



MARKET FORCES:

**AN EXAMINATION OF
MARINE TURTLE TRADE
IN CHINA AND JAPAN**

Timothy Lam, Xu Ling, Soyo Takahashi
and Elizabeth A. Burgess

A TRAFFIC EAST ASIA REPORT

TRAFFIC

the wildlife trade monitoring network

This report was published
with the kind support of



Published by TRAFFIC East Asia,
Hong Kong SAR, China

© 2012 TRAFFIC East Asia

All rights reserved.

All material appearing in this publication is copyrighted and may be reproduced with permission. Any reproduction in full or in part of this publication must credit TRAFFIC East Asia as the copyright owner.

The views of the authors expressed in this publication do not necessarily reflect those of the TRAFFIC Network, WWF or IUCN.

The designations of geographical entities in this publication, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of TRAFFIC or its supporting organizations concerning the legal status of any country, territory, or area, or its authorities, or concerning the delimitation of its frontiers or boundaries.

The TRAFFIC symbol copyright and Registered Trademark ownership is held by WWF. TRAFFIC is a joint programme of WWF and IUCN.

Suggested citation: Lam, T., Xu Ling, Takahashi, S., and Burgess, E.A. (2011). *Market Forces: An Examination of Marine Turtle Trade in China and Japan*. TRAFFIC East Asia, Hong Kong.

Layout by Catalyze Communications

ISBN 962-86197-8-0

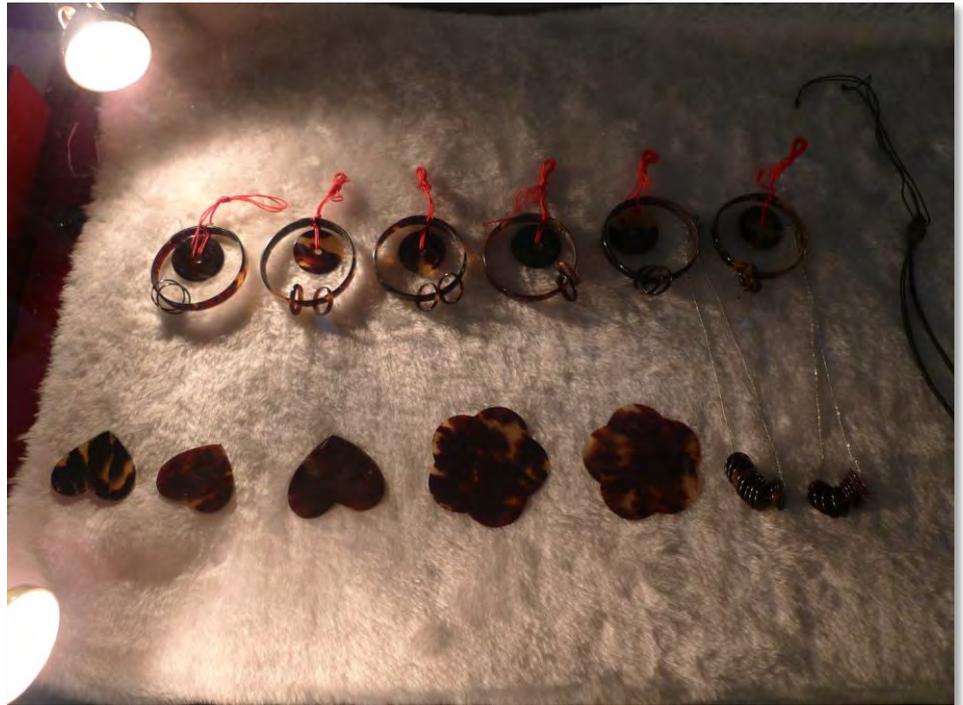
Cover: Green and Hawksbill Turtles on sale in Qingdao, Shandong Province, China

Photograph credit: Xu Ling/TRAFFIC

MARKET FORCES: AN EXAMINATION OF MARINE TURTLE TRADE IN CHINA AND JAPAN

Timothy Lam, Xu Ling, Soyo Takahashi and Elizabeth
A. Burgess

Credit : Xu Ling / TRAFFIC



Hawksbill Turtle shell jewellery on sale in Sanya, Hainan Province

CONTENTS

Acknowledgements	iii
Executive summary	iv
Introduction	1
Legislation review	7
Harvesting controls for marine turtles	7
Domestic trade controls for marine turtles	8
Methods	10
Results	13
Reported seizures in East Asia	13
Market Survey Findings	18
Mainland China	18
Source markets	22
Regional cities	25
Major cities	27
Traditional Chinese Medicine markets	28
Japan	29
Tokyo	29
Nagasaki	30
Okinawa	32
Japan Bekko Association	33
Ranching of Hawksbill Turtles	35
Discussion	37
Conclusions	41
Recommendations	42
References	45

ACKNOWLEDGEMENTS

This report would not have been possible without the support of WWF's Coral Triangle Programme, particularly Dr Lida Pet-Soede. Timothy Lam, formerly of TRAFFIC East Asia, is thanked for his co-ordination of research into the trade of marine turtles in China and Japan, led by Xu Ling and Soyo Takahashi, respectively.

Inputs from Joyce Wu, Sean Lam and Professor Xu Hongfa were also extremely helpful in compiling the information. Collaborative thanks go out to Steven Broad, James Compton, Kevin Hiew, Ken Kassem, Noorainie Awang Anak, Kanitha Krishnasamy and Irene Kelly for their peer review comments and feedback which made this report stronger. Julie Gray, Richard Thomas and Marc-Antoine Dunais are thanked for their efforts in preparing the report for publication.

EXECUTIVE SUMMARY

Marine turtle shell remains a much sought-after commodity, as well as turtle meat and whole specimens, and as a result, Hawksbill Turtle and other marine turtle populations are under heavy exploitation pressure. Evidence from current seizure records and market surveys highlight a consistent illegal trade route to mainland China from the Coral Triangle region of South-east Asia (mainly the Philippines, Malaysia, and Indonesia). This report analyses 128 seizures involving the East Asian countries between 2000 and 2008, with a trade volume of over 9180 marine turtle products including whole specimens (2062 turtles), crafted products (n = 6161 pieces) and raw shell (789 scutes and 919 kg).

The demand for marine turtles and their shell products in Hainan Province and the rest of mainland China is of an increasing magnitude. Mainland China is undoubtedly a major market for illegal trade with 150 whole specimens and 7217 processed shell products observed for sale in 117 shops with a value of nearly half a million USD. Traditional Chinese Medicine markets were found to be selling 159 kg of shell. The open sale of marine turtle products undoubtedly indicates the demand for marine turtles in China, and seizure records are evidence of the heavy exploitation that is occurring to meet this demand. In the period of this study, 2017 individual turtles were confiscated in seizures implicating mainland China. This equates to 98% of the whole specimen trade in the region. Taiwan appears to be a significant market for processed shell items with a single seizure confiscating 6120 pieces. Seizures in Hong Kong were mostly confiscated shell scutes hidden in cargo consignments, with the largest seizure involving 556 kg.

Available information shows that the number of seizures in the region has been increasing, with 2007 and 2008 recording the highest number of apprehensions. Authorities in China have seized 539 whole specimens, but the volume of whole marine turtles confiscated in international seizures which implicated Chinese nationals was 1478 turtles. Most local fishermen interviewed considered marine turtles to be a valuable by-catch species. However, there are indications that some fishing vessels from China are directly targeting marine turtles. The revenues generated by this commerce are sufficient to encourage Chinese nationals to venture into foreign territorial waters overriding concerns of enforcement and penalties. The largest seizure reported during the study period involved 387 dead turtles aboard a Chinese fishing vessel in the Derawan Archipelago in East Kalimantan (Indonesia). It is presumed that poachers are targeting source locations widely distributed across the Sulu and Celebes Sea (Sulu-Sulawesi Marine Ecoregion). With current population declines, it appears that turtle poachers are now travelling to more distant fishing areas to fill their catch, and potentially remaining in foreign waters surrounding remote archipelagos to fill their cargo.

In Japanese markets, the demand for highly decorative *bekko* pieces skilfully manufactured from Hawksbill marine turtle shell remains persistent. In 58 shops visited in Tokyo, Nagasaki and Okinawa, we found 11 080 *bekko* items for sale. From reports of seizures entering the country, it was apparent that import shipments of marine turtle into Japan were only the raw scutes, which had been removed from the turtle carapace. All consignments of marine turtle shell were exported to Japan by mail or air. The largest seizures involved 89 kg and 400 pieces of shell product imported from Indonesia. However, seized scute shipments were generally small and potentially easily concealed, hence, exporters smuggled packages by mail and air into Japan. After its removal from the turtle, the raw scute, which is the principal export product in this trade, can be stored dry without special treatment for years. It is therefore probable that the true extent of the marine turtle trade in Japan is more easily concealed because the trade was only in scutes and the number of marine turtles harvested is difficult to estimate. This trade in scutes contrasts greatly with that of the whole specimens recorded in China, which allows a direct count of the number of animals involved in the marine turtle trade.

Poaching pressure on marine turtle populations can be attributed to commercial demand at a regional (Asia) and global scale, inadequate enforcement of laws, but also the socio-economic needs of both the source and consumer countries. There are significant contrasts between the markets of China and Japan, based on consumer demand, commodity value, trade volume and even product-type. However, the source of marine turtles was similar in China and Japan with nationals from both countries involved in seizures of marine turtles sourced from countries in South-east Asia. Poaching by foreign vessels in the territorial waters of neighbouring countries is a serious conservation problem. Equally, profit-seeking subsistence fishermen are often exploited by their own countrymen. Undoubtedly, the scale of trade across China and the motivation of Chinese nationals to harvest in foreign waters clearly implicate China as a major player in this global trade. This study aimed to compile information comprehensively from seizure records and market surveys in China and Japan. This report draws attention to the Coral Triangle as being the target region for poaching marine turtles, and the scale of trade places significant pressure on marine turtle populations in the Sulu-Sulawesi Marine Ecoregion.

Recommendations resulting from this study to mitigate the current trend in marine turtle trade are as follows:

- Legal protection of marine turtles in China should be supported by strengthened enforcement actions by relevant government authorities, such as the Fishery Department of China's Agriculture Administration. Actions include confronting the issue of domestic trade and increasing efforts to detect and prevent further illegal harvesting by Chinese fishermen in foreign waters. Deliberate confiscation and destruction of all marine turtle products that remain for sale in all stores and warehouses, in accordance with the law, would also help deter further offences.

- Strengthened enforcement in China should be supported by an awareness campaign targeting local public, tourists, vendors and fishers regarding the illegal sale and/or capture of marine turtles, and to raise awareness of existing legislation and illegal trade issues – particularly focused in Hainan Province. There is a need to educate and mobilize Hainan residents, and the burgeoning numbers of tourists, to support better control of marine turtle trade. Awareness campaigns and interactive dialogue between stakeholders, government and non-government organizations will help change perceptions and develop understanding of the need to protect marine turtles and prevent illegal trade.
- Multi-lateral, regional, inter-regional commitments should be strengthened across international boundaries and in territorial waters of source countries to unify conservation efforts on a global scale. Both China and Japan are recognized range States for marine turtles, but are not yet signatories to the Memorandum of Understanding on the conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA). It is recommended that China and Japan become signatories to the IOSEA Marine Turtle international agreement in order to further support international actions for marine turtle conservation, including the curbing of illegal international trade. Regional efforts should build on the current Sulu-Sulawesi Marine Ecoregion Tri-national Sea Turtle Conservation Programme, and the inter-governmental Coral Triangle Initiative.
- Systematic exchange of actionable intelligence information regarding illegal harvest and trade of marine turtles and their products should be promoted between countries in South-east and East Asia with multi-national and trans-regional co-operation required. It is recommended that illegal harvest and trade of marine turtle products be prioritized for intelligence exchange and further law enforcement action by the 10 member countries of ASEAN Wildlife Enforcement Network, with links to existing markets in the ASEAN+3 grouping (China, Japan, South Korea).
- Assessments should be made of the socio-economic status and economic incentives that drive the direct and opportunistic take of marine turtles in China. Socio-economic studies should be conducted in fishing communities and other local businesses involved in the harvesting, processing or trade of marine turtle products to determine the level and nature of dependence on marine turtle products – particularly in Hainan Province. Solutions should consider non-consumptive uses for marine turtles in the region and create tangible benefits to the communities that interact with marine turtles. For example, enhancing tourism initiatives in Hainan would create alternative job opportunities and revenue, and engender stronger commitment for conservation efforts.

- Relevant government authorities in China should focus capacity building at regional and national levels to further educate relevant law enforcement agencies about marine turtle conservation including enforcement activities. The Fishery Department of Agriculture Administration and relevant partners, including non-government organizations, should co-operate with law enforcement agencies in the training of field staff on the implementation and enforcement of CITES and relevant national law.
- Government and non-government organization partners should continue monitoring the status of marine turtle product availability and trade patterns in China, in order to measure the success of enforcement efforts and to keep abreast of changing market trends, trade routes and other relevant information. Regional capacity building in China should be promoted through strengthening research and advocacy skills, and involving the institutional capacity of participating academic and research organizations. The current population status of all marine turtle species in the wild should continue to be monitored, and local individuals and organizations should be trained to carry out such monitoring projects. Such actions will highlight and prioritize issues requiring international co-operation and management.
- Advocacy targeted at the decline of *bekko* trade is needed in Japan. Strategies should involve relevant government agencies, such as the Ministry of Agriculture, Forestry and Fisheries, and include raising awareness through interventions with key stakeholders and the public, and the Japan Bekko Association. Any existing or proposed Hawksbill Turtle ranching projects in Japan should be monitored closely and evaluated for potential impact on marine turtle trade dynamics and Hawksbill Turtle conservation.
- There is current knowledge gap regarding the availability of marine turtle products in domestic trade of some countries and territories in East Asia, particularly Taiwan and South Korea. Both have been revealed as significant markets in the marine turtle trade in the past, and should be considered a priority to evaluate further the status of current trade.

INTRODUCTION

Marine turtles have been exploited extensively for their mottled, translucent scutes which cover the carapace and plastron of the turtle shell (Groombridge and Luxmoore, 1989; van Dijk and Shepherd, 2004). These keratinous scutes have been coveted for centuries as raw material for artefact manufacture (Aikin, 1840). Known as tortoiseshell or *bekko* in the antiquities and wildlife trade, marine turtle scutes are commonly used to make jewellery, combs, hand-held fans, buttons, spectacle frames, furniture embellishments and numerous curios (Limpus and Miller, 1990; Márquez 1990; van Dijk and Shepherd, 2004). The speckled amber and brown appearance of these artefacts is highly distinctive and visually appealing, which has led to a market demand for marine turtle shell (Canin, 1991). Despite international protection, marine turtles are still being harvested and exploited for tortoiseshell scutes as well as for their meat (Lilley, 2009; Dethmers and Baxter, 2011) and their eggs (Anon, 2009a). Therefore, reports of the commercial sale of marine turtles and their parts are critical to wildlife law enforcement efforts.

All marine turtle species (Families Dermochelyidae and Cheloniidae) are listed in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES came into force in 1975, and by 1977, it prohibited international trade of marine turtles and their products among its signatory nations. At that time, at least 45 countries were involved in exporting and importing raw tortoiseshell. Today, all seven marine turtle species are listed in Appendix I of CITES: Leatherback Turtle *Dermochelys*



Finished turtle products at a small *bekko* factory in Nagasaki, Japan.

Credit : © Jeanne A. Mortimer / WWF-Canon

coriacea, Green Turtle *Chelonia mydas*, Hawksbill Turtle *Eretmochelys imbricata*, Loggerhead Turtle *Caretta caretta*, Olive Ridley Turtle *Lepidochelys olivacea*, Kemp's Ridley Turtle *Lepidochelys kempii* and Flatback Turtle *Natator depressus*. The Leatherback Turtle (Family Dermochelyidae) lacks carapacial scutes and is not exploited for the tortoiseshell trade. The Flatback and Kemp's Ridley Turtle are very rare, and are not known to be used in the tortoiseshell trade (van Dijk and Shepherd, 2004). The most extensively used species in the tortoiseshell trade is the Hawksbill Turtle, though the Green and Loggerhead Turtle may also be exploited for their scutes (van Dijk and Shepherd, 2004).

Large numbers of Hawksbill Turtles have been harvested around the world (Mack, 1983; Groombridge and Luxmoore, 1989; Milliken and Tokunaga, 1989; Duc and Broad, 1995; van Dijk and Shepherd, 2004; Stiles, 2008; Kinch and Burgess, 2009). The tortoiseshell scutes of Hawksbill Turtles are more distinctly patterned than those of the other marine turtle species – though pigmentation in scutes can be highly variable (Frazier, 1971; Kobayashi, 2001; van Dijk and Shepherd, 2004). Hawksbill scutes are typically thicker than those of other marine turtle species and are more conducive to use as a raw material source. Items are fashioned by bonding, shaping, and carving the scutes to create pieces of jewellery, decorative ornaments, and tools (Groombridge and Luxmoore, 1989; Canin, 1991; Hainshwang and Leggio, 2006). The harvest of marine turtles to obtain this raw material is recognized as a key threat to their conservation in the wild, and has greatly contributed to their global status of Hawksbill Turtles as Critically Endangered (IUCN, 2011).

Tortoiseshell, known in Japanese as *bekko*, has been a precious commodity in global trade since ancient times. The working of tortoiseshell into ornaments appears to have first begun in China over a thousand years ago, and was introduced to Japan during feudal times (the Edo Period, about 300 years ago) (van Dijk and Shepherd, 2004). Since the 1700s, the Japanese have been renowned as the world's best *bekko* artisans. Historically, both China and Japan have figured prominently in the trade of this commodity throughout the world. However, much of the extensive decline in Hawksbill Turtle populations has occurred in the 20th century, driven by intense



Bekko factory worker operating on the ventral part of a turtle shell (plastron) to make products. Nagasaki, Japan.

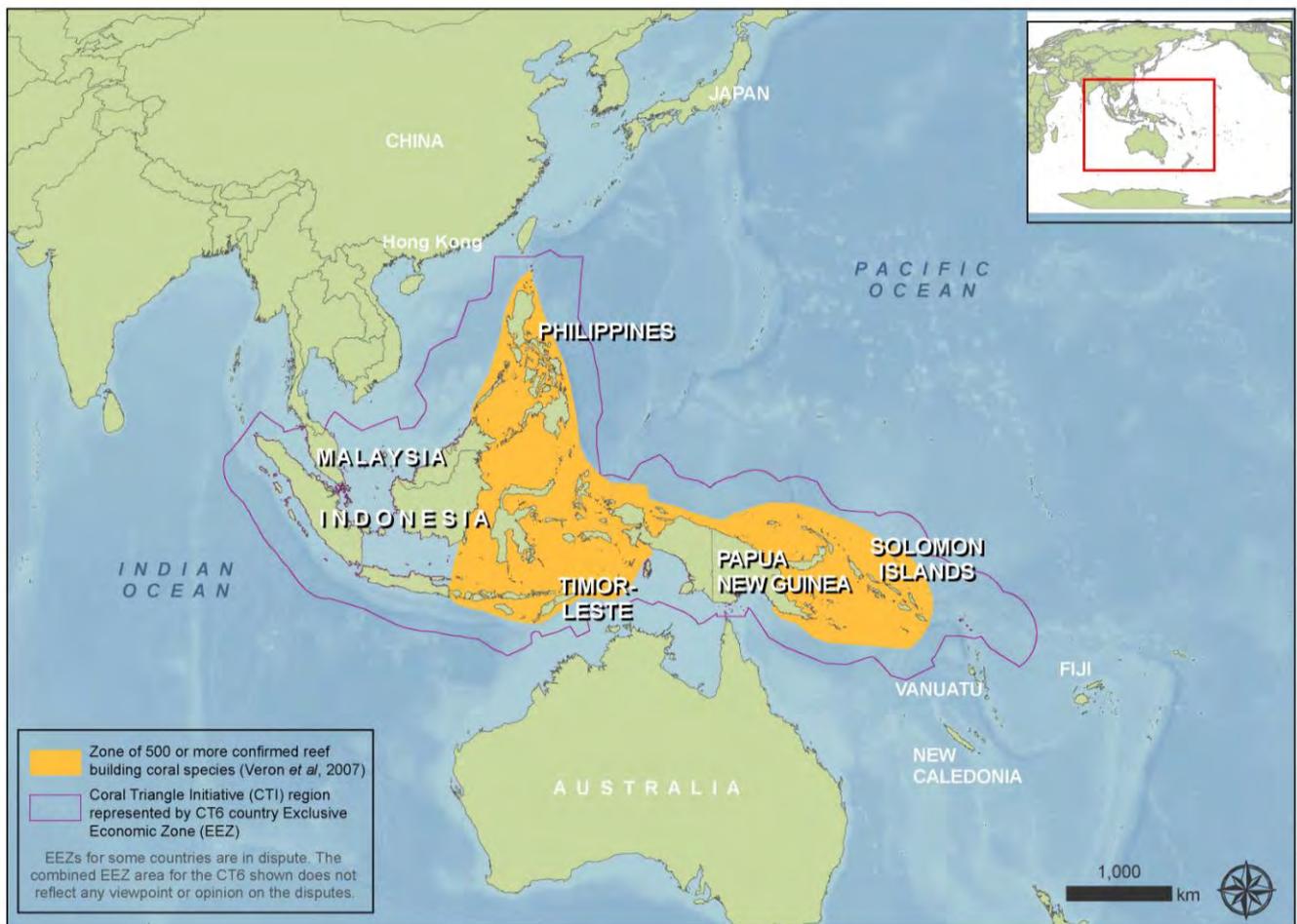
Credit : © Jeanne A. Mortimer / WWF-Canon

international trade in *bekko* to supply luxury and craft markets. Although the volume of global trade is considered to have decreased after decades of conservation, it remains an active threat.

When CITES enforcement over marine turtle trade came into effect (1977), trading did not effectively cease for several decades because Japan took a reservation (legal objection) to the listing when it acceded to CITES in 1980. By 1994, international pressure forced Japan to end its marine turtle product imports by withdrawing its reservation to the Appendix I-listing of the Hawksbill Turtle. However, Japan has supported several unsuccessful efforts to reopen the international marine turtle trade (CITES Prop. 10.60 in 1997, Prop. 11.40 and 11.41 in 1999, Prop. 12.30 in 2002). These Proposals by Cuba would have transferred Hawksbill Turtles from CITES Appendix I to II in order to allow for limited and highly regulated trade between Cuba and Japan only. The Cuban proposals failed to obtain the required two-thirds majority support by CITES Parties in 1997, and again in 1999 (only Prop. 11.41 was voted on as Cuba withdrew Prop. 11.40). In 2002, Cuba withdrew the CITES Proposal (Prop. 12.30) to transfer stockpiled shell from Cuba to Japan, three months before the CITES 12th Conference of the Parties (Santiago, Chile). The standing *bekko* stockpile in Japan should now be exhausted, but the industry remains intact with a continued demand for marine turtle shell items (TRAFFIC, 2004; van Dijk and Shepherd, 2004; Stiles, 2008). In the years preceding the 1994 ban on *bekko* imports, a number of attempts to smuggle *bekko* into Japan were intercepted – ranging from a container shipment carrying over three tonnes of *bekko* from Indonesia (1995) to smaller shipments sent by international mail from Dominica (1995) and flights from Singapore (1996–1998) (van Dijk and Shepherd, 2004). Despite important progress in reducing global trade (for example, in Viet Nam: Stiles, 2008), there remains a serious concern over the volumes of marine turtle trade in East Asia, particularly Japan and China.

In the China Sea, five marine turtle species are found along the southeast coast of China and around the southern districts of the Japan islands: Green Turtle, Hawksbill Turtle, Loggerhead Turtle, Olive Ridley Turtle and Leatherback Turtle. Only the Green Turtle, Hawksbill Turtle and Loggerhead Turtle have nesting populations in China and Japan (Kikukawa *et al.*, 1999; Cheng, 1995, 1996). In the South China Sea, Hawksbill Turtles were known to nest on Dongsha in Taiwan, and on the Paracel Island archipelago (Xisha Islands) east of Hainan (Cheng, 1995, 1996) – although no current nesting data are available (Anon, 2006). Marine turtles are frequently sighted south along the coastal sea of Fujian, Guangxi, Hainan Island to Paracel Islands, with a notable increase in Hawksbill Turtles in the waters around Hainan island (Chu-Chien, 1995). It was estimated that around 1000–1500 turtles were harvested annually in the Paracel Islands between the 1960s and 1980s (Shizheng and Hai-Tao, 2009). Such heavy exploitation pressure combined with destructive fishing practices and beach development have led to the severe depletion of marine turtle populations in this region (Shizheng, 2009).

Japan's southern archipelago is considered the northern extreme of the Hawksbill Turtle's distribution in the Pacific, and Hawksbill Turtles occur only in small numbers with low nest counts (Kikukawa *et al.*, 1999). Hawksbill Turtles were never found in abundance in Japanese waters and current trends of marine turtle decline in the China Sea has meant that Japan's *bekko* industry and China's marine turtle market must largely depend on international imports. Neighbouring countries with sizeable populations of marine turtle are Viet Nam and further south the Philippines (Carrascal de Celis, 1995), Malaysia (Sabah) and Indonesia (Kalimantan and Sulawesi) in the biodiverse Coral Triangle region.



Credit: Unpublished data, Veron *et al.*

Map of the Coral Triangle

The Coral Triangle, a roughly triangular geographic zone enclosed by the Philippines, Malaysia, Indonesia, Papua New Guinea, Solomon Islands and Timor-Leste, is identified by an area with more than 500 species of reef-building corals (Veron *et al.*, unpublished data), and is recognized as the region with the richest marine biodiversity region in the world (Carpenter *et al.*, 2011). At the apex of the Coral Triangle region is the Sulu-Sulawesi Marine Ecoregion, which encompasses the Sulu Sea and Celebes Sea (bordered by the Philippines,

Malaysia and Indonesia), and has been recognized by a broad range of stakeholders as crucial to managing and conserving marine biodiversity and resources. Recently recognized as a marine hotspot (Carpenter *et al.*, 2011), the region has a large variety of tropical marine habitat types, ranging from the fringing reefs of thousands of islands, to some of South-east Asia's largest and most intact stands of mangroves. The Coral Triangle is known for its staggering natural productivity and is considered a unique and valuable marine ecosystem, with species richness incrementally decreasing from this region eastward across the Pacific Ocean and westward across the Indian Ocean (Hoeksema, 2007). Conserving this marine biodiversity is the focus of the inter-governmental Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (see www.cti-secretariat.net/).

Six of the seven marine turtle species are found in the Coral Triangle, including the Green, Hawksbill, Loggerhead, Olive Ridley, Leatherback and Flatback turtle. The Turtle Islands region is part of the Sulu Archipelago, composed of approximately 400 islands between the southwestern tip of the Philippines and northeast apex of Sabah, Malaysia, and holds the world's largest concentration of Green and Hawksbill Turtles. The Governments of the Philippines and Malaysia recognized the significance of Turtle Islands for marine turtle protection and signed a bilateral agreement establishing the Turtle Islands Heritage Protected Area (TIHPA). The TIHPA, declared in 1996, is the first and only trans-frontier protected area for marine turtles in the world. Management of the TIHPA is shared by both countries in order to achieve the conservation of habitats and marine turtles over a large area independent of their territorial boundaries. Despite such initiatives, marine turtles in the Coral Triangle region remain under threat from direct exploitation for human consumption (meat and eggs) (TRAFFIC, 2004; Lilley, 2009; Dethmers and Baxter, 2011) and for the luxury tortoiseshell trade (TRAFFIC, 2004; Kinch and Burgess, 2008), as well as incidental by-catch from longline fishing practice (Anon, 2011) and degradation of marine turtle habitats.

Marine turtle populations in the Coral Triangle have declined dramatically in recent decades—by as much as 90 percent for some populations (WWF, 2011). Losing the biodiversity integrity of marine systems is a serious concern, and the impact of marine turtle harvest will undoubtedly cause ecosystem effects. Hawksbill turtles are consumers of sponges (Leon and Bjorndal, 2002), and their absence from reefs may allow competitively



Juvenile Hawksbill Turtle

Credit: © Rafael Mesa / WWF-NL

superior sponges to overgrow and kill corals (Bjorndal and Jackson, 2003). Consequently, as spongivores, Hawksbill Turtles play an important role in maintaining healthy coral reefs by freeing up space on the reefs for other organisms to settle and grow (Bjorndal and Jackson, 2003). Successful conservation and management of Hawksbills may be an essential component for reef biodiversity, ecosystem restoration and protection. Multi-lateral initiatives have bolstered conservation efforts in this important region, though continued direct and indirect mortality of marine turtles remains an urgent conservation and management issue.

Globally distributed and highly migratory marine megafauna, such as marine turtles, present serious challenges to conservation strategies and international enforcement. Previous marine turtle trade investigations by TRAFFIC in Viet Nam (TRAFFIC, 2004; van dijk and Shepherd, 2004; Stiles, 2008), the Philippines (Schoppe and Antonio, 2009), Indonesia (TRAFFIC, 2004; Lilley, 2009), Malaysia (Anon, 2009a), Japan (Milliken and Tokunaga, 1987; Le Dien Duc and Broad, 1995) and Papua New Guinea (Kinch and Burgess, 2009) exemplify that the trade in these migratory species crosses multi-national trade routes in commercial quantities, is influenced by socio-economics, culture and politics, and is driven by both demand for luxury items, and some nutritional needs. Researchers and conservationists remain concerned that the pressures on marine turtles have not declined and that a significant market appears to persist.

The aim of this study was to gain current information on the trade dynamics of marine turtle products throughout China and Japan, both considered major consumer markets for marine turtles. The information gleaned from this research would then become a building block for a targeted advocacy and communications campaign, in partnership with government agencies and the private sector, to address persistent market demand in China, Japan and elsewhere in Asia.

LEGISLATION REVIEW

An analysis of legislation related to marine turtle trade in China and Japan was conducted. The following is a summary of key enforcement legislation governing marine turtle harvest and trade:

Harvesting controls for marine turtles

In China, wildlife protection is ratified under the *Law of the People's Republic of China on the Protection of Wildlife* of 1988. According to the Wildlife Protection Law, the hunting, catching or killing of wildlife under state protection is prohibited (Article 16). All marine turtles are listed as state-protected Class II wildlife species. Provincial agencies are authorized to approve the hunting of Class II species for research, domestication, exhibition, or other special purposes (Article 16). Specifically, an application must be made to the relevant department of wildlife administration under the government of a province, an autonomous region or a municipality directly under the Central Government to obtain a special licence for hunting and catching state-protected species. The Wildlife Protection Law contains detailed provisions on penalties for various offences including illegal trade, trafficking, smuggling of protected species and falsification of documents. Legal penalties for violations of the Wildlife Protection Law come from several sources of laws, legislative decisions, and court rulings, such as the *Criminal Code (1997)*. The *Criminal Code* (Article 341) refers to the terms and charges for crimes involving rare and endangered wildlife which are under state protection. Article 341 specifically states that those who illegally hunt and kill rare and endangered wild animals or who illegally purchase, transport or sell those rare and endangered wild animals and their manufactured products are to be sentenced to not more than five years of fixed-term imprisonment or criminal detention, and may in addition be sentenced with a fine. In serious cases, offenders are to be sentenced to not less than five years and not more than 10 years of fixed-term imprisonment, and may in addition be sentenced to a fine. In especially serious cases, offenders are to be sentenced to more than 10 years of fixed-term imprisonment, in addition to a fine and confiscation of their properties.

In Japan, according to the *Fisheries Resources Protection Law* and *Fisheries Law*, harvesting, possession and sales of Olive Ridley and Leatherback Turtle are prohibited. In the case of by-catch of these species, the harvester has to return live turtles to the ocean and any dead specimen must be buried or burnt on the beach. These actions must be reported to the governor and Minister of Agriculture, Forestry and Fisheries (MAFF). The harvest of Olive Ridley and Leatherback Turtle can only be permitted for the purpose of scientific research under licence

issued by the MAFF. Similarly, the harvest of Green Turtle, Hawksbill Turtle and Loggerhead Turtle (species with nesting populations in Japan) is also only allowed for scientific research but is regulated by the *Prefectural Fishery Adjustment Rule* and Fishery Adjustment Commission (FAC). This structure allows individual prefectures (total 66 administrative sea areas in Japan) to establish marine fisheries adjustment regulations at a regional or local level. Such that, some administrative areas permit marine turtle catch by licensed commercial fishers as well as for scientific purposes and captive breeding purposes. For example, Okinawa prefecture sets a catch quota for marine turtles (see **Results** section - Okinawa). The harvester is required to register and obtain a licence from the local governor or FAC, and report the harvesting information to the governor or FAC. There are closed harvesting seasons, from 1 June to 31 July in Tokyo, Wakayama, Miyazaki, Kagoshima and Okinawa prefectures; 1 May to 31 July in Kochi prefecture and 1 May to 30 September in Tokushima prefecture. Only Tokyo and Okinawa prefectures have size limits for the catch: Green Turtle carapace length should be > 75 cm (Tokyo Prefecture), while for Hawksbill Turtle plastron length should be > 25cm (Okinawa Prefecture). A new penalty for violation of the Fisheries Law became effective on 1 April 2008, which states that any offender will be punished with a fine of not more than JPY2 million and/or up to three years imprisonment.

Domestic trade controls for marine turtles

In China, as stated in Article 22 of the *Law of the People's Republic of China on the Protection of Wildlife (1988)*, the sale and purchase of wildlife under state protection or the products thereof are prohibited. Where the sale, purchase or utilization of wildlife under Category II state-protection or the products thereof is necessary, the persons concerned must apply for approval by the Department of Wildlife Administration under the government of the relevant province, autonomous region or municipality directly under the Central Government or by a unit authorized by the same department. Units and individuals that domesticate and breed wildlife under special state protection may, by presenting their domestication and breeding licences, sell wildlife under special state protection or the products thereof to purchasing units designated by the government. The Wildlife Protection Law (Article 24) acknowledges China as a Party to CITES (joined in 1981) and international trade must thus be approved by the Department of Wildlife Administration *under* the State Council or *by* the State Council. An import or export permit must be obtained from the CITES Management Authority in charge of the species concerned. According to Article 151 of the *Criminal Law of the People's Republic of China*, the penalty for smuggling species protected by the state is imprisonment for at least five years and a fine. However, in specific cases that are deemed not to be serious, offenders are to be imprisoned for a term less than five years and a fine.

Japan became a signatory nation to CITES in 1980 but took out a CITES Reservation on Hawksbill Turtle and *bekko* trade. This reservation was withdrawn on 29 July 1994 (Ministry of International Trade and Industry (MITI) (Import Notice No. 436, 20 July 1994). The Japanese government has assigned the Ministry of International Trade and Industry (MITI) the task of implementing CITES, overseeing all permit processing, and inspecting imports to ensure that restrictions on Hawksbill Turtle shell are enforced. Japan implements CITES through its *Foreign Exchange and Foreign Trade Law* (FEFTL) and its *Customs Tariff Law*. The commercial import and export of marine turtle has been prohibited under the terms of the FEFTL, since July 1994. In accordance with the FEFTL, all imports or exports of CITES Appendix I specimens require a CITES permit from MITI, and violation of this law is punishable under the FEFTL and the *Customs Tariff Law*. Japan's domestic trade in CITES Appendix I-listed specimens is controlled under the *Law for the Conservation of Endangered Species of Wild Fauna and Flora* (LCES) of 1992. Initially, the 1992 LCES controlled trade in stuffed Hawksbill specimens, but not carapaces or individual shell plates. In June 1994, the LCEA was amended to cover certain specified parts and derivatives including *bekko* (Amended LCES, Law No. 52), with the amendment entering into effect in 1995. The sale, transfer and display for sale of Hawksbill Turtle specimens and shells are prohibited under Article 12 of the LCES; although, under Article 20, Hawksbill Turtle shells that were imported legally before Japan withdrew the CITES reservation and which have been registered at MoE are permitted to be traded domestically. The LCES outlines a system of registration in which traders must report their possession and sales of marine turtles and their products to the Ministry of the Environment (MoE) (Article 22). Any possession of Hawksbill Turtle specimens or shells requires registration with the MoE, and issued registration cards must be kept with the owner's specimens. If the owner transfers these specimens or shells, he or she has to report and return the registration card to MoE. Maximum penalty for violation against the law is subject to fines of JPY500 000 (USD5376) or up to six months imprisonment. Violation of possession of a valid registration card is punishable by law with a maximum fine of JPY300 000 (USD3225).

METHODS

Seizure records in East Asia

To understand the level of unregulated trade, confiscation and seizure records of marine turtles and their products involving mainland China, Taiwan, Hong Kong and Japan were compiled and consolidated from 2000–2008. A country/territory's involvement in a seizure was attributed to either an illegal import or export from that jurisdiction, or the direct involvement of a flagged or registered vessel in illegal activity. Government information, newspaper articles and media websites reporting marine turtle seizures were collated and significant findings were summarised.

Market surveys in China and Japan

Surveys for marine turtles and their products were conducted in priority locations that were considered to be sources of marine turtle and/or *bekko* in China and Japan. All surveys were conducted in 2009, covering eight provinces and three municipal cities in China and three cities in Japan.

The methodology used in this study was similar to previous marine turtle trade surveys by TRAFFIC Southeast Asia (2004), van Dijk and Shepherd (2004) and Stiles (2008). During surveys, all marine turtles products observed were recorded to gain quantitative data on the number of traders, volume of trade, type of products available, product prices, and the species involved in the marine turtle trade. Indicators of the trade dynamics, such as sources of marine turtles, turnover of products, main buyers, trade routes, and end destinations, were recorded through informal and semi-structured interviews with vendors and crafts retailers. A fluent speaker in Mandarin or Japanese conducted all the interviews in China and Japan, respectively. In addition to gathering data through surveys, information on marine turtle seizures was also gathered from published and unpublished literature, media reports and other sources. Prices quoted by retailers were in Chinese Yuan (CNY) or Japanese Yen (JPY), and converted into USD for this report; in July 2009, the exchange rate was CNY6.83 to USD1 and JPY93.01 to USD1.

Market surveys were carried out in selected coastal cities in the south and east of China that have been previously identified as entry points for illegal marine turtles. These locations were Sanya, Qionghai and Haikou (Hainan Province), Beihai and Pingxiang (Guangxi Province), Guangzhou and Jiangmen (Guangdong Province), Xiamen and Fuzhou (Fujian Province), Qingdao (Shandong Province), Dalian and Huludao (Liaoning Province). To

understand more comprehensively the marine turtle trade flow throughout mainland China, large antique markets and Traditional Chinese Medicine (TCM) markets were also surveyed in the following cities: Shanghai, Tianjin, Beijing, Anguo market in Hebei Province and Harbin in the far north (see **Figure 1**). Due to the large area of China, survey locations in China were clustered into four groups for data analysis, based on geographic location, local economy, retail market and potential end use of marine turtle products:¹

Source markets: Sanya, Qionghai and Haikou (Hainan province) and Beihai (Guangxi province);

Regional city markets: Xiamen (Fujian province), Qingdao (Shandong province), Dalian and Huludao (Liaoning province), and Harbin (Heilongjiang province);

Major city markets: Shanghai, Tianjin and Beijing;

Traditional Chinese Medicine markets: Qingping TCM market (Guangdong province) and Anguo TCM market (Hebei province).

In Japan, market surveys were carried out in Tokyo, Nagasaki and Okinawa (see **Figure 2**), which were selected for their long association with trade in *bekko* products. Interviews were also conducted with the *Japan Bekko Association*, which oversees a stockpile of *bekko* for artisans in Japan, and information on a marine turtle ranching project was also investigated.

¹ The cities were found to sell marine turtle products illegally. Additionally, three cities including Pingxiang, Jiangmen and Fuzhou were also surveyed, but no marine turtle product was found during the survey.



Figure 1. Map of China, showing the key locations surveyed.



Figure 2. Map of Japan, showing the key locations surveyed.

RESULTS

Reported seizures in East Asia

Enforcement seizures of marine turtles involving mainland China, Hong Kong, Japan and Taiwan for the period 2000-2008 have been compiled. It is important to note that the 128 seizures (**Figure 3**) and trade volume of over 9180 marine turtle products reported here represent only the minimum volume of illegal trading based on available information. However, such records present a useful indicator of trade routes, points of seizure and cargo volumes. Available information shows that the number of seizures in the region has been increasing, with the latter years of this report recording the highest number of seizures (2007, n = 22; 2008, n = 24; **Figure 3**). Mainland China appears to be an increasing market for illegal marine turtle trade in the region. The volume of trade in whole specimens is extensive and equates to 2062 marine turtles (98% mainland China, 1% Taiwan, and < 1% Hong Kong and Japan; **Figure 4**). The trade in shell totalled 789 scutes (61% Japan, 27% mainland China, 12% Hong Kong, and < 1% Taiwan) and 919.2 kg of shell reported (60% Hong Kong, 21% Taiwan, 18% Japan; **Figure 4**). A single turtle yields between 0.75 and 1.5 kg from 13 carapace scutes (Groombridge and Luxmoore, 1989), therefore based on conservative calculations the seized shell trade in the region represents over 61 and 613 marine turtles, respectively. Manufactured items made from processed marine turtle shell, totalled 6161 seized items mainly confiscated in Taiwan representing almost 100% of the trade reported (< 1% mainland China; **Figure 4**). Based on the reports that identified the species of marine turtle, Green Turtle and Hawksbill Turtles were the species most abundantly confiscated in this region (53% and 34%, respectively). It appears that the other three species, Loggerhead, Olive Ridley and Leatherback turtles play a lesser role in the trade (13% collectively).

The seizure records also indicate that illegal trade into East Asian markets has significant links to the Coral Triangle countries, particularly Indonesia (397 whole specimens, n = 14 seizures), Malaysia (342 whole specimens, n = 2 seizures) and the Philippines (126 whole specimens, n = 4 seizures). The often-large number of marine turtles found in single seizures shows the persistence of illegal trade. A summary of seizure information for mainland China, Hong Kong, Japan and Taiwan is as follows:

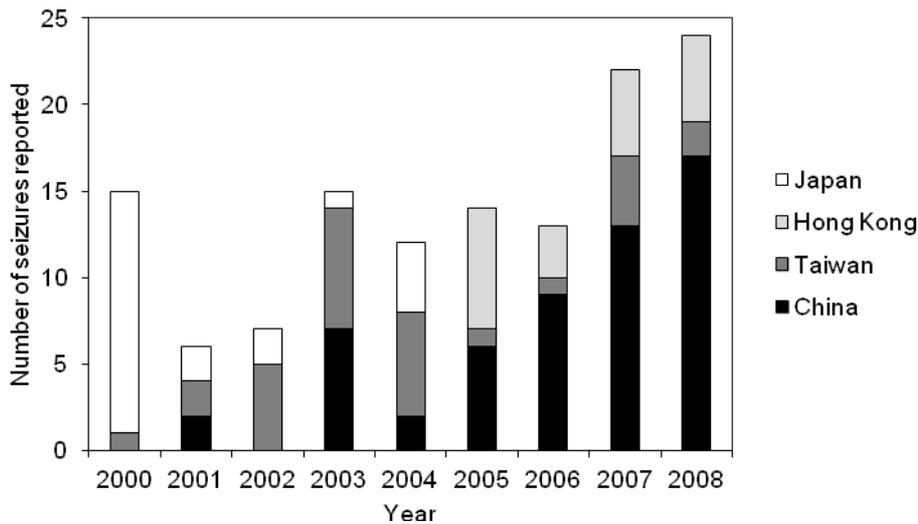


Figure 3. Number of reported marine turtle seizures involving the East Asia countries/ territories of China, Hong Kong, Japan² and Taiwan, in the period 2000–2008.

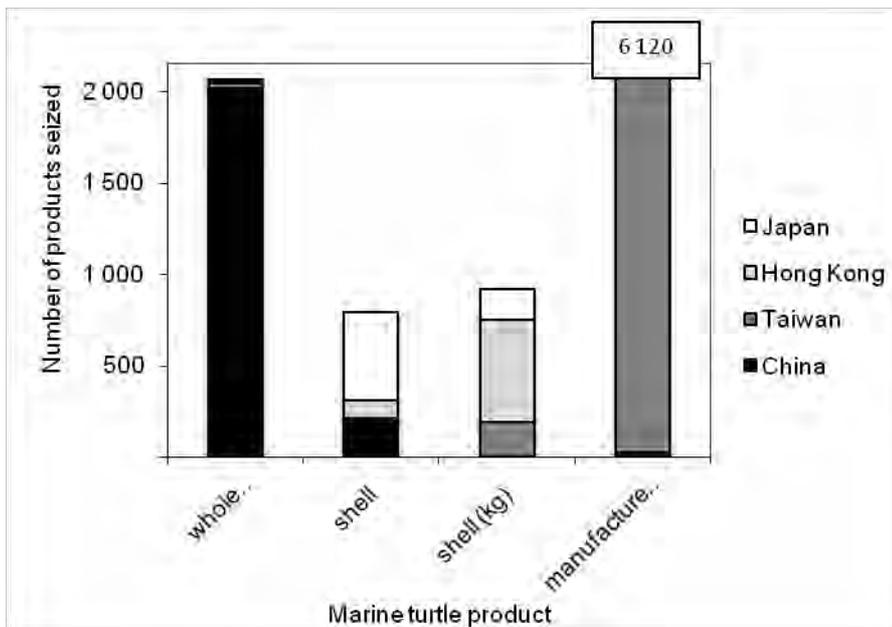


Figure 4. Volume of trade in various marine turtle products (reported as number of whole specimens, shell scutes, shell quantities reported in kg, and manufactured *bekko* items) confiscated from seizures involving the East Asia countries and territories of China, Hong Kong, Japan and Taiwan, between 2000–2008. Note: number of manufactured *bekko* items seized in Taiwan (n = 6120) did not fit the scale of the y-axis.

² Seizure records were not available for Japan in the period 2005–2006.

Mainland China

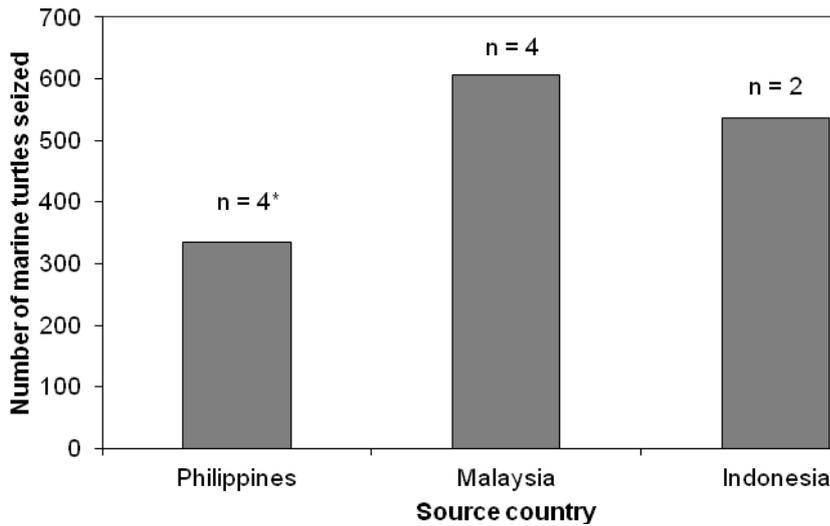
China had the largest number of reported marine turtle seizure cases in the East Asia region ($n = 56$), accounting for 44% of total seizures analysed. **Table 1** summarises the quantity of marine turtle seizures in China. The total number of seized marine turtles and their products was over 2253 specimens, which included 464 live specimens, 1553 dead specimens, 213 raw shell scutes, 5 kg Hawksbill Turtle shell glue (a paste used in TCM), 23 processed marine turtle items and 4.8 kg of Green Turtle meat. A large proportion of the China trade was in whole specimens with a total of 2017 marine turtles counted. Most of these whole specimens were Green and Hawksbill turtles (66%; **Table 1**), and it can be presumed that unknown species records were probably also Green and Hawksbill Turtles (additional 33% of the trade; **Table 1**). Loggerhead Turtles, Olive Ridley Turtles and Leatherback Turtles were uncommon in trade (1%), and possibly opportunistic catches. Notably, most live specimens retrieved from seizures were Green Turtles (69%) with only a few Hawksbill Turtles (2%). Marine turtles may be kept alive after capture to allow for trade in fresh meat once landed, as well as for sale as live displays. A total of 46 reported seizures were made by authorities in China, with a total count of 775 specimens (live whole specimens, $n = 428$; dead whole specimens, $n = 111$; raw shell, $n = 213$; processed items, $n = 23$), 5 kg of shell glue and 4.8 kg of meat. Most of these seizures occurred in Hainan Province (30%, $n = 14$), but also occurred in Zhejiang ($n = 9$), Guangdong ($n = 5$), Liaoning ($n = 3$), Shandong ($n = 3$), Fujian ($n = 3$). Single seizures were made in the major cities of Shanghai, Tianjin and Beijing ($n = 3$), as well as in the Provinces of Gansu, Shanxi, Hubei, Yunnan and Hunan, with one seizure from an unknown location ($n = 6$). Within Hainan Province, Qionghai city had the most reported seizures in this coastal province (36%, $n = 5$). In May 2003, the Hainan Sea and Fishery Administration seized 131 live specimens and 11 dead specimens of Green Turtle in Qionghai City of Hainan province (Anon, 2003). Hainan appears to be a significant entry point of illegal marine turtles with the highest quantity of seized specimens recorded in China (34%, $n = 659$ specimens). The number of domestic seizures made by Chinese authorities is low when considering the number of illegal marine turtle products available for open sale across China (see **Results** section- Market Survey Findings, China).

Of serious concern, is the volume of marine turtles seizures made by international authorities that implicate Chinese nationals in foreign waters ($n = 10$). These international seizures total 1478 marine turtles (live whole specimens, $n = 36$; dead whole specimens, $n = 1442$) and are clear evidence of heavy exploitation (**Figure 5**). Such evidence on the volume of illegal and unregulated poaching of marine turtles by vessels involving Chinese nationals is of serious concern. Chinese fishermen were apprehended in the Philippines (Anon, 2001; Anon, 2004b; Anon, 2007d), Malaysia (Anon, 2004a; Anon, 2007a, 2007b, 2007c) and Indonesia (Zindel, 2007)

(Figure 5). Source locations for marine turtles included the waters off Rizal in southern Palawan (Philippines), Sulu Archipelago (Philippines), Marine Turtle Islands Heritage Protected Area (Philippines), Labuan Island (Malaysia), off Sabah (Malaysia) and Derawan Island in East Kalimantan (Indonesia). It is possible that the source locations are widely distributed across the Sulu and Celebes Seas. Such reports implicate China as a significant consumer and end destination for marine turtles harvested from countries within the Coral Triangle. Specifically, the following reports demonstrate the high volume of illegal trade involving China over 2000-2008: In May 2004, Malaysian authorities apprehended 16 fishermen from China’s Hainan province after discovering around 160 dead marine turtles aboard a trawler (Anon, 2004a). In 2005, more than 100 marine turtles were seized from a Hainan-registered Chinese trawler which encroached into Malaysian waters off the island of Labuan, Sabah (Anon, 2007a). The year 2007 saw a significant number of large-scale seizures at sea: in March 2007, Malaysian authorities seized a Chinese trawler in waters off the coast of Sabah carrying cargo that contained a mixed shipment of 72 Green and Hawksbill turtles onboard (Anon, 2007b). Just a few days earlier, Malaysian officers intercepted another fishing trawler with a cargo of 185 Green and 89 Hawksbill Turtles (Anon, 2007c). In May 2007, Indonesian Customs arrested a 22-man crew aboard a Chinese registered vessel near Kalimantan with 387 dead and stuffed turtles onboard. Included in this illegal cargo were 296 Hawksbill Turtles, 90 Green Turtles and 1 Olive Ridley Turtle (Zindel, 2007). In September 2007, units of the Philippine Navy, Marines and Coast Guard in the Sulu Archipelago seized a Chinese poaching vessel with 19-man crew onboard. Onboard were 50 dried, 58 freshly-gutted and 18 still-living turtles, mostly Green Turtles (Anon, 2007d).

Species	Live specimens	Dead specimens	Meat	Shell glue	Raw shell	Processed items
Green Turtle	322	579	4.8 kg			23
Hawksbill Turtle	11	416		5 kg	213	
Loggerhead Turtle	2	12				
Olive Ridley Turtle	1	3				
Leatherback Turtle	1	1				
Unspecified species	127	542				
Total	464	1553	4.8 kg	5 kg	213	23

Table 1. Recorded seizures of marine turtles in mainland China, 2000–2008.



* One seizure record did not report the number of marine turtles confiscated from the Philippines.

Figure 5. Marine Turtle seizures in foreign waters involving Chinese nationals, 2000–2008 (n = number of reported seizures).

Taiwan

Taiwan is an island situated off the south-eastern coast of mainland China. Illegal marine turtle trade cases in Taiwan (n = 29) over the period of 2000³–2008, totalled over 6348 pieces which included 28 whole specimens (Hawksbill Turtle, n = 5; Green Turtle, n = 9 (two live); Olive Ridley Turtle = 1; Unknown species = 13; **Figure 4**), jewellery (n = 164), spectacle frames (n = 4), boxes (n = 11), carvings (n = 18) and miscellaneous items (n = 6123). All reported seizures were made within Taiwan by local authorities, with products supplying the domestic market. Most seizures involved single whole specimens or 20 *bekko* items on average. However, the largest reported seizure occurred in 2008, with over 6000 *bekko* pieces, 11 kg of semi-processed *bekko* products, three whole Hawksbill Turtle specimens and 182 kg of raw shell were found in a factory located at Dunlin County (southern part of Taiwan; Anon, 2008). In this seizure, the quantity of raw shell represents over 121 turtles (according to Groombridge and Luxmoore, 1989). This single seizure alone accounted for 99% of the total processed marine turtle products seized in East Asia (**Figure 4**). Sources of the confiscated goods were not clearly divulged in this large-scale incident, though Indonesia was reported as a significant source country among all recorded seizures in Taiwan.

³ In 1999, there were two reported seizures in Taiwan that have been excluded from this report since the focus is on the years 2000-2008. One seizure involved 6 *bekko* pieces, including spectacle frames, bracelets and pendants, confiscated at the Taoyuan International Airport coming from Viet Nam. The other seizure involved an individual from Taiwan charged with dismembering two Green Turtles in Penghu County.

Hong Kong

Hong Kong is a special administrative region (SAR) of China, and is situated on China's south coast. A total of 96 seizures were reported in Hong Kong, with nine whole stuffed specimens (Green turtle, $n = 4$; Unknown species, $n = 5$), 93 raw scutes and 556 kg Hawksbill Turtle scutes confiscated. Based on seizure records, there are only two cases where marine turtle products were detected being sold illegally in Hong Kong. Seizures of marine turtles involving Hong Kong were mostly confiscated in cargo consignments or were carried by passengers as personal luggage by air. Unlike mainland China, Taiwan and Japan, confiscations of marine turtles in Hong Kong were predominately sourced from African countries (South Africa, Kenya, Tanzania) rather than from South-east Asia. For example, in May 2005, Customs officials at Kwai Chung Container Terminal made the largest reported seizure involving 556 kg of Hawksbill Turtle scutes (representing over 370 turtles; Groombridge and Luxmoore, 1989) in cargo arriving from Tanzania (Anon, 2005). This single seizure accounted for 60% of marine turtle shell reported in kg in East Asia (**Figure 4**). Indonesia, Thailand, Viet Nam and Philippines were recorded as source countries, but seizures involved one or two stuffed specimens from these countries.

Japan

Seizure records showed that 23 seizure cases reported between 2000 and 2004. Unfortunately, the Japanese government was not willing to share the details of reported seizures in 2005–2006 (Ministry of Finance, Japan), and no seizures of marine turtle occurred in 2007–2008. Most of the reported incidents involved cargo arriving from Singapore (48%, $n = 11$) and Indonesia (26%, $n = 6$). However, it is likely that Singapore acted as a transit point and the marine turtles were sourced from other range countries in South-east Asia and elsewhere. Indonesia was noted as an origin country for the seizure of marine turtles with the single largest quantity of 89 kg of scutes in 2003 and more than 400 pieces of shell or shell products in 2000 (Ministry of Finance, Japan). This large seizure equates to over 60 and 30 turtles, respectively (according to Groombridge and Luxmoore, 1989). On average, seizures involved either 18.8 kg of raw scute ($n = 9$), or 43 shell products ($n = 11$), or three whole specimens ($n = 3$).

Market Survey Findings

MAINLAND CHINA

Marine turtle trade in China is centred on the domestic demand for ornamental whole specimens (stuffed or mounted) and *bekko* jewellery, as well as Hawksbill Turtle scutes for use in traditional Chinese medicine. Across the eight provinces and three municipal cities surveyed, 117 souvenir shops were observed to sell marine turtle products while eight TCM wholesale shops were found to sell Hawksbill Turtle shell (**Table 2**). No marine turtle product was observed in Pinxiang (Guangxi Province), Jiangmen (Guangdong Province) and Fuzhou (Fujian Province).

A total of 56 Green Turtle specimens, 94 Hawksbill Turtle specimens and 7217 processed Hawksbill Turtle shell products were observed for sale in souvenir shops during this survey (see **Table 2**). An additional 159 kg of Hawksbill Turtles scutes were found for sale in TCM shops. Among the locations surveyed, Hainan Province (Sanya, Qionghai and Haikou) accounted for the highest number of shops selling marine turtle products (49%) as well as the highest number of observed items made from processed Hawksbill Turtle (67%). The city of Beihai in Guangxi Province followed, accounting for 16% of shops and 23% of observed items. Beihai also had the highest number of whole Hawksbill Turtle specimens available, which accounted for 43% of the observed trade (**Table 2**). Major municipal cities of Shanghai, Tianjin and Beijing had only a few shops selling marine turtle products observed during this survey.

Table 2. Decorative or processed marine turtle items observed for sale in mainland China.

City / Province	Green Turtle	Hawksbill Turtle	Processed shell	No. of shops selling marine turtle products
Sanya, Hainan	1	3	1845	20
Qionghai, Hainan			2500	25
Haikou, Hainan	2	8	467	12
Beihai, Guangxi	2	62	1662	19
Xiamen, Fujian	6	2	107	4
Shanghai		1	75	6
Qingdao, Shandong	7	4	22	5
Anguo, Hebei	3	5		2
Tianjin			28	2
Beijing			104	1
Dalian, Liaoning	22	3	25	10
Huludao, Liaoning	10	3	38	3
Harbin, Heilongjiang	3	3	344	8
Total	56	94	7217	117

The trade of processed Hawksbill Turtle shell products comprised 24 different types of items (**Table 3**). All of these were counted separately (except for earrings, which were counted as pairs, and guitar picks, which were counted as a set of five pieces). The majority of *bekko* products were jewellery items (93%), particularly bangles (47%) and rings (23%). Prices of marine turtle products varied greatly depending on the species, size and quality of products, and the level of local economy. The price of Hawksbill Turtle whole specimens (mean USD611.71) was much higher than that of Green Turtle whole specimens (mean USD396.49); with price increasing with the size of whole specimens and other items. During this survey, the value of all observed marine turtle products was estimated to be nearly half a million US dollars (**Table 3**) - calculated by multiplying the number of items by the price mean, and then adding up the subtotals for each item type.

Table 3. Price of marine turtle products for sale in mainland China (USD).

Item	Quantity	Price mean (sample size)		Price range	Estimate of total value
WHOLE SPECIMEN					
Green Turtle	56	396	(n = 36)	88–659	22 203
Hawksbill Turtle	94	612	(n = 91)	59–2635	57 501
JEWELLERY					
Earrings (per pair)	62	4	(n = 25)	3.66	227
Necklace	118	105	(n = 6)	29–117	12 382
Pendant	684	18	(n = 211)	4–82	12 640
Comb	351	29	(n = 89)	4–56	10 102
Hairpins	66	18	(n = 8)	18.30	1208
Bangle	3430	29	(n = 1115)	3–293	98 956
Chain bracelet	472	33	(n = 127)	4–129	15803
Finger ring	1701	5	(n = 344)	0.73–10	8624
MISCELLANEOUS					
Birdcage	2	80 527	(n = 2)	43 924–117 130	161 054
Bottle cover	2	7	(n = 2)	7.32	15
Brush	2	164	(n = 2)	164.41	329
Caddy	3	805	(n = 3)	220–1098	2316
Incense holder (censer)	1	176	(n = 1)	175.70	176
Cigarette case	1	322	(n = 1)	322.11	322
Fan	64	510	(n = 8)	41–703	32 656
Guitar pick	38	7	(n = 18)	7.32	278
Jewellery box	22	73	(n = 5)	44–146	1611
Katydid pot	5	88	(n = 1)	87.85	439
Mirror	2	44	(n = 1)	43.92	88
Pencil holder	2	161	(n = 2)	146–176	322
Spectacle frame	156	198	(n = 19)	29–264	30 894
Strap	29	231	(n = 4)	73–556	6687
Shoehorn	1	88	(n = 1)	87.85	88
Toothpick pot	3	264	(n = 2)	263.54	791
UNPROCESSED					
Hawksbill Turtle scutes	159 kg	111	(n = 8)	30–154	17 687
Total	7 367*				495 397

* Total excludes 159 kg of scutes.

Source markets in China

This group includes four cities within two provinces, and accounts for approximately 90% of observed marine turtle products in China's markets. Almost all marine turtle products found in other surveyed cities in China indicated sources for the domestic supply chain from within this group of locations.

Sanya, Qionghai, and Haikou (Hainan Province)

Hainan is an island province and considered an important landing and selling point of marine turtles in China, based on recorded seizure cases (Pilcher *et al.*, 2009). During this survey, Hainan province had an extensive trade in Hawksbill Turtle shell products, and to a lesser extent marine turtle meat (**Table 2**).

Sanya had the largest retail markets among the three surveyed cities in Hainan. There were 1849 marine turtle products found in 20 shops which were located in four different markets. Most of them were retail shops selling ornaments and souvenirs, except for one vendor that operated as a wholesale shop supplying processed products mainly to the city of Shanghai. In Haikou, 467 items of marine turtle products were displayed in 12 shops located in four different antique and tourist markets. Qionghai, unlike Sanya and Haikou, was not a popular tourist destination, but had the largest number of marine turtle products recorded. A total of 25 shops in a local town, known as Tanmen Town, were found to display 2500 marine turtle products for sale. Tanmen is a key trading port for Hainan Province located at the mouth of a river on the eastern side of the island.

In-depth interviews at Tanmen port with fishermen, wholesalers and fisheries enforcement officers, revealed a variety of trade details and information providing significant insight into the illicit marine turtle trade in China. Most of the fishermen of Hainan were based in Tanmen, with the port acting as a significant site for fisherman to land their catches. Historically, local people only harvested marine resources for food purposes, including marine turtles. More recently, the fishermen realised the value of marine turtle shell and started trading in *bekko*, including the development of processing and crafting in Qionghai. The scale of *bekko* processing in Hainan is probably the largest in China, but the skill of craftsmen in Hainan was considered lesser to that produced by those in Beihai (Guangxi Province). An interview with a wholesaler in Tanmen strongly indicated that the sources of marine turtle were from countries in the Coral Triangle region. The wholesaler owned a vessel that regularly visited the Philippines and Indonesia for harvesting or buying marine turtles. Harvesting effort beyond the immediate neighbouring waters was stated to have also extended to waters of Papua New Guinea and Australia. The wholesaler supplied marine turtle stock mainly to a network of vendors in Shanghai city, including souvenir shops at high-end hotels.

In summary, interviews with Hainan fishermen revealed the following perceptions towards the trade of marine turtle:

- Fishermen generally regarded marine turtles as by-catch rather than a target species, though turtles were not released if they happened to be caught;
- However, some fishermen were known to directly target marine turtles. These marine turtle fishermen used to go to the Philippines and Viet Nam, but increased enforcement actions (or deterrents) in both these countries had turned Hainan-based fleets to Malaysian waters instead.

Interviews revealed that fishermen had an adequate understanding of China's law regarding marine turtle protection. The fisherman knew that if any harvested marine turtle was found they would be fined or even imprisoned. To avoid apprehension, fishermen with any marine turtle catch would approach the landing point under cover of darkness when enforcement officers were largely inactive. However, in the event they encountered local enforcement units, the fishermen would either throw the marine turtles into the sea or use a small boat to move the marine turtle cargo away to avoid being caught during vessel inspection. With regards to enforcement effort and efficiency, fishermen stated that Hainan's enforcement officers checked only occasionally the catch on board when fishing vessels returned from a voyage.

In terms of meat trade, interviews with seafood restaurants revealed marine turtle was sold for USD3.3 per kg, with only frozen meat being available. Meat from all species of marine turtle was available for consumption, and was sourced from local fishermen. Restaurant owners mentioned being aware that it was illegal to consume marine turtles.

Qionghai has a long history of fisheries activity, and many local people rely on the industry for their livelihoods. To contend with the problem of illegal fishing, a local government initiative was initiated to help fishermen change their line of business into the developing tourism sector. Additionally, regulatory measures to address the illegal marine turtle trade problem have been put in place, such as an incentive scheme which provides a diesel fuel subsidy of CNY100 000 per vessel per year (USD14 641). This subsidy is provided on the condition that fishermen do not participate in any illegal activities, including being caught with marine turtle cargo or products. This conditional incentive has reportedly been effective in reducing illegal fishing and transport of illegal fisheries cargo (including marine turtles) into port according to a senior official in charge of Fishery Management & Monitoring, at the Marine and Fishery Department of Hainan Province (*pers. comm.* to TRAFFIC, 2008).

Although the interviewed traders stated that the enforcement effort in Qionghai had gradually increased, their business had not been affected because Qionghai itself was not a tourist destination and much of their stock was instead forwarded to other retail shops in other cities of China. They no longer displayed marine turtle specimens in their shops in Qionghai, and have moved their distribution network further underground in order to reach other market destinations within China.

Interviews with a Hainan fisheries enforcement officer revealed that the budget for enforcement action and public awareness against illegal marine turtle trade was currently very limited. However, the perception of the fisheries enforcement agency was that the general public had begun to realise that the capturing and selling of marine turtles and their products is illegal – and there has been an increasing number of information reports received from the public regarding suspected illegal trade in marine turtles. Hainan’s fisheries enforcement agencies believe the sources of marine turtle supply into Hainan mainly comes via three main channels:

1. By-catch from local fishermen, who exploit fishing grounds in the waters of Philippines, Malaysia, Indonesia and Viet Nam;
2. South-east Asian fishermen who sell the marine turtles to Chinese fishermen;
3. Ethnic Chinese traders in South-east Asian countries who buy marine turtles from local fishermen and re-sell them to Chinese fishermen or middlemen involved in transportation of cargoes.

The Hainan fisheries enforcement agency stated to TRAFFIC that it welcomed initiatives to work collaboratively to raise public awareness regarding marine turtle conservation and to increase the capacity of local enforcement units through future training workshops. The officers recognized that the illegal marine turtle trade in Hainan remained a serious issue. It was found from the market survey that some provinces of China like Fujian and Guangdong had better regulation and monitoring of marine turtle trade, *i.e.*, demonstrated by retailers only displaying limited and small items for observable sale. However, in Guangxi and Hainan, comparatively large quantities, including whole specimens of Hawksbill and Green Turtles could easily be found, which indicates a comparatively lax effort in enforcement and monitoring. Discussions with Hainan enforcement authorities indicated a generally limited access to enforcement resources and a positive opportunity to work with TRAFFIC on capacity building, training and outreach campaigns.

At Wenchang, Hainan, there is a captive facility for Green Turtles rescued from fishing nets or confiscations. There were 70-80 injured wild-caught Green Turtles in need of rehabilitation, and about 400-500 juveniles that had been successfully hatched from eggs. The Hainan government is considering designating Wenchang to be a marine turtle protected area, and in the future, farmed marine turtles would be released into the wild in order to support the recovery of their wild population.

Beihai and Pingxiang, Guangxi Province

Beihai is a large port city at the southern tip of Guangxi Province, immediately to the north of Hainan. Four antique or tourist souvenir markets and two wet markets were visited during this survey. A total of 1726 *bekko* items were seen displayed in 19 retail outlets (**Table 2**). In a large shop surveyed in Beihai, the shopkeeper stated that stock was sourced from Thailand and Malaysia by ship. The risk of smuggling through Thai and Malaysian borders is high, and consequently the price of the marine turtle products were believed to have increased accordingly. The dealer mentioned that he would not ship live marine turtles to China, but would buy finished products of whole specimens and ornaments from the two South-east Asian countries.

Apart from retail outlets in Beihai, a warehouse storing marine turtle products was discovered. Inside the warehouse, whole specimens of four Hawksbill Turtles and one Green Turtle were visibly mounted on the wall, with an additional 40 or more whole specimens stored in boxes. Unprocessed turtle shells and scutes were seen packed in bags that would be sold to jewellery manufacturers and TCM markets. There were various other finished products made of *bekko*, including 50 combs, 200 rings, 150 bangles, 200 pendants also found in the warehouse. The owner of the warehouse stated that he was a wholesaler, and his stock of marine turtle products was mainly sourced from Indonesia by sea. Everyday there was stock moving out from the warehouse to supply local markets, suggesting frequent turnover. The warehouse had been operating since 2001 and the loose enforcement in Beihai had allowed the business to continue. In the two wet markets surveyed, no marine turtle meat or other parts were observed.

Regional cities

Developing cities surveyed in China included five cities within four provinces: Xiamen (Fujian Province), Qingdao (Shandong Province), Dalian and Huludao (Liaoning Province), and Harbin (Heilongjiang Province). All the cities in this group are tourist locations, and the socio-economic status is considered middle to high for a Chinese city.

Xiamen, Fujian Province

Xiamen is a fast-developing coastal city in Fujian on mainland China. Market surveys were carried out in four antique markets (Yuxin, Bailuzhou, Wanshoulu, Xiamen), five wet markets (Zhongpu, Meirengong, Xinmin and Ruiyu), and one tourist market (Gulangyu). Of the nine markets surveyed, Gulangyu was the only market surveyed in this region observed selling marine turtle products.

In Gulangyu, an offshore island adjacent to Xiamen city, *bekko* products were found in the main tourist souvenir market with a total of 115 items found in four shops (**Table 2**). A shopkeeper, from one of the shops surveyed, mentioned that the marine turtle products in the shop came from the Philippines. There were only a few *bekko* bangles and combs displayed in the shop. The shopkeeper stated that because of strict enforcement controls over the local markets, they could only display a few *bekko* products but she claimed to have more stock in her warehouse, including Green Turtle and Hawksbill Turtle whole specimens.

Shopkeepers from the other three shops surveyed, were all very cautious when asked about the origin and the stock they had and they were not willing to show the products they possessed or where the sources were from. However, one of them mentioned their stock was purchased from Hainan Province⁴.

Qingdao, Shandong Province

Qingdao is one of the coastal cities of eastern China, with a much developed tourism industry, particularly since the 2008 Beijing Olympic Games. Seven antique or tourist souvenir markets were visited in Qingdao, with only five shops across four markets observed to have marine turtle products. A total of seven Green Turtle specimens, four Hawksbill Turtle specimens and 22 processed items were recorded (**Table 2**). Research with one company dealing in marine turtle products revealed that this company obtained raw marine turtle products from Hainan and manufactured items in Qingdao, but also acted as the middleman by supplying processed marine turtle products to local souvenir shops.

⁴ TRAFFIC reported these findings to Xiamen Fishery and Administration Department by phone. The enforcement unit responded quickly by taking investigation action to Gulangyu and one enforcement officer called TRAFFIC to confirm details of the reported information. The final investigation result has not been disclosed, however.

Dalian and Huludao, Liaoning Province

Dalian and Huludao are both coastal cities where marine turtle products have previously been observed. These cities are comparatively small and have a limited retail market compared to other surveyed locations in this report. Fifty marine turtle items were found in Dalian from 10 different shops, while in Huludao 51 items were found in three shops (**Table 2**). The number of Green Turtle specimens ($n = 22$) was greater than that of Hawksbill Turtle specimens ($n = 3$). One vendor stated that the trade of Hawksbill Turtle specimens was seriously prohibited, but Green Turtle specimens were still allowed to be sold in the market. Significantly, almost all the known sources of raw material or finished marine turtle products sold in these retail shops were attributed to Hainan Province as the source of consolidated supply from within China.

Harbin, Heilongjiang Province

Harbin is the capital of Heilongjiang Province and had the largest quantity of marine turtle products observed among the developing cities surveyed, with 350 items found in eight shops in two antique markets (**Table 2**). Some of the older items in trade (such as shoe horns and cigarette cases) were apparently from Japan not from south China.

Major Cities

The three municipal cities of Shanghai, Tianjin and Beijing are the most developed cities in China and are well-known tourist destinations. All of them have many large antique markets where other endangered species products are sold as luxury items, including ivory.

Twenty antique or tourist souvenir markets were visited in Shanghai and six shops were found with marine turtle products. A total of 75 processed items and one Hawksbill Turtle specimen were recorded (**Table 2**). Shanghai had the most refined and expensive marine turtle products observed during this survey, such as a birdcage made of *bekko* and ivory was priced at CNY800 000 (USD117 647) (**Table 3**). Most of the surveyed shops claimed the marine turtle products or raw materials came from Hainan.

Tianjin and Beijing had only two and one souvenir shops, respectively, holding observable marine turtle products for sale. A total of 28 and 104 items were recorded, most of which were jewellery and other small items (**Table 2**).

Traditional Chinese Medicine (TCM) markets

Surveys were conducted in two wholesale markets, Qingping and Anguo, to assess the significance of marine turtle shell used in TCM. Qingping market located in Guangzhou (Guangdong Province) was the largest TCM wholesale market in the south of China. While Anguo market in the city of Anguo (Hebei Province) was the largest TCM market in the north of China.

Guangzhou, the capital of Guangdong Province, is notorious for various aspects of wildlife trade and consumption, particularly wild species used for meat and traditional medicine. However, in the current survey, no *bekko* products were observed in the antique markets or marine turtle meat in wet markets. Only one stall in Qingping TCM wholesale market was found with Hawksbill Turtle shell. A large shell plate (length 20–30cm, width 10–15cm) was offered for sale at USD154 per kg while small-sized Hawksbill (length 10–15cm, width 5–10cm) or damaged shell plates were offered for sale at a much lower price of USD34 per kg. Approximately 100 kg of large-sized and 50 kg of small-sized Hawksbill Turtle shell were available at the time of the survey (**Table 4**). The owner of the stall stated that the marine turtle shells were bought from Hainan.

In Anguo TCM wholesale market, around 9 kg of Hawksbill shell was observed in eight stalls (**Table 4**). The price was significantly lower than that in Qingping. The average price was USD46 per kg, and the price range was USD37–59 per kg. Excepting one stall, which claimed the marine turtle shells were bought from Indonesia, all others claimed their stock was sourced from Hainan.

During this survey, there was no marine turtle product observed in Jiangmen city in Guangdong Province. However, the owner of a souvenir shop in a hotel claimed he had 30–50 Hawksbill Turtle whole specimens in his storage room, which could be shown to prospective buyers.

Table 4. Marine turtle products used in Traditional Chinese Medicine (TCM) observed for sale in China.

TCM market, Province	Marine turtle shell (kg)	No. of shops selling marine turtle shell
Qingping, Guangdong	150	1
Anguo, Hebei	9	7

JAPAN

Marine turtle trade in Japan is comprised of finely crafted *bekko* products, including jewellery, combs, spectacle frames, and traditional ornaments. A total of 11 080 *bekko* items were observed for sale in the 58 shops surveyed across Tokyo, Nagasaki and Okinawa. Of the three cities, Nagasaki was found to have the highest number of marine turtle products for sale (60%), followed by Tokyo (35%) and a small variety found in Okinawa (5%).

Tokyo

The capital city of Japan was found to have the largest *bekko* retail outlets. A total of 32 jewellery shops and souvenir shops were surveyed with 3872 *bekko* items recorded. Product variety, quantity and prices are listed in **Table 5**. Most shops in Tokyo only displayed a few items of each type in the showroom but stated that more stock was held in their storeroom and could be shown to customers on request. Consequently, the actual quantity of *bekko* available in Tokyo might be largely underestimated based on observed retail products. For instance, the recorded quantity of observed *bekko* in Tokyo was less than the quantity recorded in Nagasaki (see **Table 6**). However, the best quality and the highest priced *bekko* products were found in retail shops of Tokyo. Unlike other surveyed cities, most Tokyo *bekko* shops were not located in tourist hubs and were found in craft-orientated areas of Tokyo. Large *bekko* shops in Tokyo usually had their own workshop and craftsmen. According to one shopkeeper, small-scale retail operators bought *bekko* products from craftsmen in Tokyo and Nagasaki.

A craftsman with more than 30 years of experience in *bekko* crafting stated in an interview that he had ample *bekko* materials in stock at his warehouse because he imported a lot of stock before the international trade ban in 1994. He also mentioned that the Japan Bekko Association (JBA; see **Results** section - Japan Bekko Association) organized auctions for *bekko* materials periodically, using *bekko* material from this ‘domestic source’ *i.e.*, a stockpile. The craftsman was aware that harvesting, possession and sales of marine turtles and their products were regulated under the law and that the JBA encouraged the craftsmen to follow the law.

Table 5. Bekko products in Tokyo, Japan.

Products	Volume	Price range (JPY)	Price range (USD)
Earrings (per pair)	832	5600–38 000	60–408
Necklace (chain)	288	36 000–315 000	387–3383
Necklace (locket and chain)	384	20 000–367 500	215–3947
Brooch	416	8000–110 000	86–1181
Ear pick	56	1000–2500	11–27
Hairpin (<i>Kanzashi</i>)	632	23 000–1 750 000	247–18 795
Hair band	224	84 000–294 000	902–3158
Tie clip	384	8000–80 000	86–859
Obi tie (<i>Obi dome</i>)	192	28 500–300 000	306–3222
Spectacle frame	168	115 000–1 460 000	1235–15 680
Spectacle chain	224	15 000–63 000	161–677
Japanese <i>Shamisen</i> plectrum	72	60 000–720 000	644–7733
Total	3872	1000–1 750 000	11–18 795

Nagasaki

Nagasaki has a long history of *bekko* craftsmanship. Early in the 17th Century, Nagasaki was the only port open for trade with foreign countries, including China and Portugal. A great variety of commodities arrived in Nagasaki from around the world, including Hawksbill Turtle shells from South-east Asia. One famous *bekko* shop in Nagasaki has run their family business since the 17th century. *Bekko* crafting has continued to develop until today, and has been an important industry for local communities in Nagasaki.

The Nagasaki prefecture has promoted *bekko* as traditional artisan craft, and there is a *bekko* museum organised by JBA in the city. One of the interviewed dealers said *bekko* business in Nagasaki used to be “just like banking, it will never disappear”, because of the large demand – but added that it has not been good business in recent years. The largest wholesale *bekko* market surveyed was in Nagasaki. This significant wholesaler employed their own craftsmen to manufacture *bekko* products for sale in their own shops as well as supplying crafted *bekko* to jewellery shops at department stores around Japan.

Seventeen *bekko* souvenir shops were surveyed which included some shops located near tourist ‘hotspots’ around the town and also at Nagasaki airport. A total of 6605 different products were seen displayed in shops (**Table 6**). Nagasaki also had the largest variety of *bekko* products of the three market locations examined in Japan during this survey. Marine turtle items such as Hawksbill Turtle whole specimens and watches could only be found in Nagasaki.

Bekko products made with a combination of plastic were found in several shops labelled as *Hari-bekko*. These products were manufactured using thin slices of *bekko* and adding layers of melded plastic. Selling price was approximately one-third of the price of a similarly sized pure *bekko* product.

Table 6. *Bekko* products in Nagasaki, Japan.

Products	Volume	Price range (JPY)	Price range (USD)
Earrings (per pair)	1170	4730–52 500	51–564
Necklace (chain)	130	2100–98 700	23–1060
Necklace (locket and chain)	970	1470–252 000	16–2706
Bracklet	260	16 800–136 500	180–1466
Brooch	200	22 050–200 000	237–2148
Hairpin (<i>Kanzashi</i>)	470	12 600–472 500	135–5075
Hair band	220	2500–96 600	27–1037
Finger ring	1580	4150–73 500	45–789
Watch	150	25 200–166 000	271–1783
Obi tie (<i>Obi dome</i>)	670	23 000–971 300	247–10 432
Tie clip	130	21 000–84 000	226–902
Bolo tie	190	15 000–210 000	161–2255
Ear pick	200	3780–6010	41–65
Spectacle frame	80	214 200–1 366 000	2301–14 671
Tea scoop (<i>Chashaku</i>)	120	17 850–52 500	192–564
Japanese <i>Shamisen</i> plectrum	45	84 000–105 000	902–1128
Whole stuffed turtle	20	2 800 000–3 200 000	30 072–34 368
Total	6605	1470–3 200 000	16–34 368

In the *bekko* industry of Japan, craftsmen classify scute colour around 8 terms, including *Shiroko* (unpatterned whitish-yellow), *Jotoro ko* (shade of orange and slightly unclear marks), *Chutoro ko* (blackish in colour with slightly unclear marks) and *Barafu* (very distinct patterning). The white scutes, *Shiroko*, were the most valuable and expensive type (Table 7). The pricing of *bekko* products in Japan depended upon the characteristics of the scutes, particularly colour, and the artistic style of the craftsmanship.

Table 7. The value of different scute colours, standardized for a *bekko* finger ring (2mm thickness).

	Shiroko	Orangeko	Chutoroko	Nagasaki	Osaka
JPY	17 850	12 600	5250	4730	4150
USD	192	135	56	51	45

Okinawa

A total of nine retail outlets were surveyed in Okinawa, with seven of them located in the city and two shops located in the international airport. Of the three geographic locations surveyed in Japan in 2009, Okinawa was found to have the least number of shops selling *bekko* as well as the least number of recorded *bekko* products (603 items, Table 8). According to one shop owner, the scale of the *bekko* retail industry in Okinawa has been diminishing. He used to hire several craftsmen, but they have all left with the decreased demand of *bekko* products by local people and tourists. The necklaces at his shop, for example, were made in the 1980s, and he still stocks unprocessed *bekko* scutes at his warehouse. The two souvenir shops at the Okinawa international airport with *bekko* products available did not show any CITES references at the shops and the salesperson mentioned that most of the customers were tourists from Taiwan.

Table 8. Bekko products values and volume in Okinawa, Japan (n = number of shops surveyed).

Products	Price range (USD)	Downtown (n = 7)	Airport (n = 2)	Total
Earrings (per pair)	79–789	133	25	158
Necklace (chain)	28–1020	119	5	124
Necklace (locket and chain)	43–204	77	4	81
Bracklet	128–1353	52	2	54
Brooch	34–344	38	6	44
Comb	282–778		10	10
Hairpin (<i>Kanzashi</i>)	203–3609		12	12
Tie clip	23–1466	84	17	101
Bolo tie	135–408		16	16
Japanese <i>Shamisen</i> plectrum	677–902		2	2
Shoehorn	902		1	1
Total	23–3609	503	100	603

Japan Bekko Association

The Japan Bekko Association (JBA) is a public service corporation established in 1992 under the jurisdiction of the Ministry of International Trade and Industry in Japan to help the local *bekko* industry. The JBA is concerned about the sustainable management and utilisation of marine turtles resources, and the association has funded significant research to further understand the biology and population dynamics of Hawksbill Turtles (for example, Limpus and Miller 2008). The JBA is made up of five *bekko* subsidiary associations with voluntary membership. In 1992, 148 members (craftsmen and wholesalers) joined the JBA, though only 75 members remained in 2009 (Table 9). One reason given for the decline in membership is the difficulty for some craftsmen to pay the membership fee to JBA, as well as the general economic trend in recent years. A *bekko* association in Osaka was closed in 1994, and another in Nagasaki shut down in May 2009.

Table 9. Number of members in the Japan Bekko Association, since its establishment in 1992.

Year	Tokyo	Nagasaki	Osaka	Total
1992	79	56	4	148
1998	69	39	0	108
2009	57	18	0	75

Source: (TRAFFIC East Asia-Japan, 2000), Anon, 2009b

A stakeholder interview was conducted with an administration officer of the JBA in Nagasaki. In general, the JBA is concerned about the decline of *bekko* stocks in Japan. A lot of craftsmen have told JBA that the limited stocks of *bekko* material created a problem with training new apprentices in the skill of *bekko* craftsmanship. With limited supply of raw materials, a *bekko* master was unable to provide high quality shell for training, and therefore it was difficult for apprentices to have the opportunity to improve their skills. The JBA remained concerned that Japan would not only lose its craftsmen but that the skill of *bekko* crafting would also decline in quality. In preparation for the 10th and 11th Conference of the Parties to CITES held in 1997 and 2000, the JBA sent staff to Cuba in the hope that the Cuban proposal to transfer Hawksbill Turtles from CITES Appendix I to II in order to allow for a limited and highly regulated trade between Cuba and Japan (Prop. 10.60, 11.40, 11.41). The Cuban proposals failed to obtain two-thirds majority support from CITES Parties, and the JBA has sought alternative sources of marine turtle shell, such as marine turtle ranching.

The JBA has established a Hawksbill Turtle ranching project under the administration of the Fisheries Research Agency (FRA; <http://www.fra.affrc.go.jp/english/eindex.html>) and the Nagoya Port Aquarium (<http://www.nagoyaaqua.jp>). Prior to the establishment of this domestic ranching project, the JBA was involved in setting up ranching operations in Bali and Ujung Pandang (south Sulawesi) in Indonesia, though these international attempts were unsuccessful (van Dijk and Shepherd, 2004). In 2009, JBA budgeted half of its funds (JPY53 253 000 = USD572 551) for the marine turtle ranching project. This project is currently a head-starting programme which aims to support the ranching research for Hawksbill Turtle conservation, with the possibility of commercial use in the future. The JBA has regularly discussed with FRA staff on the quality, thickness and colour of Hawksbill shell with reference to the needs of the *bekko* industry.

Another interview was conducted with a highly skilled *bekko* artisan who had more than 40 years experience in *bekko* crafting, and who attended the 10th Conference of the Parties to CITES (1997) as a delegate from JBA. He mentioned that Hawksbill Turtle shell from South-east Asia was thicker than those from Cuban populations of the same species. The Hawksbill Turtle shell from South-east Asia populations was therefore preferred over that from Cuba, because of the comparative strength and workability of the scutes. The craftsman expressed his great concerns about the level of *bekko* stock and also the future of the *bekko* industry in Japan. Although the JBA has started the ranching project in Ishigaki (Okinawa) and Nagoya, the association was not sure when this project would produce any commercial volume for *bekko* products. Also, the craftsman stated that the *bekko* industry should establish a *bekko* stock traceability system in Japan (following the example of the ivory industry) and that future considerations should be given to obtaining a legal stock from source countries. He said the Japanese *bekko* industry could demonstrate the potential for sustainable wildlife harvest and exemplify the conservation of marine turtle species.

Ranching of Hawksbill Turtles

TRAFFIC visited a ranching operation for Hawksbill Turtle in Japan and conducted an interview with the project head at the research institute of Fisheries Research Agency (FRA) in Ishigaki Island, Okinawa prefecture. This operation has successfully obtained hatchlings from long-term captive individuals, and has been running an experimental head-starting programme of captive-reared Hawksbill Turtles (Yoseda and Shimizu, 2006). Head-starting is the practice of growing hatchlings in captivity to a size that protects them from the high rates of natural predation that would otherwise occur in the early months, and then releasing them into the sea. A total of 894 eggs were collected in 2004 and 910 eggs in 2006. The egg hatching success rate was stated to be low because of the difficulty of egg management, but other references show that the hatched Hawksbill Turtles have a high survival rate of 82% (Yoseda and Shimizu, 2006). This project has managed to rear second and third generations (F2 and F3) of Hawksbill Turtles since 2004.

However, the volume of hatched turtles in this project has not reached a scale to supply commercial levels of *bekko* crafting. Two difficulties were described as preventing this from happening under the current ranching project: 1) the high cost involved in the grow-out of Hawksbill Turtles to adult size so that their shells are large and thick enough for *bekko* processing, and 2) the challenge to amend the harvesting permissions for the ranching project to qualify not only as a research institution but be allowed to produce for commercial use in the *bekko* industry.

Okinawa in Japan is an important nesting site for marine turtles in Japan. In the Okinawa prefecture, harvesting marine turtle is allowed for scientific research purposes under prefectural regulation (see **Legislation Review** section). Based on the Fisheries Resources Protection Law and Fisheries Law, the harvesting, possession and sales of marine turtles are managed and regulated by the Prefectural Fishery Adjustment Rule and Fishery Adjustment Commission in Japan. According to Okinawa fisheries sector records, 27 fishermen were granted permits by the Okinawa government in 2008 to harvest marine turtles (**Table 10**). Also, Okinawa prefecture has set up an annual Total Allowable Catch (TAC) for Hawksbill turtle since 1994. In 2008, the TAC for Hawksbill Turtles was 36 individuals where only two were reported to be harvested (**Table 10**). According to the manager of the ranching project, fishermen sold the two Hawksbill Turtles to FRA for biological research. In 2008 and 2009, JBA and FRA had a meeting with Okinawa prefecture requesting the amendment of Prefectural Fishery Adjustment Rule and Fishery Adjustment Commission to allow harvested Hawksbill Turtle from wild to be sold for commercial use in the future.

Table 10. Marine turtles harvested from the wild under permission in Okinawa, Japan.

Year	Permitted fisherman	Actual harvest fisherman	Green Turtle		Hawksbill Turtle		Loggerhead Turtle	
			TAC	Harvest	TAC	Harvest	TAC	Harvest
2001	18	17	204	181	29	25	6	2
2002	18	17	204	188	29	25	6	3
2003	18	18	204	192	29	25	6	3
2004	19	5	174	9	48	4	33	0
2005	29	13	233	45	32	3	38	0
2006	28	15	211	62	47	21	26	2
2007	32	9	256	66	34	6	28	5
2008	27	5	218	51	36	2	23	0
Total	189	99	1704	794	284	111	166	15

Source: Interview with Fishery section, Okinawa prefecture (2009).

DISCUSSION

Demand for marine turtle products in China and Japan continues to have a detrimental impact on the survival of marine turtle populations. The trade continues despite marine turtles being officially protected under international treaties ratified by China and Japan, and under national species protection legislation in China. Public displays of *bekko* and marine turtle products for sale provide irrefutable evidence of the trade in these products in both countries. Based on confiscation records, most marine turtles and their products were sourced from waters outside China and Japan. Of serious concern are the reported incidences of Chinese nationals actively poaching marine turtles in foreign territorial waters.

In previous surveys, TRAFFIC has reported on the substantial quantity of marine turtle jewellery, products and whole specimens for sale in Viet Nam, with connections to supply foreign demand in mainland China, Japan and Taiwan (TRAFFIC, 2004; Stiles, 2008). In 2002, large numbers of marine turtles were being processed annually in Viet Nam, many for export. One dealer stated that China was the biggest importing country of stuffed specimens, with orders increasing considerably over the previous three years. At the time, sales of stuffed specimens to China were often at wholesale quantities, with numerous Vietnamese vendors describing regular international wholesale buyers (*i.e.*, those ordering 100 or more products at a time), predominantly from China (TRAFFIC, 2004). This level of trade seemed unsustainable, and a follow-up survey in 2008 reported no regular wholesale export trade in Viet Nam – although foreign visitors still bought a high proportion of the marine turtle products sold in Viet Nam (Stiles, 2008). Species protection legislation and public advocacy were enhanced in Viet Nam, and TRAFFIC reported a reduction in the scale of the marine turtle market; although fears of a market decline induced from overexploitation in Vietnamese waters, with only relic marine turtle populations, were suspected (Stiles, 2008). Informants in all coastal localities reported that it was becoming rare to catch local marine turtles, especially the Hawksbill, and large marine turtles were virtually absent, except for Green Turtles in the Con Dao Islands, Viet Nam.

China, unlike Japan, maintains a ban on all trade in marine turtles, whether international or domestic. However, *bekko* products were found to be sold openly in southern and eastern coastal cities of China. Qionghai, Sanya and Beihai in southern China were found to be the most important locations for import, processing and trade; linking wholesalers and processing units to retail outlets distributed widely throughout the country, including northern cities such as Harbin in Heilongjiang Province, which borders Russia. Marine turtle products, including those from Green Turtle and Hawksbill, were also observed to be sold for meat and medicinal purposes. The volume of

trade observed for sale across China was large, often comprising whole animal specimens and totaling over half a million US dollars in value. While the Japanese trade was significant, the *bekko* market tended to involve the sale of smaller, manufactured items of high quality. Considering reported market declines in Viet Nam (Stiles, 2008), evidence suggests that the domestic market for marine turtles in China is probably the largest regional consumer of Hawksbill and Green Turtles and a serious risk to marine turtle survival.

Hainan Province in China is a significant market for marine turtle products, as well as a point of distribution to the wider national market. This island province has a large number of vendors selling openly and a large quantity of products displayed publicly for retail. Furthermore, Hainan, a traditional fishing area, is a port for landing marine turtle catches. The size and openness of this trade in Hainan demonstrates that the legislation prohibiting such trade was being deliberately flouted by traders. Similarly, Pilcher *et al.*, (2009) also found that demand for turtle products in Hainan was high, with many shops selling turtle products over the counter and with little concern for local enforcement. Chinese market vendors and fishermen stated they were aware that it was illegal to capture, process and sell marine turtle products, but were not concerned about the likelihood of enforcement action. Moreover, there were suggestions that the current high demand for marine turtles meant that fishermen were increasingly tempted to risk involvement in the illegal trade, and any turtle by-catch was no longer released. Fishing vessels from China appear to catch marine turtles primarily as by-catch. Marine turtle by-catch occurred as a result of the small mesh size of fishing nets, but fishermen tended not to release the turtles despite knowing that keeping marine turtles was an unlawful act. The large size of some seizures indicates that some level of targeted catch is also occurring. The complacent views of Hainan-based fishermen towards enforcement, and their involvement in the illegal harvest of marine turtles is significant and should be addressed with a targeted response of increased deterrents to such behaviour.

Japan has had a long history of *bekko* crafting and retains a network of highly organized wholesale and retail outlets throughout the country. Authorized and licensed traders are able to sell legal *bekko* products derived from pre-Convention stockpiles in Japan (*i.e.*, prior to Japan withdrawing its reservation on the listing of Hawksbill Turtle in CITES Appendix I) with no new supply of legally imported raw materials. In this survey, the *bekko* industry in Japan continues, though this traditional craft has regressed since lifting its CITES reservation in 1992 (Milliken and Tokunaga, 1987; Groombridge and Luxmoore, 1989; Canin, 1991). The craftsmen interviewed by TRAFFIC were concerned about the depletion of stockpiled raw materials and the difficulties to continue their craft, which required extensive training of apprentices to maintain the workmanship of traditional *bekko* artisans. While some craftsman showed concern over losing a traditional and long-maintained skill, others were

convinced that there was an ample *bekko* stockpile to continue the trade. From discussions with Japanese traders, the *bekko* products sold in shops in Japan were claimed by vendors to be derived from pre-Convention stockpiles. However, illegal import seizures were reported during the period of this study. Reported marine turtle seizures in Japan all involved confiscated quantities of raw scutes only, illegally sent in the mail or by air. The main export countries of this illegal freight were Singapore and Indonesia. Previously, Milliken and Tokunaga (1987) reported that Indonesia was one of the biggest exporters of Hawksbill Turtles to Japan. Current market surveys in Indonesia suggested that such illegal trade between Indonesia and Japan has decreased substantially since 1992 (Anon, 2005). Similarly, TRAFFIC surveys in Indonesia reported that companies involved in *bekko* export to Japan had stopped when the trade had been banned and they could not get permits (van Dijk and Shepherd, 2004). The current sale of marine turtle products in Japan was dominated by jewellery or ornamental pieces. Only a small number of whole stuffed turtles were observed; these pieces commanded a very high price (USD30 000) and turnover of this stock was low. This contrasts with the volume and price of whole specimen trade observed both on sale and in warehouse storage in China (price range USD60–2635). The price of Japanese *bekko* products was significantly higher than prices observed in China, possibly indicating the quality of the craftsmanship. Marine turtle trade in Japan appears to remain focused on making delicate and detailed ornaments and accessories from turtle shell with traditional workmanship.

Critical to this report are the serious concerns about the large-scale poaching operations involving Chinese nationals operating in foreign waters to source marine turtles (Pilcher *et al.*, 2009; Schoppe and Antonia, 2009). Numerous reports identify foreign vessels apprehended in Malaysia, the Philippines and Indonesia with hundreds upon hundreds of turtles confiscated. Marine turtles in the South-east Asia region are being targeted by foreign vessels originating from Hainan, China – and possibly Viet Nam, as noted by Pilcher *et al.* (2009). These boats are intentionally targeting marine turtles; a practice that is regarded as illegal both in their home country and in the waters of countries in which they fish. The species most affected by this significant trade were the Hawksbill Turtle and the Green Turtle. Most of the confiscations involved whole animals – often kept alive, or intended to be shipped alive but dying while in transit onboard the fishing vessel. Methods used by fishermen to catch such large numbers of marine turtles included beach collection during nesting, in-water techniques using spear guns and long-line fishing, as well as by-catch from fishing nets and dynamite fishing (Schoppe and Antonio, 2009). In the Philippines, the international trade of live marine turtles was considered to be rampant and was almost exclusively done by Chinese and Vietnamese poachers who fish in the South China Sea and the Sulu Sea (Schoppe and Antonio, 2009). Apprehensions of Chinese poachers in the Sulu Sea suggest that major fishing

areas for marine turtles were in northern Palawan, Kalayaan Islands, Balabac Strait and Tubbataha Reef in the Philippines (Schoppe and Antonio, 2009). The presence of vessels in such remote archipelagos appears to encourage illegal activity, with reports of locals bartering marine turtles with the crew of Chinese vessels in their area in return for goods, such as a brand new engine or portable generator (Schoppe and Antonio, 2009). Anecdotal reports by Pilcher *et al.* (2009) implicate Viet Nam in this trade at sea, with suggestions that much of the Vietnamese marine turtle catch is traded at sea with Hainanese vessels for commodities, rather than being landed in Viet Nam ports. Much of the source areas are very remote and current control is not only insufficient, but corruption has also been reported amongst law enforcers (Schoppe and Antonio, 2009). Thus significant challenges will be faced in mitigating this trade in countries of the Coral Triangle region.

Over the past decade, there has been a noteworthy increase in large-scale poaching operations at sea and there is a need to determine the prevalence of this practice. Critically Endangered and Endangered marine turtles (Hawksbill Turtle and Green Turtle) in vulnerable biologically diverse regions (e.g. Coral Triangle) are being targeted to supply the immense consumer demand in East Asia. There is an urgent need to put a stop to the continuing encroachment of illegal fishing vessels into Sulu–Sulawesi waters, and the poaching of the South-east Asian marine turtles.

CONCLUSIONS

It is widely believed that the long-term survival of marine turtles is at risk (Anon., 2006; IUCN, 2011). Previous TRAFFIC reports have documented the poaching of marine turtles from South-east Asia and highlighted the involvement and connectivity with Chinese demand (TRAFFIC, 2004; van Dijk and Shepherd, 2004; Schoppe and Antonia, 2009; Stiles, 2008). The current study reports that such demand for marine turtles remains high with large quantities of turtle specimens, often whole animals, observed for open sale in a variety of market locations in China (particularly Hainan) and marine turtle cargoes aboard Chinese vessels seized by foreign authorities at sea.

Poaching at sea by Chinese nationals is of serious concern; violating international treaties, contravening foreign laws, and threatening the survival of endangered marine turtles. With depleted marine turtle stocks along the north and several archipelagos in the central South China Sea, it appears that supply lines are pushing into South-east Asia in search of marine turtles to satisfy this demand. Evidence from the current study and other investigations (Pilcher *et al.*, 2009) indicates that Hainan Province in southern China is a pivotal location in this illegal trade. It appears that the majority of illegal fishers involved originated from Hainan, the majority of catches were landed in this island province, and that the Hainan markets were the main source for processing and distributing turtle products northward into mainland China. Authorities in Malaysia, Indonesia and the Philippines have each made significant apprehensions of Hainan-based vessels, confiscated hundreds of whole marine turtles and turtle parts and imposed fines totalling hundreds of thousands of US dollars. Revenues generated by the marine turtle industry are sufficiently high to warrant the risk of acquiring large-scale shipments in foreign territorial waters as far away as the Sulu and Sulawesi seas. Marine turtle poaching of the magnitude seen in recent years is of significant conservation concern and likely to impact detrimentally the survival of marine turtle populations.

RECOMMENDATIONS

TRAFFIC recommends that urgent action be taken to prevent extirpation of marine turtles in the South China Sea and the remaining marine turtle populations in the Coral Triangle. Substantial quantities of marine turtle products recorded in China's markets show the need for further steps to be taken to mitigate illegal trade, and to break the supply chain to increase protection of these depleting species in the countries of origin, particularly South-east Asia.

Specific recommendations from the findings of this report are as follows:

- Legal protection of marine turtles in China should be supported by strengthened enforcement actions by relevant government authorities, such as the Fishery Department of China's Agriculture Administration. Actions include confronting the issue of domestic trade and increasing efforts to detect and prevent further illegal harvesting by Chinese fishermen in foreign waters. Deliberate confiscation and destruction of all marine turtle products that remain for sale in all stores and warehouses, in accordance with the law, would also help deter further offences.
- Strengthened enforcement in China should be supported by an awareness campaign targeting local public, tourists, vendors and fishers regarding the illegal sale and/or capture of marine turtles, and to raise awareness of existing legislation and illegal trade issues – particularly focused in Hainan Province. There is a need to educate and mobilize Hainan residents, and the burgeoning numbers of tourists, to support better control of marine turtle trade. Awareness campaigns and interactive dialogue between stakeholders, government and non-government organizations will help change perceptions and develop understanding of the need to protect marine turtles and prevent illegal trade.
- Multi-lateral, regional, inter-regional commitments should be strengthened across international boundaries and in territorial waters of source countries to unify conservation efforts on a global scale. Both China and Japan are recognized range States for marine turtles, but are not yet signatories to the Memorandum of Understanding on the conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA). It is recommended that China and Japan become signatories to the IOSEA Marine Turtle international agreement in order to further support international actions for marine turtle conservation, including the curbing of illegal international trade. Regional efforts should build on the current Sulu-Sulawesi Marine Ecoregion Tri-national Sea Turtle Conservation Programme, and the inter-governmental Coral Triangle Initiative.

- Systematic exchange of actionable intelligence information regarding illegal harvest and trade of marine turtles and their products should be promoted between countries in South-east and East Asia with multi-national and trans-regional co-operation required. It is recommended that illegal harvest and trade of marine turtle products be prioritized for intelligence exchange and further law enforcement action by the 10 member countries of ASEAN Wildlife Enforcement Network, with links to existing markets in the ASEAN+3 grouping (China, Japan, South Korea).
- Assessments should be made of the socio-economic status and economic incentives that drive the direct and opportunistic take of marine turtles in China. Socio-economic studies should be conducted in fishing communities and other local businesses involved in the harvesting, processing or trade of marine turtle products to determine the level and nature of dependence on marine turtle products – particularly in Hainan Province. Solutions should consider non-consumptive uses for marine turtles in the region and create tangible benefits to the communities that interact with marine turtles. For example, enhancing tourism initiatives in Hainan would create alternative job opportunities and revenue, and engender stronger commitment for conservation efforts.
- Relevant government authorities in China should focus capacity building at regional and national levels to educate relevant law enforcement agencies further about marine turtle conservation including enforcement activities. The Fishery Department of Agriculture Administration and relevant partners, including non-government organizations, should co-operate with law enforcement agencies in the training of field staff on the implementation and enforcement of CITES and relevant national law.
- Government and non-government organization partners should continue monitoring the status of marine turtle product availability and trade patterns in China, in order to measure the success of enforcement efforts and to keep abreast of changing market trends, trade routes and other relevant information. Regional capacity building in China should be promoted through strengthening research and advocacy skills, and involving the institutional capacity of participating academic and research organizations. The current population status of all marine turtle species in the wild should continue to be monitored, and local individuals and organizations should be trained to carry out such monitoring projects. Such actions will highlight and prioritize issues requiring international co-operation and management.

- Advocacy targeted at the decline of *bekko* trade is needed in Japan. Strategies should involve relevant government agencies, such as the Ministry of Agriculture, Forestry and Fisheries, and include raising awareness through interventions with key stakeholders and the public, and the Japan Bekko Association. Any existing or proposed Hawksbill Turtle ranching projects in Japan should be monitored closely and evaluated for potential impact on marine turtle trade dynamics and Hawksbill Turtle conservation.
- There is a knowledge gap regarding the availability of marine turtle products in the domestic trade of some countries and territories in East Asia, particularly Taiwan and South Korea. Both have been revealed as significant markets in the marine turtle trade in the past, and hence it is a priority to evaluate the status of current trade in these markets.



Credit: © Carlos Drews / WWF-Canon

Juvenile Hawksbill Turtle

REFERENCES

- Aikin, A. (1840). On horn and tortoise shell, *Journal of the Franklin Institute* 30:256–63.
- Anon, (2001). http://www.ecologyasia.com/news-archives/2001/sep-01/kyodo_news_240901_01.htm (Accessed 4 October 2012)
- Anon. (2003). <http://china.org.cn/english/2003/May/64461.htm> (Accessed 4 October 2012)
- Anon. (2004b). http://www.hicourt.gov.cn/NEWS/news_detail.asp?newsid=2005-5-24-8-56-19 (Accessed 4 October 2012)
- Anon. (2004). Seizures and prosecutions - Malaysia. *TRAFFIC Bulletin* 20(1):37.
- Anon. (2005). Hawksbill trade in Indonesia. Profauna Indonesia.
- Anon. (2005). Seizures and prosecutions – Hong Kong. *TRAFFIC Bulletin* 20(3):115.
- Anon. (2006). *The state of the world's hawksbills*. SWOT Report, Volume 3.
- Anon. (2007a). Turtle poachers apprehended in Malaysia. Earthdive. 13 March 2007. <http://www.earthdive.com/site/news/newsdetail.asp?id=2069>
- Anon. (2007b). More turtles poachers caught. Daily Express News, Sabah, Malaysia, 29 March 2007. <http://www.dailyexpress.com.my/news.cfm?NewsID=48642>
- Anon. (2007c). Seizures and prosecutions - Malaysia. *TRAFFIC Bulletin* 21(2):71.
- Anon. (2007d). Chinese fishermen arrested butchering endangered turtles. Intrafish. 15 June 2007.
- Anon. (2008). The Liberty Times, 17 January 2008. <http://www.libertytimes.com.tw/2008/new/jan/17/today-center9.htm>
- Anon. (2009a). Survey of marine turtle egg consumption and trade in Malaysia. Prepared by TRAFFIC Southeast Asia for WWF Malaysia.
- Anon. (2009b). Japan Bekko Association. 21 March 2009. <http://www.bekko.or.jp/index.html>
- Anon. (2011). Towards the adoption of circle hooks to reduce fisheries bycatch in the coral triangle region. Policy Brief, WWF Coral Triangle Programme.
- Bjorndal, K. A. and Jackson, J. B. C. (2003). Role of sea turtles in marine ecosystems: reconstructing the past. In: Lutz, P. L., Musick, J. A. and Wyneken, J. (Eds), *Biology of sea turtles*. Vol. II. CRC Press.
- Canin, J. (1991). International trade aspects of the Japanese hawksbill shell ('Bekko') industry. *Marine Turtle*

Newsletter. 54: 17-21.

- Carillo, E., Webb, G.J.W. and Manolis, S.C. (1999). Hawksbill turtles (*Eretmochelys imbricata*) in Cuba: An assessment of the historical harvest and its impacts. *Chelonian Conservation Biology*. 3: 264-280.
- Carpenter, K.E., Barber, P.H., Crandall, E.D., Ablan-Lagman, M.C.A., Ambariyanto, Mahardika, G.N., Manjaji-Matsumoto, B.M., Juninio-Meñez, M.A., Santos, M.D., Starger, C.J. and Toha, A.H.A. (2011). Comparative phylogeography of the coral triangle and implications for marine management. *Journal of Marine Biology* 2011:1-15.
- Carrascal de Celis, N. (1995). The status of research, exploitation, and conservation of marine turtles in the Philippines. In: Bjorndal, K.A. (Ed), *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.
- Cheng, I-L. (1995). Sea turtles at Dungsha Tao, South China Sea. *Marine Turtle Newsletter* 70:13-14.
- Cheng, I-L. (1996). Sea turtles at Taipin Tao, South China Sea. *Marine Turtle Newsletter* 75:6-8.
- Chu-Chien, H. (1995). Distribution of sea turtles in China Seas. In: Bjorndal, K.A. (Ed), *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.
- de Silva, G.S. (1995). The status of sea turtle populations in East Malaysia and the South China Sea. In: Bjorndal, K.A. (Ed), *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.
- Dethmers, K.E.M. and Baxter, P.W.J. (2011). Extinction risk analysis of exploited green turtle stocks in the Indo-Pacific. *Animal Conservation* 14(2):140-150.
- Frazier, J. (1971). Observations on sea turtles at Aldabra Atoll, *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 260(836):373-410.
- Groombridge, B. and Luxmoore, R. (1989). *The Green Turtle and Hawksbill (Reptilia: Cheloniidae): World Status, Exploitation and Trade*. CITES, Lausanne, Switzerland.
- Hainshwang, T., and Leggio, L. (2006). The characterization of tortoise shell and its imitations. *Gems Gemology*. 42(1): 36-52.
- Hoeksema, B.W. (2007). Delineation of the Indo-Malayan centre of maximum marine biodiversity: the coral triangle. In: Renema, W. (Ed), *Biogeography, Time and Place: Distribution, Barriers and Islands*. Springer, Dordrecht, The Netherlands.
- IUCN. (2011). *IUCN Red List of Threatened Species*. www.iucnredlist.org. Downloaded on 16 March 2011.
- Kaepler, A.L. (1978). "Artificial curiosities": An explosion of native manufactures collected on the three Pacific voyages of Captain James Cook, R. N. Bernice P. Bishop Museum Special Publication 65.

- Kikukawa, Akira, Naoki Kamezaki and Hidetoshi Ota (1999). Current status of the sea turtles nesting on Okinawajima and adjacent islands of the central Ryukyus, Japan. *Biological Conservation*, 87: 149-153.
- Kinch, J. and Burgess, E.A. (2009). An assessment of the trade in hawksbill turtles in Papua New Guinea. *TRAFFIC Bulletin*. 22(2):62-72.
- Kobayashi, M. (2001). Annual cycle of the speckle pattern on the carapace of immature hawksbill turtles (*Eretmochelys imbricata*) in Cuba, *Amphibia-Reptilia* 22(3):321-8.
- Le Dien Duc and Broad, S. (1995). Exploitation of Hawksbill Turtles in Viet Nam. *TRAFFIC Bulletin* 15(2), 77.
- Leon Y.M and Bjorndal K.A. (2002) Selective feeding in the hawksbill turtle, an important predator in coral reef ecosystems. *Marine Ecology Progress Series* 245:249-258.
- Lilley, R. (2009). A preliminary report of the nature and scale of domestic and international trade in marine turtle in Indonesia. Unpublished internal TRAFFIC report.
- Limpus, C.J. and Miller, J.D. (1990). The use of measured scutes of hawksbill turtles, *Eretmochelys imbricata*, in the management of the tortoiseshell (bekko) trade. *Australian Wildlife Research* 17:633-639.
- Limpus, C.J. and Miller, J.D. (2008). Australian Hawksbill Turtle Population Dynamics Project. Research Publication Queensland Environmental Protection Agency, Brisbane, Australia.
- Mack, D. (1983). Worldwide trade in wild sea turtle products: An update. *Marine Turtle Newsletter* 24:10-15.
- Márquez M., R. (1990). *FAO Species Catalogue, 11: Sea Turtles of the World. An annotated and illustrated catalogue of sea turtle species known to date*. FAO Fisheries Synopsis, No. 125, Vol. 11. FAO, Rome, Italy.
- Milliken, T., and Tokunaga, H. (1987). *The Japanese Sea Turtle Trade 1970-1986*. TRAFFIC Japan, Tokyo.
- Pilcher, N., Chan, E.H. and Hiew, K. (2009). *Battling the direct poaching of sea turtles in south-east Asia*. Workshop on regional cooperation to address poaching of sea turtles, Kuala Trengganu, Malaysia, June 2009.
- Schoppe, S. and Antonio, R. A. S. (2009). Marine turtle trade in the Philippines. Unpublished TRAFFIC Report.
- Shizheng, W. and Hai-Tao, S. (2009). *Sea turtle conservation status in Paracel (Xisha) Islands and case analysis of sea turtle conservation in Hainan Province*. Workshop on Regional Cooperation to Address Direct Capture of Sea Turtles, 1-3 June 2009. Kuala Terengganu, Malaysia.
- Stiles, D. (2008). An assessment of the marine turtle products trade in Viet Nam. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia.
- TRAFFIC (2004). The trade in marine turtle products in Viet Nam. TRAFFIC Southeast Asia - Indochina.

- TRAFFIC East Asia-Japan (2000). Status of trade in hawksbill turtles. Report to the CITES Secretariat. http://www.cites.org/eng/prog/hbt/bg/trade_status.shtml
- Uchida, I. and Nishiwaki, M. (1995). Sea turtles in the waters adjacent to Japan. In: Bjorndal, K.A. (Ed), *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.
- Van Dijk, P. and Shepherd, C.R. (2004). Shelled out? A Snapshot of Bekko Trade in Selected Locations in South-east Asia. TRAFFIC Southeast Asia.
- WWF (2011). Towards the Adoption of Circle Hooks to Reduce Fisheries Bycatch in the Coral Triangle Region, WWF-Indonesia Observer Programme.
- Yoseda, K. and Shimizu, T. (2006). Technology development for spontaneous spawning, egg management and juvenile stocking in endangered sea turtles, *Nippon Suisan Gakkaishi* 72(3): 476-479.
- Zindel, F. (2007). Shocking news – 397 dead sea turtles discovered. *Turtle Foundation*. <http://www.turtle-foundation.org/NewsWeblog/tabid/70/EntryID/57/Default.aspx>

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

For further information contact:

TRAFFIC Regional Office in East Asia

c/o WWF-Hong Kong

15/F, Manhattan Centre

8 Kwai Cheong Road

Kwai Chung N.T.

Hong Kong

Tel: (852) 2161 9686

Email: traffic.eastasia@traffic.org

The Executive Director

TRAFFIC International

219a Huntington Road

Cambridge CB3 0DL

United Kingdom

Telephone: (44) 1223 277427

Fax: (44) 1223 277237

