

NWF/IUCN/WWF Programme for Endangered Species in Asia

in collaboration with TRAFFIC Southeast Asia

Investigations into Tortoise and Freshwater Turtle Trade in Vietnam



IUCN Species Survival Commission



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IUCN
The World Conservation Union

IUCN Species Survival Commission

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TRAFFIC is a conservation programme of WWF-The World Wide Fund for Nature, and IUCN-The World Conservation Union. TRAFFIC International, based in Cambridge, UK, is the coordinating office of the TRAFFIC Network, which consists of 17 offices worldwide. In supporting the work and missions of WWF and IUCN, TRAFFIC's purpose is to help ensure that wildlife trade is at sustainable levels and in accordance with domestic and international laws and agreements. This is achieved through the investigation, monitoring and reporting of such trade, particularly that which is detrimental to the survival of flora and fauna and that which is illegal.

The Centre for Resources Management and Environmental Studies

CRES, located within the University of Hanoi, was established in 1985 to conduct research and field activities and to train Vietnamese scientists in environmental and related social sciences. Major activities include professional development in environmental studies and management, carrying out small projects to help local people use natural resources sustainably and educational awareness and information development.

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**Investigations into Tortoise and Freshwater Turtle Trade
in Vietnam**

by

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TRAFFIC Southeast Asia

for

TRAFFIC Southeast Asia

National Wildlife Federation

**IUCN - The World Conservation Union
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Preface

With the establishment of IUCN offices in Vietnam, Cambodia and Lao PDR, and the signing of agreements with host governments, the Species Survival Commission of IUCN, the World Conservation Union, has been able to conduct a number of important projects on endangered species, with the generous financial support of the National Wildlife Federation of the United States. These projects have been conducted as part of a collaborative programme involving the World Wide Fund for Nature (WWF), and where possible, collaboration has also been sought with other conservation NGOs with field programmes in Indochina.

Considering the large number of freshwater turtle species and the occurrence of a number of globally threatened species, Vietnam is considered a priority country for chelonian conservation. The IUCN/SSC Tortoise and Freshwater Turtle Specialist Group noted, in its recent action plan, that research should focus on establishing up-to-date distribution information, assessing habitat quality, reviewing the potential for specific protection measures and investigating the economic importance of chelonians in the country (particularly through market surveys). With this last recommendation in mind, the TRAFFIC Network has undertaken an initiative in Southeast and East Asia to determine the economic importance in freshwater and terrestrial chelonians in the region. This report represents the results of an investigation of Vietnam's trade in tortoises and freshwater turtles carried out during 1993 by the Centre for Natural Resources Management and Environmental Studies (CRES) of the University of Hanoi.

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Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRES	The Centre for Natural Resources Management and Environmental Studies
CVRER	Committee for Vietnam's Resources and Environmental Research
FIPI	Forestry Inventory and Planning Institute of MoF
GEF	Global Environmental Facility
ICBP	International Council for Bird Preservation, now BirdLife International
IEBR	Institute of Ecology and Biological Resources
IUCN	The World Conservation Union
MoF	Ministry of Forestry
MoSTE	Ministry of Science, Technology and the Environment
SSC	Species Survival Commission of IUCN
WCMC	World Conservation Monitoring Centre
WWF	World Wide Fund for Nature

The scientific and English names of tortoises and freshwater turtles used in the text follows Iverson (1992).

Scientific terms (from Pritchard, 1979):

plastron - The ventral shell of a tortoise or turtle.

carapace - The dorsal part of the shell of a tortoise or turtle

Summary and Recommendations

Summary

The chelonian fauna of Vietnam remains poorly known, but at least 21 species of freshwater turtle and two species of terrestrial tortoise have been recorded. Recent changes to the country's economic system have opened direct access to major foreign markets, but legislation provides little protection. Certain aspects of chelonian trade, such as documentation of imports of large quantities of terrestrial tortoises from Cambodia for local use and for re-export to other countries, were documented during previous investigations. During the present study, detailed investigations into the tortoise and freshwater turtle trade in Vietnam were focused on aspects of local and export use of live animals and products. Trade and market surveys were conducted throughout Vietnam during July-November 1993.

The study revealed turtle collection points in all of the areas visited. Every collection point had its own sources and collectors who travel for at least 7-10 days per trip. Those collectors cover large areas of the country. Lao PDR and Cambodia are also important sources for Chelonians that are traded in Vietnam. The vast majority of the current trade depends on collection of animals from the wild, but a few instances of captive production were noted.

Efforts were made to develop a detailed understanding of the trade routes employed. Ho Chi Minh City and Hanoi are the two biggest centres of the trade. Most freshwater turtles and tortoises in trade (probably 90%) go to China, where tortoises and turtles are used for food and preparation of tonics and medicines. Interviews with dealers in areas bordering China revealed a highly organized trade system, in which arrangements are made by telephone. Investigations in Vietnam found no indication of direct turtle exports from Vietnam to other markets.

The complexity of the trade system and lack of official records undermined efforts to estimate trade volumes. Estimates of exports to China from the main border crossing and shipping points indicate a likely combined daily export of around 450-750kg, equivalent to an annual export of around 165-270 tonnes. However, data from elsewhere suggest that these figures may be serious underestimates. Relating these export volumes to numbers of animals is an even more difficult task; however, it appears from available information that at least 200,000 individual tortoises and freshwater turtles, and conceivably several times this, have been traded in Vietnam each year. All native species, with the exception of four freshwater turtle species were observed in trade. For some of these species, even low levels of exploitation could pose a serious problem for long-term survival, and exploitation may be unsustainable at current levels.

Tortoises and turtles have extremely important and long-standing cultural value in China. The extent to which China re-exports tortoise and turtle products to other consumer states, such as Taiwan and South Korea, also remains unknown. Whether aimed at local or export markets, it is clear that considerable values are placed on tortoise and turtle species in the Vietnamese economy. The total value of the export trade cannot be accurately calculated with any confidence on the basis of available data. However, it is clear that considerable income is being accrued: exports to China are likely to have a minimum value of around US\$1 million per year and possibly considerably more, though direct government revenue did not appear to be accrued as most exports apparently take place unofficially. The present study

revealed that the number of freshwater turtles and tortoises hunted for local use as food in rural areas is small when compared with the number being exported to China. Freshwater turtle eggs are also collected for sale as food in the Mekong Delta and Cambodia. Chelonians are also used within Vietnam for food, medicines, pets and Buddhist release.

Recommendations

■ *Legislation*

1. The government of Vietnam should consider an immediate review of the national protection status of tortoise and turtle species and afford full legislative protection to those species which appear to be most vulnerable to over-exploitation.
2. To compliment national protection measures, the government of Vietnam could consider the listing of certain chelonian species in CITES Appendix III as a means of seeking the support of other CITES Parties in controlling international trade of tortoises and freshwater turtles from Vietnam.

■ *Law Enforcement*

3. The government of Vietnam should consider collaboration with local scientists and appropriate international organisations to assess the effect of current levels of chelonian exploitation and to prepare species identification materials and other enforcement aids to compliment increased legislative protection.
4. The government of Vietnam should consider initiating bilateral discussions regarding control of chelonian trade with neighbouring countries, in particular China, the main market for current production.

■ *Field Studies*

5. Field investigations should be initiated as a matter of urgency to assess the distribution and population status of chelonians in Vietnam - priority should be given to those species which appear most vulnerable to trade threats.

■ *Review of Red Data Book Status*

6. The information derived during this study may be used in review of the current categories of chelonian species in the Red Data Book of Vietnam (MoSTE, 1992).

■ *Public Awareness*

7. The government of Vietnam and local scientific bodies should consider collaborating to raise public awareness of chelonian conservation problems in the country.

■ *Regional trade studies*

8. TRAFFIC should initiate detailed investigations of tortoise and freshwater turtle consumption in China, in order to be able to properly assess the nature and extent of demand and to develop insight into how any related conservation problems might be addressed.

1. Introduction

The chelonian fauna of Vietnam remains poorly known. Species' taxonomy, distribution and ecological characteristics have been researched to a far lesser extent than in many other parts of the world, but at least 21 species of freshwater turtle (Emydidae, Platysternidae and Trionychidae) and two species of terrestrial tortoise (Testudinidae) have been recorded (Bourret, 1941; Iverson, 1992). These 23 species are listed in Table 1, together with details of their listings in the Red Data Book of Vietnam (MoSTE, 1992), the 1994 IUCN Red List of Threatened Animals (Groombridge, 1993), and their threat rating by the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group (IUCN/SSC, 1989).

Annam Leaf Turtle *Annamemys annamensis*, Indochinese Box Turtle *Cuora galbinifrons*, Elongated Tortoise *Indotestudo elongata* and Impressed Tortoise *Manouria impressa* are listed as "Insufficiently Known" but suspected to be threatened in the 1994 IUCN Red List (Groombridge, 1993). Both tortoises are listed in Appendix II of CITES. In addition, there is a possibility that the endangered River Terrapin *Batagur baska*, listed in CITES Appendix I, occurs in the south of the country (IUCN/SSC, 1989), and that the range of the Asian Brown Tortoise *Manouria emys* may extend into southern Vietnam (Iverson, 1992). Finally, at least four marine turtle species have been recorded in Vietnamese coastal waters: Leatherback Turtle *Dermochelys coriacea* (Dermochelyidae), Common Green Turtle *Chelonia mydas*, Hawksbill Turtle *Eretmochelys imbricata* and Olive Ridley Turtle *Lepidochelys olivacea* (Cheloniidae) (MoSTE, 1992). Utilisation of marine turtles is not covered by the present report: a separate CRES/TRAFFIC Southeast Asia trade study on that issue is in preparation.

Considering the large number of freshwater turtle species and the occurrence of a number of globally threatened species, Vietnam is considered a priority country for chelonian conservation. The IUCN/SSC Tortoise and Freshwater Turtle Specialist Group noted in its recent action plan (IUCN/SSC, 1989) that research should focus on establishing up-to-date distribution information, assessing habitat quality, investigating the economic importance of chelonians in the country (particularly through market surveys) and reviewing the potential for specific protection measures.

Legislation relating to chelonians

Vietnam has suffered enormous ecological changes in most habitat zones owing to land conversion for agriculture and the ravages of armed conflicts during the past fifty years. Although freshwater turtles and tortoises have been subject to human use for centuries, recent changes to the country's economic system have opened direct access to major foreign markets. Current legislation provides little protection to Vietnam's chelonian fauna, and there is no provision of incentives for sustainable exploitation of this valuable resource.

Vietnam has adopted basic wildlife protection legislation, which restricts hunting and trade of two chelonian species, *Indotestudo elongata* and the Asian Giant Softtail Turtle *Pelochelys bibroni*, which are listed in Annex IIB of the January 1992 Decree of the Council of Ministers adopting a list of "Rare and Precious Forest Flora and Fauna" (Decree No. 18-HDBT). Animal species listed in Annex IIB may only be trapped or captured in essential circumstances, such as to create a breeding population, for scientific research or for international exchange for breeding.

General wildlife trade investigations in Vietnam jointly carried out by CRES and TRAFFIC Southeast Asia, as well as the investigations conducted in other Southeast Asian countries by TRAFFIC Southeast Asia have revealed poor implementation and enforcement of current wildlife protection regulations (CRES, 1994).

Table 1. List of tortoise and freshwater turtle species recorded in Vietnam (nomenclature follows Iverson, 1992)

Distribution: N = North Vietnam, Cen = Central Vietnam, Ne = Northeast Vietnam, S-cen = central part of South, Cen-s = south part of Central Vietnam etc.; * = restricted distribution; (?) = locality unknown, ? presence not confirmed

VN RDB = Vietnam Red Data Book: R = Rare, V = Vulnerable (MoSTE, 1992)

Red List = status in 1994 IUCN Red List of Threatened Animals (Groombridge, 1993). K = Insufficiently known, but suspected to be threatened.

SSC APR = Action Plan Rating IUCN/SSC (1989) 1. known threatened species in need of specific conservation measures; 2. species of restricted distribution in need of status investigation; 3. other species for which specific conservation projects and status surveys are required.

Species	English Name	Distribution	VN RDB	Red List	SSC
Emydidae (Batagurinae)					
<i>Annamemys annamensis</i>	Annam Leaf Turtle	Cen*		K	2
<i>Cuora amboinensis</i>	Southeast Asian Box Turtle	S-cen			
<i>C. (Cistoclemmys) galbinifrons</i>	Indochinese Box Turtle	N, n-Cen		K	2
<i>C. trifasciata</i>	Chinese Three-striped Box Turtle	N			
<i>Cyclemys dentata</i>	Asian Leaf Turtle	Ne,Cen,S-cen			3
<i>Cyclemys (Geoemyda) tcheponensis</i>	Stripe-necked Leaf Turtle	Cen			
<i>Geoemyda spengleri</i>	Black-breasted Leaf Turtle	N, Cen			3
<i>Heosemys (Geoemyda) grandis</i>	Giant Asian Pond Turtle	S-cen	V		
<i>Hieremys annandalii</i>	Yellow-headed Temple Turtle	S-cen*	V		
<i>Malayemys subtrijuga</i>	Malayan Snail-eating Turtle	S			3
<i>Mauremys mutica</i> (= <i>Cyclemmys nigricans</i>)	Yellow Pond Turtle	N, Cen-n			
<i>Notochelys platynota</i>	Malayan Flat-shelled Turtle	S(?)			3
<i>Ocadia sinensis</i>	Chinese Stripe-necked Turtle	N, Cen			
<i>Pyxidea (Cyclemys) mouhotii</i>	Keeled Box Turtle	N, Cen			3

Species	English Name	Distribution	VN RDB	Red List	SSC
<i>Sacalia (Clemmys) quadriocellata</i>	Four-eyed Turtle	Cen, N?			
<i>Siebenrockiella crassicollis</i>	Black Marsh Turtle	S-cen			
Platysternidae					
<i>Platysternon megacephalum</i>	Big-headed Turtle	N	R		3
Testudinidae					
<i>Indotestudo elongata</i>	Elongated Tortoise	Ne, S-cen, Cen-s	V	K	1
<i>Manouria impressa</i>	Impressed Tortoise	N, Cen-s	V	K	1
Trionychidae					
<i>Amyda (Trionyx) cartilaginea</i>	Asiatic Softshell Turtle	Cen			3
<i>Palea (Trionyx) steindachneri</i>	Wattle-necked Softshell Turtle	N, Cen			
<i>Pelochelys bibroni</i>	Asian Giant Softshell Turtle	N, Cen	V		3
<i>Pelodiscus (Trionyx) sinensis</i>	Chinese Softshell Turtle	N, Cen			

Aims and objectives

Previous general investigations by CRES and TRAFFIC have revealed that the scale of trade in both freshwater turtles and tortoises is a cause for serious conservation concern. Certain aspects of chelonian trade, such as documentation of imports of large quantities of terrestrial tortoises from Cambodia for local use and for re-export to other countries, were documented during previous investigations. However, apart from the very general impression that many turtles are sold in the markets in Ho Chi Minh City, very little was known about real trade volumes or routes.

During the present study, detailed investigations into the tortoise and freshwater turtle trade in Vietnam were focused on aspects of local and export use of live animals and products (medicines, shells, meat etc.), and included an assessment of the causes of illegal trade, in order to provide recommendations to the Vietnamese authorities regarding the enforcement of national wildlife protection laws and regulations. To achieve these objectives, the investigations focused on:

- investigating and providing data on exports and domestic sales of wild turtles and tortoises in all regions of Vietnam on main trade routes;
- investigating and providing data on species and number of individuals being traded in Hanoi, Ho Chi Minh City and other major provincial towns;
- providing information about the economic, cultural, and medicinal values of turtles and tortoises gathered from village hunters and trappers, private and government organizations;
- providing a set of recommendations to the Vietnamese government concerning solutions to problems identified by the investigations.

2. Research Methods

Trade and market surveys were conducted during the period July-November 1993 to investigate trade in turtles and tortoises for domestic use and exports. The following places were visited during the course of the survey (Figure 1):

Northern Vietnam

Mong Cai, Quang Ninh Province
 Lang Son (Dong Dang), Lang Son Province
 Hanoi (Dong Xuan Market, Lan Ong street)
 Ha Tay (Thuong Tin), Ha Tay Province
 Tam Dao, Vinh Phu Province
 Ninh Binh, Ninh Binh Province
 Thai Binh, Thai Binh Province
 Thanh Hoa, Thanh Hoa Province

Central Vietnam

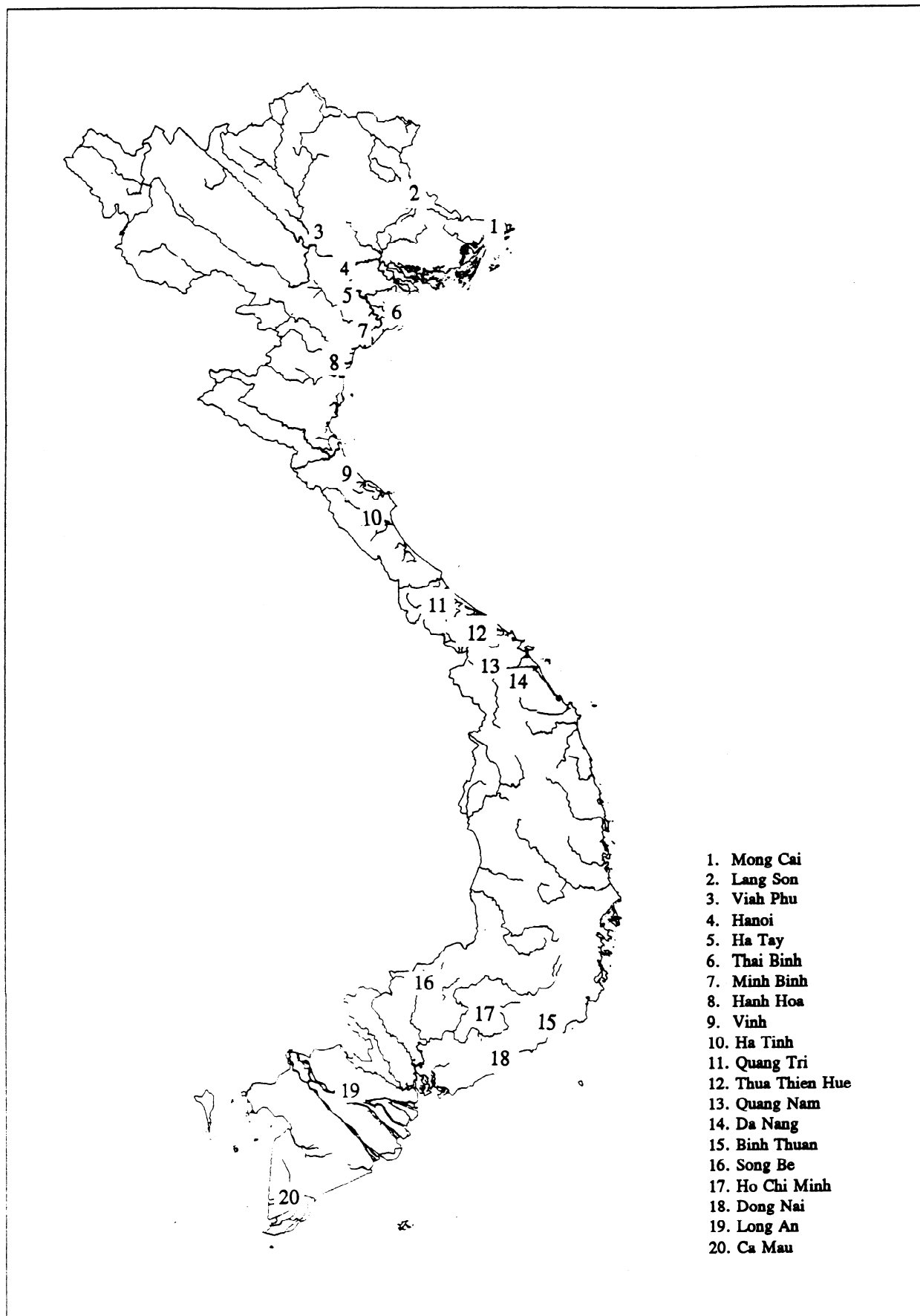
Nghe An Province
 Ha Tinh, Ha Tinh Province
 Vinh, Ha Tinh Province
 Hue, Thua Thien Hue Province
 Quang Tri Province
 Quang Nam - Da Nang Province
 Binh Thuan Province

Southern Vietnam

Ho Chi Minh City (Cau Mong market, Lan Ong market, Trieu Quang Phuc street, tourist shops in Dong Khoi St.)
 Dong Nai Province
 Phuoc Long and Loc Ninh, Song Be Province
 Ca Mau, Minh Hai Province
 Da Hoai, Da Te and Cat Tien, Lam Dong Province
 Long An Province

At each location, attempts were made to record the species in trade, trade routes, volume of trade and related market information. When conducting surveys the research team interviewed people who, in one way or another, were involved in turtle business, including hunters and trappers, middlemen, sellers, and exporters. The objective of the interviews was to obtain information about hunting and trapping, species utilised, trapping seasonality, source areas, numbers of trappers and hunters involved, prices of the various species, transportation routes, names of exporters, and quantity of exported turtles. Names and nationalities of buyers were also listed. To facilitate investigations, the researchers sometimes posed as traders or buyers in order to set up a network of informants. Wirot (1979) and Bourret (1941) were used for species identification.

Figure 1. Study sites visited in Vietnam



3. Market Survey Results

3.1 Hanoi

There were four turtle shops in the Dong Xuan Market, Hanoi. In addition, street vendors sold turtles, and six young men from Thanh Hoa were encountered selling turtles on the roadside. Thanh Hoa Province, to the south of Hanoi, is apparently a major source for turtles sold in this way. Traders from here probably arrive by train, hiring a lambretta to transport turtles from the railway station to Dong Xuan Market. Each sack of turtles and tortoises found in the survey weighed about 3-15kg. In July 1993, a total of 14 chelonians from four families and comprising a total weight of about 15kg were observed, including two young *Manouria impressa*, a CITES-listed species that is included in both the IUCN Red list (Groombridge, 1993) and the Vietnam Red Data Book (MoSTE 1992) (Table 2).

Pharmacies in Lan Ong street purchased turtles infrequently and in small numbers. They purchased all kinds of turtles and tortoises, but favoured the Chinese Three-striped Box Turtle *Cuora trifasciata* because this species is most valuable: no capital investment in holding premises was necessary owing to the small number of animals required to make considerable profit: the price for individual *C. trifasciata* ranges from 500,000-1,500,000 dong (US\$50-150). Usually, sellers hide their turtles in nylon stockings or briefcases to conceal them from potential thieves. A trader living in Lan Ong street revealed that most of the turtles came from Hoang Lien Son, Thanh Hoa, Nghe Tinh, Ca Mau, Ban Me Thuat, with the main source being Nghe Tinh.

Table 2. Numbers, estimated sizes and prices of freshwater turtles and tortoises observed in trade in the Dong Xuan Market, 14 July 1993

Species	Number	Size (kg/ind)	Price (d/kg)	Usage	Source
Emyridae					
<i>Cuora galbinifrons</i>	3	1	60,000	export	Mountains
<i>Mauremys mutica</i>	4	1	40,000		North VN
Platysternidae					
<i>Platysternon megacephalum</i>	1	0.5	100,000		
Testudinidae					
<i>Manouria impressa</i>	2	0.2	50,000		
Trionychidae					
<i>Pelodiscus sinensis</i>	2	1.5	150,000		
<i>Palea steindachneri</i>	2	2.5	150,000		

In Lan Ong street, 17 out of 63 shops purchase turtle shells for medical treatment. The owners of these shops use traditional knowledge to make medicines from turtle shells. Most products for sale are made from terrestrial Testudinidae, which mostly come from the southern and central Vietnam (in particular Da Lat in Lam Dong Province and Gia Lai Province), and from areas inhabited by

minority peoples in the north-west. However, the current level of purchasing power is not very high, and only about 20kg are purchased at a time to make traditional medicines.

The plastron is of much higher value, the carapace being used only as additives. Carapace is mixed with plastron to make balm; in its unadulterated form, plastron is used to make medicine. Prices varied from 10,000 dong (US\$1) for one kilogram of carapace to 30,000-40,000 dong (US\$3-4) per kilogram of plastron. Table 3 provides details of other Hanoi trade observations in August 1993: a total of 203kg of freshwater turtles and tortoises of 15 species was found on a single date.

Table 3. Estimated quantities of live turtles observed in Hanoi (31 August 1993)

Species	Quantity	Price (d/kg)	Source
Emydidae (Batagurinae)			
<i>Cuora amboinensis</i>	8kg	86,000	Thanh Hoa
<i>C. galbinifrons</i>	45kg	86,000	
<i>C. trifasciata</i>	unknown	1,500,000	
<i>Cyclemys tcheponensis</i>	7kg	40,000	
<i>Geoemyda spengleri</i>	3kg	40,000	
<i>Hieremys annandalii</i>	1-2 ind.		
<i>Malayemys subtrijuga</i>	1-2 ind		
<i>Mauremys mutica</i>	7kg	40,000	Thanh Hoa
<i>Pyxidea mouhotii</i>	30kg	40,000	Thanh Hoa, Nghe Tinh
Platysternidae			
<i>Platysternon megacephalum</i>	4kg	55-60,000	Thanh Hoa
Testudinidae			
<i>Indotestudo elongata</i>	7kg	60,000	Thanh Hoa
<i>Manouria impressa</i>	7kg	60,000	Nghe Tinh
Trionychidae			
<i>Palea steindachneri/Amyda sinensis</i>	85kg	130-150,000	Thanh Hoa, Nghe Tinh

3.2 Mong Cai, Quang Ninh Province

Mong Cai Market lies on the border with China, with the Chinese market of Dong Hung facing it across the river. Business in this coastal town in the extreme north of the country was very busy, with 1-2 tonnes of sea products being transported to nearby China by boat everyday. This means of transportation proved difficult to investigate. Animal traders in Mong Cai Market generally had much newer buildings than those typical of animal dealer's in markets in Hanoi and Ho Chi Minh City, indicating that animal trading here is an extremely profitable business.

Many boats anchored in the rivers were heavily loaded with goods to exchange. Vietnamese and Chinese nationals are involved in trade at the port, using both Vietnamese and Chinese currency. An informant revealed that she sometimes observed turtles and snakes being sold in this market, but that this happened very quickly. Normally, turtles and snakes are taken to the Chinese border immediately. It seemed that sellers and buyers were known to each other and well-acquainted with this business.

Through discussions with several district officers, the researchers learned that "live goods", including turtles and tortoises, are handled at Mong Cai principally by two local businessmen. Both of them have sources of capital, tens of employees, and business in many provinces. One of these two businessmen reportedly purchased tonnes of live animals each day and immediately transported them to a storage facility some 10km from Mong Cai. This trader reported that he purchased about 50-100kg (75kg average) of live tortoises and turtles to export to China each day.

The other principal trader reported that he purchased approximately 1-2 tonnes of "sea products" everyday, mainly iced fish, snakes, turtles, tortoises, lizards and pangolins. All of them were immediately transported across the border, making it very difficult to compile accurate statistics on volume of trade. This trader reported daily purchases of 100-200kg of live tortoises and turtles for export. Many of the Chinese buyers he dealt with were young businessmen, some of whom spoke fluent Vietnamese.

Eighteen of Vietnam's 23 species of freshwater turtle and tortoise were observed on sale in Mong Cai on 2-3 September 1993:

Emydidae:

Cuora amboinensis
Cuora galbinifrons
Cuora trifasciata
Cyclemys tcheponensis
Geoemyda spengleri
Heosemys grandis
Hieremys annandalii
Malayemys subtrijuga
Mauremys mutica
Pyxidea mouhotii
Sacalia quadriocellata

Platysternidae:

Platysternon megacephalum

Testudinidae:

Indotestudo elongata
Manouria impressa

Trionichidae:

Pelochelys bibronii
Amyda cartilaginea
Pelodiscus sinensis
Palea steindachneri

3.3 Dong Dang and Lang Son, Lang Son Province

Dong Dang and Lang Son are towns on the main road-crossing from Vietnam to China, on the main route north from Hanoi. Trade in Lang Son was found to be dominated by two dealers, one based in Lang Son town, and the other in Dong Dang. The Dong Dang trader appeared to be selling 100-150kg of live tortoises and turtles each day to China. Table 4 details the species noted in stock during the investigator's visit to Dong Dang in July 1993, when 125 individuals (125-140kg) of 14 species were observed. These chelonians, destined for export to China, were reported to be from Cambodia, Thanh Hoa, Hanoi, Lang Son and Vinh Phu.

Table 4. Tortoise and turtles observed in Dong Dang, Lang Son (21 July 1993)

Species	Number observed	Estimated size (kg/ind)	Price (d/kg)
Emydidae			
<i>Cuora amboinensis</i>	8	0.5	100,000
<i>C. galbinifrons</i>	27	1.0	100,000
<i>Heosemys grandis</i>	2	2	
<i>Hieremys annandalii</i>	3	5	
<i>Malayemys subtrijuga</i>	30	0.5-1	
<i>Mauremys mutica</i>	3	1	55,000
<i>Pyxidea mouhotii</i>	1	1	45,000
<i>Sacalia quadriocellata</i>	1	1	
Platysternidae			
<i>Platysternon megacephalum</i>	1	1	80,000
Testudinidae			
<i>Indotestudo elongata</i>	31	1	60,000
<i>Manouria impressa</i>	1	1	60,000
Trionychidae			
<i>Amyda cartilaginea</i>	3	2	
<i>Pelodiscus sinensis</i>	7	1.2	150,000
<i>Palea steindachneri</i>	5	1.5	
Unidentified	2	0.5	

The main trader in Lang Son was found to be handling 200-300kg of live tortoises and turtles each day, although it was reported that sometimes as much as 1000kg were moved to China during a single day. The source of this trader's tortoises and freshwater turtles was reported to include Ho Chi Minh City, Cambodia, Gia Lai, Lai Chau, Son La and Hanoi. Table 5 details the species noted in stock on the day of the investigator's visit in July 1993.

Table 5. Turtle trade in Lang Son Town (22 July 1993)

Species	Number observed	Estimated mean size (kg)
Emydidae		
<i>Cuora amboinensis</i>	16	0.5
<i>C. galbinifrons</i>	54	1.0
<i>Cyclemys tcheponensis</i>	1	0.5
<i>Heosemys grandis</i>	5	2
<i>Hieremys annandalii</i>	6	5
<i>Malayemys subtrijuga</i>	60	0.5
<i>Mauremys mutica</i>	4	1
<i>Pyxidea mouhotii</i>	2	1
<i>Sacalia quadriocellata</i>	2	1
Platysternidae		
<i>Platysternon megacephalum</i>	3	1
Testudinidae		
<i>Indotestudo elongata</i>	63	1
<i>Manouria impressa</i>	3	1
Trionychidae		
<i>Amyda cartilaginea</i>	5	2
<i>Pelodiscus sinensis</i>	12	1.2
<i>Palea steindachneri</i>	9	1.5
Unidentified	5	0.5

3.4 Tam Dao Resort, Vinh Phu Province

Tam Dao is a hill station resort 85km north-west of Hanoi in Vinh Phu Province. As turtles in Tam Dao are mostly sold to tourists as pets, the business operates only during the summer months. Interviews revealed that about ten turtles are sold daily. As each turtle weighed above 150g, the total fresh weight sold during the whole summer would be little more than 135kg. Several sellers reported that they bred and raised *Geoemyda spengleri* at home in order to have young animals for sale. Market observations in August 1993 (Table 6) supported this assertion, since most of the 100 *G. spengleri* on sale were young animals. Only three individuals of two other species were on sale at the time of the visit. According to those sellers, females reach maturity in 5-6 years.

Table 6. Turtles on sale as pets in Tam Dao, Vinh Phu (21-22 August 1993)

Species	Number observed	Price (d/kg)	Source
Emydidae			
<i>Cuora galbinifrons</i>	1	40,000	Local
<i>Geoemyda splengleri</i>	100	5,000	Captive bred
<i>Pyxidae mouhotii</i>	2	100,000	Local

3.5 Central Provinces: Ninh Binh, Thanh Hoa, Vinh, Ha Tinh

These four provinces lie along the main north-south National Highway One, to the south of Hanoi. Investigations were conducted in provincial capitals (in this instance, these all having the same name as the respective province) during 28-31 July 1993, to determine the extent of trade in tortoises and freshwater turtles along this route which serves as a collection point for goods from Lao PDR, as well as the south of Vietnam. Table 7 details the results of these surveys: all individuals observed were said to be for export.

Table 7. Turtles observed in trade in Ninh Binh, Thanh Hoa, Nghe An and Ha Tinh (28-31 July 1993) (information on quantity not available).

Species	Price (d/kg)	Source
Emydidae		
<i>C. galbinifrons</i>	38,000-40,000	Thua Thien Hue
<i>Cuora trifasciata</i>	1.6-1.8 million	
<i>Geoemyda spengleri</i>	33,400-46,700	Thanh Hoa, Nghe An, Quang Nam Da Nang
<i>Pyxidea mouhotii</i>	90,000-100,000	
<i>Mauremys mutica</i>	26,000-28,000	Thanh Hoa, Nghe An
Platysternidae		
<i>Platysternon megacephalum</i>	47,000-48,000	Thanh Hoa, Nghe An, Quang Tri, Gia Lai
Testudinidae		
<i>Indotestudo elongata</i>	40,000	Ca Mau, Cambodia, Tay Ninh
Trionychidae		
<i>Pelodiscus sinensis</i>	95,000-145,000	
<i>Palea steindachneri</i>	105,000-160,000	

3.6 Hue, Thua Thien-Hue Province

Hue is a strategically-placed city in the centre of the country, just inland from the South China Sea. Research was carried out in Hue, Phu Vang District, Huong Thuy District (Thua Thien-Hue Province). Details of tortoise/turtle dealers and hunters in the area were collected. According to trade contacts, tortoises and turtles for sale in Hue are from the following areas:

- Truong Son Range (Khe Sanh, Lao Bao, A Luoi, Binh Dien, Nam Dong, Bach Ma -Hai Van): *Cuora galbinifrons*, *Platysternon megacephalum*, *Heosemys grandis*, *Amyda cartilaginea*, *Indotestudo elongata*, *Geoemyda spengleri*, etc.
- Fields, ponds in Hue and its suburbs (Truong An, Vi Da, Xuan Phu, Phu Luong Village, Phu Mau Village, Phu Duong Village of Phu Vang District, Thuy Phu, Thuy Tan, Thuy Chau, and Thuy Luong Villages of Huong Thuy District, Loc Hai, Loc Tri, Loc Bon, Loc Dien Villages of Phu Loc District): *Pelodiscus sinensis*, *Palea steindachneri*, etc.
- Southern provinces (Quang Nam - Da Nang, Binh Thuan, Ninh Thuan): *Indotestudo elongata*, *Platysternon megacephalum*.

In Hue, most of turtle trappers are opportunists, including farmers, fishermen, frog hunters, hunters, forestry product gatherers, children grazing buffalo, swiddeners, etc. and thus their hunting methods are varied. Although largely informal, the local trade system is well coordinated, with a fixed price structure and efficient circulation of information. Means of hunting include catching by hand, hooks, traps and use of torchlight. Turtles are transported in hand-carried sacks, small bamboo containers, on foot or by bicycle, whilst large wooden containers are used to transport turtles to Hanoi and China by vehicle.

Table 8. Turtles observed in trade in Hue (19-30 November 1993)

Species	Number	Price (d/kg)
Emydidae		
<i>Cuora galbinifrons</i>	2	50,000
<i>Heosemys grandis</i>	not displayed	40,000
Platysternidae		
<i>Platysternon megacephalum</i>	not displayed	40,000
Testudinidae		
<i>Indotestudo elongata</i>	not displayed	1,500,000
<i>Testudo</i> sp.	5	45,000
Trionychidae		
<i>Amyda cartilaginensis</i>	3	76,000
<i>Pelodiscus sinensis</i>	3	20,000
<i>Palea steindachneri</i>	4	170,000

Investigations revealed that animal trade, especially that involving chelonians, is widespread in Hue. Ten shops were counted within a small area of the city. Density of turtle shops was also high in Thuy Phu and Phu Thuong villages. Such shops are concentrated along the main north-south highway or close to main roads for easy access. The bulk of the trade is reportedly destined for China, with most chelonians coming from Thua Thien Hue Province. In November 1993, 17 individuals of 8 species were observed in trade in Hue (Table 8).

3.7 Ho Chi Minh City

There are many vendors of tortoises and freshwater turtles in Ho Chi Minh City. A total of six such shops were observed in Cau Mong Market (the city's main wildlife market), where chelonians were being sold along with other wild animals, including snakes, pythons and birds. Apart from those fixed premises within the market, there were several mobile vendors of wildlife, moving around by bicycle. A number of shop owners reported that they kept large stocks of turtles at other premises in and around Ho Chi Minh City. They noted that they obtained their stocks from many localities including the southern provinces of Minh Hai, Tay Ninh, Dong Thap, An Giang, Hau Giang, Long An, Song Be and Dong Nai and from Cambodia.

Regarding quantity, one dealer claimed that he purchases nearly 1,000kg of turtles (fresh weight) every day. Interviews with other traders suggested that a total of around 3,000kg of turtles (fresh weight) are traded by the dealers based at Cau Mong Market each day. Of this, about a quarter was claimed to originate from Ca Mau (a town in the extreme south of the country) and the remaining three-quarters from the provinces to the west and east of Ho Chi Minh City and from Cambodia. The breakdown of these claimed sales by species is detailed in Table 9.

Table 9. Claimed tortoise and turtle sales in Cau Mong Market, Ho Chi Minh City based on interviews with dealers in September 1993

Species	Estimated Amount (kg/day)	Price (d/kg)
Emydidae		
<i>Cuora amboinensis</i>	135	60,000
<i>Cyclemys dentata</i>	irregular	unknown
<i>Heosemys grandis</i>	67.5	unknown
<i>Hieremys annandalii</i>	67.5	29,000
<i>Malayemys subtrijuga</i>	2,172	29,000
Testudinidae		
<i>Indotestudo elongata</i>	511	10,000

Observations of tortoises and turtles on sale at Cau Mong Market in September 1993 are detailed in Table 10. The small numbers available, with only 65 individuals of three species, reflect the fact that much of the large-scale trade is carried out from other premises. Further observations of tortoises and turtles at Cau Mong Market were noted by Bezuijen (1994), and these are detailed in Table 11 below. During three visits to the market in January 1994 he observed a total of eight native and one exotic species for sale, with between 130 and 265 individuals on sale each visit. The most valuable turtle observed was the exotic Spotted Turtle *Clemmys guttata*, that was valued at US\$100 (1,000,000

dong). Bezuijen reported that the majority of the turtles were sold for meat, but that the species recorded in the largest numbers, *Malayemys subtrijuga* (mostly juveniles) was commonly sold as a pet to local children. He also recorded one exotic species, *Clemmys guttata* from North America, which was allegedly imported from Singapore. Observations during TRAFFIC Southeast Asia market inspections during 1993 and 1994 confirm that small numbers of exotic chelonians appear on Cau Mong Market from time to time (S. Broad, pers comm.).

Table 10. Turtles on sale in Cau Mong Market, Ho Chi Minh City, on 25-27 September 1993

Species	Number	Price (d/kg)
Emydidae		
<i>Cuora amboinensis</i>	3	60,000
<i>Malayemys subtrijuga</i>	48	29,000
Testudinidae		
<i>Indotestudo elongata</i>	14	100,000

Table 11. Observations by Bezuijen (1994) of tortoises and turtles on sale at Cau Mong Market in January 1994

Species	Number			Price (US\$) [1\$ = c.10,000d]
	12 Jan	22 Jan	29 Jan	
Emydidae				
<i>Cuora amboinensis</i>	15	37	75	5.0-7.0/kg
<i>Cuora galbinifrons</i>	4	0	12	5.0-7.0/kg
<i>Heosemys grandis</i>	4	3	4	5.0-7.0/kg
<i>Malayemys subtrijuga</i>	97	203	166	7.0/kg
<i>Clemmys guttata</i> ¹	0	0	1	100
Platysternidae				
<i>Platysternon megacephalum</i>	0	2	2	60
Testudinidae				
<i>Indotestudo elongata</i>	5	7	0	5.0-7.0/kg
<i>Manouria impressa</i>	2	0	0	15.0
Trionychidae				
Unidentified spp.	3	8	16	14.0/kg

¹ *C. guttata* is a North American species

3.8 Ca Mau, Minh Hai Province

Enquiries were made about the trade in Ca Mau, a town in the extreme south of the country. Cau Mau was reported to be an important source of chelonians by Ho Chi Minh City traders. The investigators found four storage areas that stocked live turtles for transport to Ho Chi Minh City and to the north of Vietnam for onward sale to China. The total stocks at those four premises on 17-18 September 1993 are detailed in Table 12: a total of 1,880kg of turtles were observed, of which 90% was *Malayemys subtrijuga*. These turtles were said to be for export to China and for food and medicine.

Table 12. Turtles observed in dealer's premises in Ca Mau Town (17-18 September 1993)

Species	Quantity (kg)	Price (d/kg)
Emydidae		
<i>Annamemys annamensis</i>	47	80,000
<i>Cuora amboinensis</i>	47	80,000
<i>Malayemys subtrijuga</i>	1,692	90,000
Unidentified	94	80,000

Ca Mau has a large population of turtle hunters and buyers. The main dealers reported the following stock turnover:

Dealer A:	240kg/2 days
Dealer B:	100kg/day
Dealer C:	1200kg/3 times a week
Dealer D:	400kg/day

These figures would imply a weekly turnover of almost 8 tonnes. One dealer alone claimed that his total production, for sale in Ho Chi Minh City and transport to the Chinese border, approached 12-15 tonnes of live turtles every 10-15 days. Another informant suggested that the total production from Ca Mau was approximately 10 tonnes every two weeks.

Most of the turtle hunters who sell to the dealers in Ca Mau are farmers who hunt turtles and other wild animals in their spare time. They search canals, swamps, mangrove forests, and *Melaleuca* forests using small boats. *Annamemys annamensis* was said to come principally from *Melaleuca* forests, whilst *Cuora amboinensis* was said to come from forests near U Minh (to the west of Ca Mau).

3.9 Loc Ninh, Dong Nai Province

Loc Ninh located in Dong Nai province, just north of Ho Chi Minh City on a main route to the Cambodian border, was visited on 1 October 1993. One dealer provided details of his current stock which comprised 100 individuals (124kg) of at least five species (Table 13). He explained that turtle sales were restricted to nine months of the year in this area, very few animals being available during December to February. He explained that approximately 14 other turtle traders were operating in the province, but on a smaller scale than his own business. The principal source of his turtles, which were destined for export, was said to be Cambodia.

Table 13. Turtle trade reported by one dealer in Loc Ninh, Dong Nai (1 October 1993)

Species	Number	Estimated Weight	Price (d/kg)
Emydidae			
<i>Cuora amboinensis</i>	14	7	13,000
<i>Heosemys grandis</i>	3	6	33,000
<i>Hieremys annandalii</i>	7	42	14,000
<i>Malayemys subtrijuga</i>	17	12	20,000
Testudinidae			
<i>Indotestudo elongata</i>	54	54	40,000-100,000
Unidentified spp.	5	3	18,000

4. Overview of the Trade

4.1 Hunting, Collection and Captive-breeding

During the trade survey, some incidental information was collected regarding hunting techniques. It appears that means of hunting are relatively simple: by hands, hooks, or electricity. Fishtraps, or arrow-pointed sticks are also used occasionally. Hunting dogs are used to hunt terrestrial tortoises in *Melaleuca* forests. Hunting is seasonal depending on the species sought, some being easier to obtain in the wet season and some during the drier months. Detailed information on this seasonality was not collected during the present study.

The study revealed turtle collection points in all of the areas visited. Every collection point has its own sources and its staff are divided into two groups. The first one includes hunters and collectors who work just in daytime and then go home at night. This group usually consists of 4-5 persons, but sometimes up to 20 persons. The second group includes collectors who travel extensively for at least 7-10 days per trip.

A recent review of softshell turtle (Trionychidae) trade in southern Lao PDR. carried out for TRAFFIC Southeast Asia (Baird, 1994), revealed some details about collection in that country and the importance of the Vietnamese market. Baird reported that Laotian traders exported Trionychidae from southern Lao PDR. to Vietnam in large numbers, despite the fact that such trade is apparently forbidden under Lao legislation. These animals were collected from the Mekong River and its tributaries. Vietnamese traders purchased them at high prices (up to US\$3/kg live weight) and then transported them from Savanakheth and Pakse (Lao PDR.) to Vietnam. Traders reportedly target animals of under 5kg body weight, as larger individuals are difficult to transport. Baird (1994) also recorded imports of softshell turtles from Cambodia into Lao PDR., for re-export to Vietnam. Some traders and collectors in Lao PDR. were aware that the final destination for the turtles exported was the Chinese market. In Cambodia, Mundkur *et al.* (1995) found a number of species of freshwater turtle and tortoise in a market at Stung Treng, on the Mekong River. At least six different species were observed, *Indotestudo elongata*, *Heosemys grandis*, *Cuora amboinensis*, *Malayemys subtrijuga* and two unidentified species. From Stung Treng, live turtles were reported to be sent to Phnom Penh, but mainly sold across the border in Vietnam. The volume of trade was reported to exceed several tonnes a month.

The vast majority of the current trade depends on collection of animals from the wild, but a few instances of captive production were noted. Some dealers in Vinh Phu reported that they raised *Geoemyda spengleri* in captivity in order to supply juveniles to the local pet market. Of more interest in the long-term though, is the apparent trend towards captive-raising of soft-shelled turtles Trionychidae in some parts of the country. Captive-breeding of *Pelodiscus sinensis* is becoming increasingly popular in other Southeast Asian countries, including Thailand and Malaysia (S. Broad, TRAFFIC Southeast Asia, pers. comm.). In Vietnam, it seems that present captive-breeding/ranching populations of Trionychidae are small.

4.2 Domestic and Export Trade Routes

Efforts were made to develop a detailed understanding of the trade routes employed (Figure 2). Market surveys provided a wealth of information, which is summarised together with other reports in Table 13, but clearly, Ho Chi Minh City and Hanoi are the two biggest centres of the trade.

Ho Chi Minh City controls all the turtles coming from the Mekong Delta: Minh Hai, Long An, Chau Doc (An Giang - from Cambodia), Moc Hoa (Long An), and Loc Ninh (Song Be). Turtles in Ho Chi

Minh City and Phan Thiet are transported to the former Region Four (upper central Vietnam). Here, they join with the turtles coming from High Plateau, Lao PDR. (through Quang Tri Province) to be transported to Hanoi.

Most of the turtles in Hanoi are transported to Lang Son or Dong Dang, and from there overland to Bang Tuong (China), and from Bang Tuong to Guiyang (China). The rest are transported to Mong Cai (Quang Ninh). In Mong Cai, they join with the turtles from Thai Binh to be transported to Dong Hung (China) by sea transport.

Table 14. Reported sources of animals found on sale during market surveys

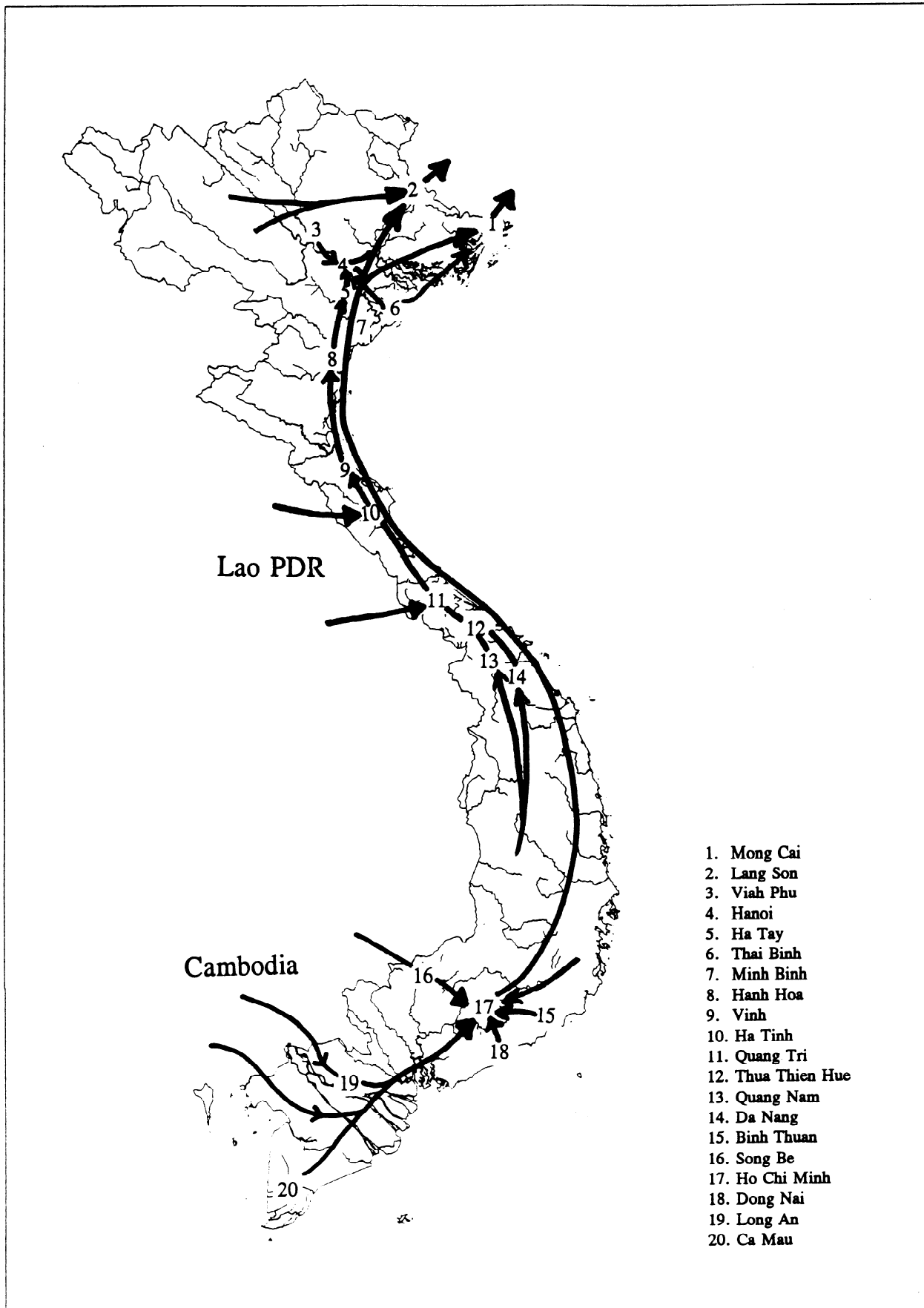
Selling points	Reported source of chelonians sold
Ho Chi Minh City	Suburbs of Ho Chi Minh City, West of Nam Bo Cambodia
Song Be	Cambodia (mostly) Provincial districts (Loc Ninh, Phuoc Long)
Dong Nai	Tan Phu District (mostly)
Lam Dong	Da Hoai, Da Ten, Duc Trong, Lam Ha, Lam Dong
Bin Thuan	Ham Thuan Bac, Duc Linh, Tanh Linh
Quang Ngai	The South
Quang Nam-Da Nang	The South and other districts
Quang Tri	The South and other districts
Ha Tinh	Other districts, Phan Thiet, Lao PDR., Cambodia
Nghe An	In the province
Ninh Binh	In the province, North Thanh Hñã, Nam Dinh
Thai Binh	In the province
Ha Tay	Thuong Tin, Dong Thap
Hanoi	The South, Central, North
Vinh Phu	Tam Dao
Lang Son	Ho Chi Minh City, Cambodia, Son La, Vinh Phu, etc
Quang Ninh	Thai Binh, Ha Tinh
Thua Thien Hue	In the province
Thanh Hoa	In the province, North of Nghe An
Long An	In the province, Cambodia
Minh Hai (Ca Mau)	West of Nam Bo, mangrove & Melaleuca forests

Interviews with dealers in areas bordering China revealed a highly organized trade system. In Lang Son, a consortium of Vietnamese dealers operates in partnership with six Chinese businessmen across the border. Similarly, in Dong Dang, one dealer reported that he has a partnership with two Chinese traders. Trade arrangements are made by telephone.

Prior to arrival in the border areas, stock movements are reported to be quite rapid and animals seldom remain for more than one or two days in intermediate locations. However, stock is sometimes retained by intermediate traders for a few weeks if the price offered by exporters drops. Once animals arrive in border areas they tend to be shipped to China immediately.

Previous reviews of general international wildlife trade (e.g. Fitzgerald, 1989) reveal that the USA, Europe, and Japan are the biggest consumers of pet tortoises and freshwater turtles. However, investigations in Vietnam have found no indication of direct turtle exports from Vietnam to these markets.

Figure 2. Principal trade routes used for moving freshwater turtles and tortoises in Vietnam



4.3 Volumes of Domestic Trade and Export

The complexity of the trade system and lack of official records undermine efforts to estimate trade volumes. Nevertheless, the present study allows some very rough indications to be calculated based on the accounts of dealers and exporters. First, it was claimed by various traders that the vast majority, perhaps 90%, of the trade in animals collected within Vietnam and imported from Cambodia and Lao PDR, is destined for export to China. Considering the structure of the trading system, estimates of exports to China from the main border crossing and shipping points therefore give the best available indication of total trade volumes.

Investigations at the main land border crossing to China (Lang Song and Dong Dang) and the main port of departure for exports to China by boat at Mang Cai, revealed that four dealers handled the vast majority of exports. Estimates of daily exports by those dealers were roughly calculated during the investigator's visits to their premises (Table 15).

Table 15. Estimates of daily export range based on interviews

Trader	Reported daily export range (kg)
Mong Cai A	100-200
Mong Cai B	50-100
Lang Son	200-300 (sometimes up to 1000)
Dong Dang	100-150

These indicate a likely minimum combined daily export of around 450 kg. If export is assumed to be carried out daily throughout the year, this indicates a probable minimum annual export of around 165 tonnes. From the figures the possible maximum export exceeds 750 kg daily, or 270 tonnes annually and could be considerably higher than this if the reported shipments of 1000 kg daily from Lang Son are a frequent event. Indications from elsewhere indicate that these figures may be underestimates, as Ho Chi Minh City dealers claimed a daily turnover of 3000 kg (over 1000 tonnes per year) and figures from the four storage areas in the southern town of Ca Mau indicated annual production from that area of around 400 tonnes.

Relating these export volumes to numbers of animals is an even more difficult task. Table 2 indicates average weights of individual animals held prior to export to China on two days. Although weights of the different species identified varied from 0.5kg up to 5kg per individual, the mean weight of all animals at both dealer's premises was estimated to be just over 1kg (1.00-1.12kg). Considering the uncertainty of the trade volume estimate and the limited sample of animal weights, calculation of an accurate estimate of the number of animals exported each year is not possible. However, it appears from available information that at least 200,000 individual tortoises and freshwater turtles, and conceivably several times this, have been traded in Vietnam each year.

4.4 Species Composition of the Trade

The results of the trade investigation allow some clear ideas to be gained about the relative importance of certain species to the trade in Vietnam. Table 16 summarises the findings of the market surveys carried out throughout the country. All native species, with the exception of four freshwater turtle species (*Cyclernys dentata*, *Notochelys platynota*, *Ocadia sinensis* and *Siebenrockiella crassicolis*) were observed in trade although *C. dentata* is very similar to and possibly synonymous with *C. tcheponensis*, which was recorded. Six species were found to be traded in moderate or high

volumes. These included five freshwater turtles (three species of Emydidae and two soft-shelled Trionychidae) and one terrestrial species of Testudinata. However, of equal importance is the fact that all of the nine species listed as Vulnerable or Rare in the Vietnamese Red Data Book were recorded in trade (some at moderate or moderate/high levels). For some of these species, even low levels of exploitation could pose a serious problem for long-term survival, and exploitation may be unsustainable at current levels.

Table 16. Indications of the relative importance of tortoise and turtle species in trade

Species	Trade occurrence	Trade Volume
Emydidae (Batagurinae)		
<i>Annamemys annamensis</i>	No record	
<i>Cuora amboinensis</i>	Common	Moderate
<i>C. (Cistoclemmys) galbinifrons</i>	Common	Moderate
<i>C. trifasciata</i>	Quite common	Low
<i>Cyclenys dentata</i>	No record	
<i>Cyclenys (Geoemyda) tcheponensis</i>	Quite common	Low
<i>Geoemyda spengleri</i>	Common	Low/Moderate
<i>Heosemys (Geoemyda) grandis</i>	Common	Low/Moderate
<i>Hieremys annandalii</i>	Common	Low/Moderate
<i>Malayemys subtrijuga</i>	Common	High
<i>Mauremys mutica</i> (= <i>Cyclenys nigricans</i>)	Common	Low
<i>Notochelys platynota</i>	No record	3
<i>Ocadia sinensis</i>	No record	
<i>Pyxidea (Cyclenys) mouhotii</i>	Common	Low/Moderate
<i>Sacalia (Clemmys) quadriocellata</i>	Quite common	Low
<i>Siebenrockiella crassicollis</i>	No record	
Platysternidae		
<i>Platysternon megacephalum</i>	Common	Low
Testudinidae		
<i>Indotestudo elongata</i>	Common	Moderate/High
<i>Manouria impressa</i>	Common	Low
Trionychidae		
<i>Amyda (Trionyx) cartilaginea</i>	Quite common	Low
<i>Palea (Trionyx) steindachneri</i>	Common	Moderate
<i>Pelochelys bibroni</i>	Rare	Low
<i>Pelodiscus (Trionyx) sinensis</i>	Common	Moderate

4.5 The Nature of Demand in China

Tortoises and turtles have extremely important and long-standing cultural value in China. Although the level of demand and consumption is unknown at this time, the uses for which turtle and tortoise products are employed are well-documented. Medicinal uses apply to a wide range of ailments for which turtle products are considered a tonic to yin, including kidney-yin deficiency, faint and weak voice, afternoon heat spells, nocturnal sweats, lumbago, weak sinews, swollen or infected pancreas, tumours and failure of opening in the top of a baby's skull to close (Reid, 1987). Recent use of turtle blood by Chinese athletes and swimmers has been well-documented in the popular press in Asia and elsewhere. Turtle meat, especially that of the Trionychidae species, is a popular food in China, but this consumption has not been researched in detail to date. The extent to which China re-exports tortoise and turtle products to other consumer states, such as Taiwan and South Korea, also remains unknown.

5. Economic, Cultural, and Medicinal Values of the Tortoise and Turtle Trade in Vietnam

5.1 Economic Value

In Vietnam, tortoises and freshwater turtles are exploited for food, medicine, decoration, pets, release (in religious rites), and export. Table 17 summarises the information collected during the survey regarding the value of species in trade.

A considerable range of values was noted between species and even for the same species. One explanation for the wide ranges of asking price for the same species is that live animals are not only sold for trade with China, but are also offered for sale as pets in urban markets. The advertised prices of pets may be significantly higher than that of similar individuals sold for trade with China. Also, for some species, large numbers of juvenile animals were offered for low prices, again aimed at the domestic pet market. Whether aimed at local or export markets, it is clear that considerable values are placed on tortoise and turtle species in the Vietnamese economy. With a current exchange rate of approximately 10,000 dong to one US\$, these prices are very significant - export values of many of these chelonian species greatly exceeding those asked for other wildlife commodities, for example live birds, by Vietnamese traders (CRES, 1994). The total value of the export trade cannot be accurately calculated with any confidence on the basis of available data. However, with export trade volumes likely to total at least 200,000 animals and export values falling in a range between 45,000-150,000dong/kg (US\$4.50-15.00/kg) it is clear that considerable income is being accrued. Exports to China are likely to have a minimum value of around US\$1 million per year and possibly considerably more.

Distribution of income from the trade is difficult to assess without further information about the prices paid to hunters and collectors in rural areas. However, comparison of the values for tortoises and turtles quoted in Loc Ninh (primarily a collection area), with those at the Chinese border, indicates that considerable value is accrued by intermediate traders and exporters. The small number of exporters in areas near the Chinese border appear, from evidence of their property holdings, to be benefitting from considerable income from this and other wildlife trade. Unlike other areas of wildlife trade in Vietnam, there seems to be little or no official government involvement in the current dealing system. Previous investigation of wildlife exports at the Chinese border (CRES, 1994) revealed that most wildlife exports leave Vietnam unofficially: therefore the country derives no export revenue from the trade.

5.2 Local Medicinal and Food Values of the Turtle Trade

People have used tortoise and turtle plastron to make balm for many centuries. Carapace is also used to make balm, but usually just as an additive. Pharmacies in Lan Ong Street, Hanoi, and in Trieu Quang Phuc Street, Ho Chi Minh City, purchase both plastron and carapace mostly to make balm and to use as a medicine. During the course of the study, researchers observed a small pharmacy in Ho Chi Minh City selling 0.35 kg of turtle balm for 50,000 dong/0.01 kg. The researchers did not see any turtle balm at Lan Ong Street in Hanoi, but observed people purchasing turtle plastron, mostly plastron of *Testudinidae*.

Ancient and modern medical texts in Vietnam refer to the medicinal value of turtle products (Ly Thoi Tran, 1595; Anon., 1983; Do Tat Loi, 1991). Whether in the form of balm or prepared as a medicine in other forms, turtle products, both plastron and carapace, are reportedly good for kidneys, coughing, body ache, malaria and other ailments. A dose of 12-24g per day is recommended. Not

much is known about the chemical elements of balm. Blood of turtles and tortoises is very stimulative and has been claimed to be an important ingredient of tonics used by athletes in China.

Hawksbill Turtle (*Eretmochelys imbricata*) scales, according to traditional medicine, taste sweet and can be used to cure various afflictions: aphtha, delirium, convulsions, carbuncles, swellings, etc. A dose of 4-8g, boiled or mashed, is recommended.

The present study revealed that the number of freshwater turtles and tortoises hunted for local use as food in rural areas is small when compared with the number being exported to China. In some cases, though, local consumption can be considerable. Interviews revealed that about 30kg of turtle meat was being consumed every day in Ca Mau for special local food (e.g., grilled turtles, casseroled turtles, etc.). Freshwater turtle eggs are also collected for sale (as food) in nylon packages, as observed in the Mekong Delta and Cambodia.

5.3 Cultural Values

Traditionally, symbols of turtles, either made of wood and bamboo or stone, have been displayed in many pagodas, temples and, more recently, at the Temple of Literature (The first University of Vietnam): a turtle with a crane on its back symbolizes longevity and strength. Turtles also appear in many legends of Vietnam, such as the golden turtle in Hoan Kiem (Returning the Sword) Lake. That turtle is now still preserved in the temple on the lake as a holy memory.

Turtles' carapace and plastron are also used as ornaments in the house. Many rich families have their beds standing on four turtles for ornamental purposes. A polished stuffed Hawksbill Turtle is an extremely expensive ornament, that only the rich can afford. Together with marine turtles, *Indotestudo elongata* and *Notochelys platynota* are often killed for ornamental purposes. Turtles are also collected to be kept as pets. *Geoemyda spengleri* in Tam Dao Resort area, *Cuora*, and *Malayemys subtrijuga* are raised in the fish tanks of many families.

Turtles are also used as a "release" animal by Buddhists. Released turtles are often small in size (young animals), and the most favoured species are *Cuora amboinensis*, *Indotestudo elongata* and *Malayemys subtrijuga*. The investigators observed a number of Buddhists purchasing turtles in Cau Mong Market (Ho Chi Minh City) to release.

Table 17. Value of native tortoises and turtles in trade on domestic markets and at export points in Vietnam, 1993-1994

Species	Value on domestic market (d/kg)	Value at export point (d/kg)
Emydidae (Batagurinae)		
<i>Annamemys annamensis</i>	unknown	unknown
<i>Cuora amboinensis</i>	13,000-86,000	100,000
<i>C. (Cistoclemmys) galbinifrons</i>	38,000-86,000	100,000
<i>C. trifasciata</i>	1,500,000-1,800,000	no record
<i>Cyclemys dentata</i>	unknown	no record
<i>Cyclemys (Geoemyda) tcheponensis</i>	40,000	no record
<i>Geoemyda spengleri</i>	5,000-47,000	no record
<i>Heosemys (Geoemyda) grandis</i>	33,000-40,000	no record
<i>Hieremys annandalii</i>	14,000-80,000	no record
<i>Malayemys subtrijuga</i>	20,000-29,000	no record
<i>Mauremys mutica</i> (= <i>C. nigricans</i>)	26,000-40,000	55,000
<i>Notochelys platynota</i>	unknown	unknown
<i>Ocadia sinensis</i>	unknown	unknown
<i>Pyxidea (Cyclemys) mouhotii</i>	40,000-100,000	45,000
<i>Sacalia (Clemmys) quadriocellata</i>	no record	no record
<i>Siebenrockiella crassicollis</i>	unknown	unknown
Platysternidae		
<i>Platysternon megacephalum</i>	40,000-100,000	80,000
Testudinidae		
<i>Indotestudo elongata</i>	40,000-100,000	60,000
<i>Manouria impressa</i>	50,000-60,000	60,000
Trionychidae		
<i>Amyda (Trionyx) cartilaginea</i>	76,000	no record
<i>Palea (Trionyx) steindachneri</i>	105,000-170,000	no record
<i>Pelochelys bibroni</i>	no record	no record
<i>Pelodiscus (Trionyx) sinensis</i>	20,000-150,000	150,000

6. Discussion

The present study reveals that hundreds of thousands of tortoises and freshwater turtles are traded in Vietnam annually. Investigators found evidence that at least 18 of the country's 23 native freshwater and terrestrial chelonian species are traded. Those traded included all nine species listed in the Red Data Book of Vietnam and three of the four species listed in the 1994 IUCN Red List of Threatened Animals (see Table 1). In addition, both of the species protected under Vietnamese legislation (*Indotestudo elongata* and *Pelochelys bibronii*) were found to be in trade. Interestingly, no evidence was found of trade in the two species whose occurrence in the country remains uncertain, *Batagur baska* and *Manouria emys*.

The trade is dominated by the demand for export to China, where tortoises and turtles are used for food and preparation of tonics and medicines. Although accurate economic data were not available, the export trade was estimated to be worth at least US\$1 million annually, although direct government revenue did not appear to be accrued as most exports apparently take place unofficially. Tortoises and freshwater turtles are also used to a lesser extent within Vietnam for food, medicines, pets and Buddhist release.

Although species population data are unavailable, loss of habitats (forests, and wetlands) as well as over-hunting are suspected to severely threaten many species. Comparison of the results of the present trade study with available indicators of species status raises particular concerns about certain species as follows:

***Cuora* spp.:** *C. galbinifrons*, considered Vulnerable in Vietnam and suspected to be threatened by IUCN was found to be traded in moderate volumes; *C. amboinensis* is considered Vulnerable in Vietnam and trade volumes were also assessed as moderate; *C. trifasciata* is traded at lower volumes, but the very high prices asked for this species may well indicate particular rarity and threat;

Heosemys grandis* and *Hieremys annandalii are considered Vulnerable in Vietnam and they both appeared in low to moderate volumes in trade. Both species have relatively restricted ranges in Vietnam, one in the extreme south and the other in the southern central region of the country;

Malayemys subtrijuga was found to be the most heavily traded species and it is restricted to parts of the south of the country - this species was identified as in need of conservation action by the IUCN/SSC Specialist Group review;

Geoemyda spengleri* and *Pyxidea mouhotii were found to be traded in low to moderate volumes, but both were identified as in need of conservation action by the IUCN/SSC Specialist Group review;

Platysternon megacephalum is considered Rare in Vietnam and, as such, common occurrence in trade may be cause for concern;

Indotestudo elongata was found to be traded in moderate to high volumes which is of great concern when one considers the fact that it is listed as Vulnerable in Vietnam and of high priority for action by the IUCN/SSC Specialist Group review. The other native terrestrial tortoise, ***Manouria impressa***, is also considered Vulnerable in Vietnam and has the same IUCN/SSC rating. It was commonly found in trade, albeit at lower volumes;

Pelochelys bibroni and *Amyda cartilaginea* were considered in need of conservation action by the IUCN/SSC Specialist Group review and the former is considered Vulnerable in Vietnam - even the relatively low volumes of trade observed may therefore be of concern; the two other native Trionychidae species are traded at higher volumes, but there is currently no evidence that they are threatened.

Although these 13 species appear the most vulnerable to trade threat on the basis of the limited information available, the massive scale of current exports is a serious concern for the conservation of all chelonian species in Vietnam. The fact that significant numbers of the animals in trade in Vietnam originate in Lao PDR. and Cambodia is also cause for concern for chelonian populations in those countries.

These large-scale, valuable exports of chelonians from Vietnam are not subject to regulation or other management measures. The almost complete lack of reliable biological and population data for the species in trade prevents any meaningful assessment of the sustainability of current exploitation. However, the little that is known about the status of chelonian species in Vietnam would suggest that conservation measures relating to exploitation are an urgent priority.

Overall, it is clear that there is a great necessity to review the national protection status of chelonian species in Vietnam. Those species found to be particularly vulnerable to trade threat should be afforded increased legal protection. This measure will need to be supported by increased enforcement of wildlife protection and trade control laws, the key to which may well be effective policing of wildlife trade across the border with China, the principal market for these animals. As a member of CITES (since April 1994), Vietnam has the option of listing certain species in CITES Appendix III to assist the enforcement of national protection measures. Increased control of trade, supported by public awareness activities, has potential to decrease pressure on threatened chelonian species. At the same time, such control will also provide potential for Vietnam to gain appropriate revenue from any managed exports of tortoises and turtles that continue.

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APPENDICES

Appendix 1. Detailed distribution of Turtle Species in Vietnam

Species	Distribution
Emydidae (Batagurinae)	
1. <i>Annamemys annamensis</i> (incl. <i>A. merklei</i>)	Quang Nam Da Nang (Phuc Son)
2. <i>Cuora amboinensis</i>	Dac Lac, Long An, Minh Hai (U Minh, Nam Can)
3. <i>Cuora (Cistoclemmys) galbinifrons</i>	Vinh Phu (Tam Dao), Hoa Binh, Ha Bac, Quang Ninh, Ha Tinh, Nghe An, Quang Binh, Thua Thien - Hue
4. <i>Cuora trifasciata</i>	Cao Bang, Lang Son, Vinh Phu (Tam Dao), Ha Tinh (Vu Quang)
5. <i>Cyclemys dentata</i>	Quang Ninh (Hon Gai)
6. <i>Cyclemys (Geoemyda) tcheponensis</i>	Lai Chau, Ha Tinh (Vu Quang), Quang Tri, Gia Lai
7. <i>Geoemyda spengleri</i>	Vinh Phu (Tam Dao), Thanh Hoa, Quang Nam, Da Nang (Quang Nam)
8. <i>Heosemys (Geoemyda) grandis</i>	Dac Lac (Nam Da), Nam Bo
9. <i>Hieremys annandalii</i>	Minh Hai (U Minh, Nam Can)
10. <i>Malayemys subtrijuga</i>	Can Tho, Kien Giang (Rach Gia), Minh Hai (U Minh, Nam Can)
11. <i>Mauremys mutica</i> (<i>Cyclemys nigricans</i>)	Lao Cai, Quang Ninh, Hoa Binh, Ninh Binh (Cuc Phuong), Ha Bac, Nghe An, Khanh Hoa
12. <i>Notochelys platynota</i>	Nam Bo (the South - detailed information not available)
13. <i>Ocadia sinensis</i>	Ha Tay, Thanh Hoa, Quang Nam Da Nang
14. <i>Pyxidea (Cyclemys) mouhotii</i>	Lao Cai, Bac Thai, Vinh Phu, Ha Tay, Hoa Binh, Ha Bac, Ninh Binh, Thanh Hoa, Nghe An
15. <i>Sacalia (Clemmys) quadriocellata</i>	Lao Cai, Ha Tinh (Tan Ap Vu Quang), Quang Nam- Da Nang (Phuc Son)
16. <i>Siebenrockiella crassicolis</i>	Nam Bo (the South)
Platysternidae	
17. <i>Platysternon megacephalum</i>	Lao Cai, Lai Chau, Bac Thai, Ha Tinh, Quang Tri, Gia Lai

Testudinidae

18. *Indotestudo elongata*

Tuyen Quang, Cao Bang, Lang Son, Ha Tay, Hoa Binh, Ha Bac, Quang Ninh, Nghe An, Khanh Hoa, Tay Ninh

19. *Manouria impressa*

Lai Chau, Lao Cai, Nghe An, Ha Tinh, Quang Nam -Da Nang, Kon Tum, Lam Dong (Liang Biang)

Trionychidae

20. *Pelochelys bibronii*

Lai Chau, Ha Tay (Dong Mo, Ngai Son), Hanoi (Ho Guom), Thanh Hoa (Song Ma), Khanh Hoa

21. *Amyda (Trionyx) cartilaginea*

Khanh Hoa, Lam Dong (Lao Bao), Nam Bo

22. *Pelodiscus (Trionyx) sinensis*

Lao Cai, Hanoi, Ha Bac, Quang Ninh, Ha Tay, Hoa Binh, Thanh Hoa, Nghe An, Ha Tinh, Thua Thien - Hue, Quang Nam - Da Nang (Fai Fo)

23. *Palea (Trionyx) steindachneri*

Tuyen Quang, Lai Chau, Lao Cai, Bac Thai, Lang Son, Vinh Phu, Ha Tinh, Quang Nam - Da Nang, Can Tho