Blanco y Negro, Bolivia: Situación Actual y Recomendaciones. (40 pp.) (Spanish)

WCS Working Paper No. 4

Komar, Oliver & Nestor Herrera. (1995) Avian Diversity at El Imposible National Park and San Marcelino Wildlife Refuge, El Salvador. (76 pp.) (English and Spanish)

WCS Working Paper No. 5

Jenkins, Jerry. (1995) Notes on the Adirondack Blowdown of July 15th, 1995: Scientific Background, Observations, and Policy Issues. (93 pp.)

WCS Working Paper No. 6

Ferraro, Paul, Richard Tshombe, Robert Mwinyihali, and John Hart. (1996) Projets Integres de Conservation et de Developpement; Un Cadre pour Promouvoir la Conservation et la Gestion des Ressources Naturelles. (105 pp.) (French)

WCS Working Paper No. 7

Harrison, Daniel J. & Theodore G. Chapin. (1997) An Assessment of Potential Habitat for Eastern Timber Wolves in the Northeastern United States and Connectivity with Occupied Habitat in Southeastern Canada. (12 pp.)

WCS Working Paper No. 8

Hodgson, Angie. (1997) Wolf Restoration in the Adirondacks? The Questions of Local Residents. (85 pp.)

WCS Working Paper No. 9

Jenkins, Jerry. (1997) Hardwood Regeneration Failure in the Adirondacks: Preliminary Studies of Incidence and Severity. (59 pp.)

WCS Working Paper No. 10

García Viques, Randall. (1996) Propuesta Técnica de Ordenamiento

Territorial con Fines de Conservación de Biodiversidad en Costa Rica:
Proyecto GRUAS.. (114 pp.) (Spanish)

WCS Working Paper No. 11

Thorbjarnarson, John & Alvaro Velasco. (1998) Venezuela's Caiman Harvest Program: A historical perspective and analysis of its conservation benefits. (67 pp.) (English with Spanish Abstract)

WCS Working Paper No. 12

Bolze, Dorene, Cheryl Chetkiewicz, Qui Mingjiang, and Douglas Krakower. (1998) The Availability of Tiger-Based Traditional Chinese Medicine Products and Public Awareness about the Threats to the Tiger in New York City's Chinese Communities: A Pilot Study. (28 pp.)

WCS Working Paper No. 13

O'Brien, Timothy, Margaret F. Kinnaird, Sunarto, Asri A. Dwiyahreni, William M. Rombang, and Kiki Anggraini. (1998) Effects of the 1997 Fires on the Forest and Wildlife of the Bukit Barisan Selatan National Park, Sumatra. (16 pp.) (English with Bahasa Indonesia Summary)

WCS Working Paper No. 14

McNeilage, Alastair, Andrew J. Plumptre, Andy Brock-Doyle, and Amy Vedder. (1998) Bwindi Impenetrable National Park, Uganda. Gorilla and large mammal census, 1997. (52 pp) (English with French Summary)

WCS Working Paper No. 15

Ray, Justina C. (2000) Mesocarnivores of Northeastern North America: Status and Conservation Issues. (84 pp)WCS working paper No.17
Matthew Gompper (in press) the Ecology of Coyotes in Northeastern North America: Current Knowledge and Priorities for Future Research

WCS Working Paper No. 16

Kretser, Heidi. (2001) Adirondack Communities and Conservation Program : Linking Communities and Conservation Inside the Blue Line. (62 pp.)

WCS working paper No.18

Weaver, John L. (2001) The transboundary Flathead: A critical Landscape for Carnivores in the Rocky Mountains (64 pp.)

WCS working paper No.19

Plumptre, Andrew J., Michel Masozera, Peter J. Fashing, Alastair McNeilage, Corneille Ewango, Beth Kaplin, and Innocent Liengola. (2002) Biodiversity surveys of the Nyungwe Forest Reserve in S.W. Rwanda (96 pp.)

WCS working paper No.20

Schoch, Nina. (2002) *The Common Loon in the Adirondack Park*. (60pp.)

WCS working paper No.21

Karasin, L. (2003) *All-Terrain Vehicles in the Adirondacks: Issues and Options*.

WCS working paper No.22

Clarke, Shelley. (2002) *Trade in Asian Dried Seafood: Characterization, Estimation and Implications for Conservation*. (92pp.)

Copies available from:

Wildlife Conservation Society
International Conservation
2300 Southern Boulevard
Bronx, New York 10460-1099 USA
Telephone: (718) 220-5155
Fax: (718) 364-4275
<http://www.wcs.org/science/workingpapers>

