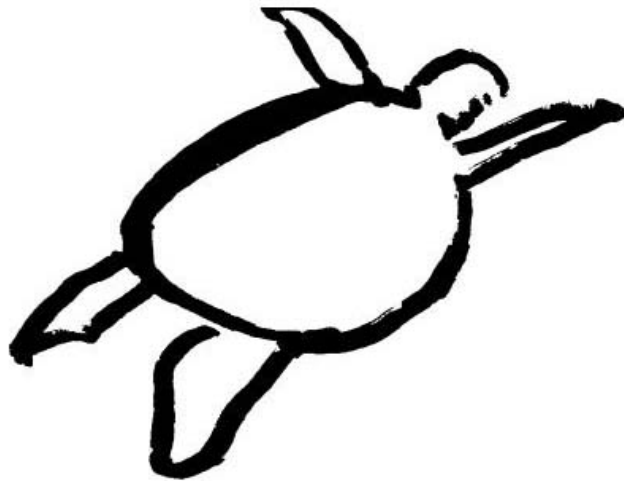


CONSERVATION STATUS REPORT

MARINE TURTLES AND THEIR HABITATS IN VIET NAM

Prepared by the Ministry of Fisheries under the guidance of the
Marine Turtle Conservation Project Steering Committee for
The Government of the Socialist Republic of Viet Nam

2002/2003



Ministry of Fisheries

IUCN
The World Conservation Union

Table of contents

1. EXECUTIVE SUMMARY	4
2. CONTEXT AND INTRODUCTION	5
3. CURRENT LEGISLATION PERTAINING TO MARINE TURTLES AND THEIR HABITATS IN VIET NAM ..	5
3.1 INTERNATIONAL TREATIES TO WHICH VIET NAM HAVE ACCЕDED	6
<i>Specific agreements relating to the trade of marine turtle products and their eggs</i>	6
<i>Specifically relating to the prohibition of harvesting of marine turtle species</i>	7
<i>Specifically relating to the prohibition of any acts that cause damages to marine habitats</i>	7
3.4 REMAINING ISSUES RELATING TO THE NATIONAL LEGISLATION OF MARINE TURTLE SPECIES CONSERVATION.....	8
4. SPECIES SUMMARIES	8
4.1 LOGGERHEAD TURTLE (<i>CARETTA CARETTA</i>).....	9
4.2 LEATHERBACK TURTLE (<i>DERMOCHELYS CORIACEA</i>)	9
4.3 OLIVE RIDLEY TURTLE (<i>LEPIDOCHELYS OLIVACEA</i>)	10
4.4 HAWKSBILL TURTLE (<i>ERETMOCHELYS IMBRICATA</i>)	10
4.5 GREEN TURTLE (<i>CHELONIA MYDAS</i>)	11
5. THREATS TO MARINE TURTLES IN VIET NAM	18
5.1 DIRECT AND INDIRECT TAKE OF NESTING AND FORAGING TURTLES AND EGGS	19
5.2 IMPACTS ON FORAGING HABITAT AND FOOD SOURCES.....	20
5.3 IMPACTS TO NESTING TURTLE HABITAT	21
6. A SUMMARY OF THE REPORT, ‘THE TRADE IN MARINE TURTLE PRODUCTS IN VIET NAM’	21
6.1 INTRODUCTION	22
6.2 CONCLUSION	23
6.3 RECOMMENDATIONS OF THE TRAFFIC SURVEY (TAKEN FROM REPORT)	23
7. FISHERIES AND TURTLE EXCLUDER RESEARCH WITH REGARD TO MARINE TURTLE CONSERVATION IN VIET NAM	24
7.1 TURTLE EXCLUDER DEVICES	24
7.2 FISHING INDUSTRY	25
8. AN OVERVIEW OF THE CONSERVATION STATUS OF CORAL REEF AND SEAGRASS HABITATS IN VIET NAM	26
8.1 CORAL REEFS	26
8.2 EXPLOITATION STATUS OF CORAL REEFS IN VIET NAM	27
8.3 CURRENT STATUS OF CORAL REEFS IN VIET NAM	28
8.4 SEAGRASS BEDS.....	28
9. SUMMARY OF THREATS TO CORAL REEF AND SEAGRASS AREAS IN VIET NAM	30
10. CURRENT RESEARCH AND MANAGEMENT INITIATIVES	32
10.1 DANIDA/CMS FUNDED INITIATIVES 2001 TO 2002	32
10.2 MoFI ACTIVITIES FUNDED BY THE DANIDA PROJECT	32
10.3 WWF SUPPORTED ACTIVITIES	32
10.4 TRAFFIC ACTIVITIES FUNDED BY THE DANIDA PROJECT	33
10.5 CON DAO NATIONAL PARK NESTING BEACH STUDIES	33
10.6 RESEARCH INSTITUTE FOR MARINE FISHERIES: SEA TURTLE PROJECTS	33
10.7 NATIONAL INSTITUTE OF OCEANOLOGY	34
10.7 HAI PHONG INSTITUTE OF OCEANOLOGY	34
10.8 OTHER ACTIVITIES AS THEY RELATE TO THE IOSEA MoU, CONSERVATION AND MANAGEMENT PLAN.....	34
11. FIGURES	36
12. REFERENCES	36
APPENDIX I	39

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List of abbreviations

ASEAN	Association of Southeast Asian Nations
CITES	Convention on the International Trade of Endangered Species
CMS	Convention of Migratory Species
DoFI	Department of Fisheries
DoSTE	Department of Science, Technology and Environment
FRPD	Fisheries Resource and Protection Department
FPD	Forestry Protection Department
HIO	Hai Phong Institute of Oceanography
IOSEA	Indian Ocean and Southeast Asian
IUCN	The World Conservation Union
MARD	Ministry of Agriculture and Rural Development
MoD	Ministry of Defense
MoFI	Ministry of Fisheries
MoU	Memorandum of Understanding
MoSTE	Ministry of Science Technology and Environment
NEA	National Environment Agency
NIO	National Institute of Oceanology
RIMF	Research Institute of Marine Fisheries
TED	Turtle Excluder Device
WWF	World Wide Fund for Nature

1. Executive summary

Five species of marine turtle reside in Viet Nam's waters (loggerhead, olive ridley, leatherback, green and hawksbill turtles), and four species nest on Viet Nam's beaches (all except the loggerhead). Major nesting beaches are scattered from the northern border with China to the southern border with Cambodia, including most offshore island groups. Concentrated nesting areas are found in the Gulf of Tonkin, central provinces and the islands in the southeaster waters and the Gulf of Thailand.

The largest current threats to marine turtle populations in Viet Nam are (1) the accidental and opportunistic capture by fishers and (2) the direct take of nesting females and their eggs. The specific fisheries sectors that pose the greatest threat to marine turtles are bottom trawlers, gill net operators, Cau Kieu operators and commercial crustacean and mollusc divers. Data from a joint survey (MoFI, RIMF and IUCN) in 2002 indicate that the combined take across the entire Vietnamese coastline could still amount to approximately 4000 turtles annually.

Prior to the American War, marine turtles nested in 13 of the 27 coastal provinces of Viet Nam. With few exceptions, based on survey responses that are limited by memory of the person, many eggs and nesting turtles have been collected for food, or in the case of hawksbill turtles, for their shell. With the exception of the nesting population of green turtles on the Con Dao Islands, it is possible that the number of green, hawksbill, leatherback and olive ridley turtles nesting in Viet Nam each year has declined significantly over the last thirty years. Similarly, with the exception of the protected beaches on the Con Dao Islands and at Nui Chua, a significant, and mostly non-commercial harvest of nesting turtles and eggs still occurs for each species nesting in Viet Nam.

Recent TRAFFIC surveys have documented a substantial domestic market, and an apparently growing wholesale export trade for marine turtle products. It is assumed that this trade has contributed significantly to decline in marine turtle numbers in Viet Nam. This trade contravenes both national legislation and international conventions, such as CITES, to which Viet Nam is a signatory. The size and openness of the trade in marine turtle products in Viet Nam, as found during TRAFFIC's study, demonstrates that legislation prohibiting such trade is being deliberately flouted. Without effective enforcement of existing domestic and international measures to protect marine turtles, the five species found in Viet Nam waters, all of which are listed as either critically endangered or endangered in the IUCN Red List of Threatened Species (IUCN, 2002), and all of which are listed under Appendix I of CITES, are unlikely to be found in Viet Nam in the near future.

Protection of eggs and nests are insufficient to restore Viet Nam's sea turtle populations (see for example Heppell et al. 1996). In addition to the protection of nesting turtles and their eggs, a significant reduction in the mortality of juvenile and adult life stages is essential for the protection, preservation and restoration of sea turtles in Viet Nam.

Awareness among Government employees, fishers and the general public about the need to conserve the marine environment is lacking in many areas. Before any marine turtle conservation programs can be effective, significant awareness raising strategies must be implemented so that these stakeholder groups can become aware of why marine conservation is important to their livelihoods, and how they can help.

Assessment of marine habitats with regard to marine turtles is difficult, because little is known about specific requirements and microhabitat use. However, it appears that despite high diversity of coral species, many coral reefs in Viet Nam are degraded or face a myriad of

anthropogenic threats. Similarly, it is apparent that although some large and productive seagrass areas are found in Viet Nam, they too are under increased pressure from a wide variety of threats. The main threats include, destructive fishing, collection for tourist trade, decreased water quality through river runoff and development. Fishers on Phu Quoc have seen turtles affected by fibropapillomas, and one threat that has been little studied is the affect of toxins in the water on the food chains, for example in the Mekong Delta region.

2. Context and introduction

Viet Nam lies on the western side of the South China Sea, and has a mainland coast stretching over 3000 km, and spanning some 15 degrees of latitude between Cambodia in the south to China in the north. Additionally, there are 1000's of offshore islands, which include the offshore archipelagos of Hoang Sa (Paracel) and Truong Sa (Spratly). Over the last century many biologists and explorers have recorded the presence of marine turtles in Viet Nam, however few studies have addressed their distribution, abundance and status. Marine turtles in Viet Nam are protected by both international (CITES) and domestic (Decree 48/CP) legislation (Table 1.1). Moreover, Viet Nam ratified the ASEAN MOU on Sea Turtle Protection and Conservation in September 1997. Additionally, in June 2001, the Viet Nam Government formally ratified the MoU for the Protection of Marine Turtles and their Habitat in the Indian Ocean Southeast Asian region. As a requirement of signing this MoU, the Government was required to establish a Steering Committee that would oversee tasks as they relate to marine turtle conservation and management in Viet Nam. The following report aims to summarize (1) information on marine turtle abundance, distribution and threats in Viet Nam and (2) information regarding habitat quality, trade of marine turtle products and fisheries management. The overall goal of the report is to provide a conservation status report for marine turtles in Viet Nam.

Table 2.1 Details of legislation afforded to sea turtle populations in the Socialist Republic of Viet Nam.

Common Name	Scientific Name	IUCN Category	CITES Listing	Viet Nam Decree 48/CP (2002)	
				Group I	Group II
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	CR	I	√	
Green Turtle	<i>Chelonia mydas</i>	EN	I	√	
Loggerhead Turtle	<i>Caretta caretta</i>	EN	I		√
Leatherback Turtle	<i>Dermochelys coriacea</i>	CR	I	√	
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	EN	I		√

Definition of IUCN Categories:

CR: Critically Endangered – A taxon facing an extremely high risk of extinction in the wild in the immediate future.

EN: Endangered – A taxon which is not critically endangered but which faces a very high risk of extinction in the wild in the near future.

Source: IUCN 2002. 2002 IUCN Red List of Threatened Species.

3. Current legislation pertaining to marine turtles and their habitats in Viet Nam

Compiled from reports by:

Le Thanh Binh and Mai Ngoc Bich Nga, National Environment Agency
 Nguyen Huu Dung and Cuc Kien Lam, Forestry Protection Department
 Nguyen Van Chiem, Ministry of Fisheries

3.1 International treaties to which Viet Nam have acceded

- 1) UN Convention of the Law of Sea. *Ratified by Viet Nam on June 23, 1994*
- 2) Convention on Biological Diversity. *Ratified by Viet Nam on November 16, 1994*
- 3) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR). *Viet Nam become a Party on September 20, 1988*
- 4) Convention on Prevention of Marine Pollution from Shipping Activities (MARPOL 73/78) *Signed in December 18, 1990*
- 5) Convention on the Protection of the World Cultural and Natural Heritage, *Signed in October 19, 1982*
- 6) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). *Viet Nam become a Party on January 20, 1994*
- 7) Vienna Convention on the Protection of the Ozone Layer, *Signed in April 26, 1994*
- 8) UN Framework Convention on Climate Change, *Signed in November 16, 1994*
- 9) The Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection. *Signed on September 20, 1997*
- 10) MoU for the Protection of Marine Turtles and their Habitat in the Indian Ocean Southeast Asian region (IOSEA) *Signed in July 2001*

Specific agreements relating to the trade of marine turtle products and their eggs

Annex I of CITES enacted by Decision 344/2001/QĐ-BTS of May 2, 2001 by Minister of MoFI relating to the management of sectoral fishery export and import during the period 2001-2005

3.2 Established statute laws passed by the National assembly of Viet Nam

- 1) The 1992 Constitution of the Socialist Republic of Viet Nam adopted by the National Assembly of Viet Nam, VIII Legislature, the 11th Meeting on April 15, 1992
- 2) Law on Environmental Protection adopted by the National Assembly of Viet Nam, IX Legislature, the 4th Meeting on December 27, 1993
- 3) Ordinance for Fishery Resource Protection and Development signed by the President of the State Council on April 25, 1989
- 4) Ordinance for Veterinary
- 5) National Conservation Strategy 1985

3.3 Established statutes issued by the Government of Viet Nam

- 1) Council of Ministers Decree 18-HĐBT dated Jan. 17, 1992 providing for the list of endangered and rare species of wild fauna and flora, and their management and protection regimes.
- 2) Government Decree 175 CP dated November 18, 1994 on guidance for implementing the Law on Environmental Protection.
- 3) Prime Minister of Government Decision 415-TTg dated August 10, 1994 on the issuance of Regulation on Inspection Organizational Structure and Operation of Fishery Resource Protection
- 4) Government Decree 02 –CP dated January 05, 1995 relating to Regulations of Trade in Commodity Items and Services that are Banned and/or subject to conditions within domestic markets.
- 5) Prime Minister of Government Decision 845-TTg dated December 22, 1995 on the Approval of “Viet Nam Biodiversity Action Plan”
- 6) Government Decree 26-CP dated April 26, 1996 relating to Regulation of Administrative Penalty for Environmental Protection.

- 7) Article 7 of the Decree 26-CP of April 26, 1996 provides for Violations against Biodiversity Protection and Natural Conservation.
- 8) Article 8 of the Degree 26-CP of April 26, 1996 provides for Violations against Exploitation and Trade in Endangered and Rare Species of Wild Fauna and Flora included in the lists issued by Ministries of Agriculture and Rural Development and Fisheries
- 9) Prime Minister of Government Instruction 359-TTg dated May 29,1996 relating to Urgent Measures to Protect and Develop Species of Wild Fauna
- 10) Government Decree 48/CP dated August 12, 1996 on Regulation of Administrative Penalty applied in the field of fishery resource protection
- 11) MOSTE Ministerial Circular 2891-TT/KCM of Dec.12, 1996 relating to guidance for environmental protection of Ha Long Bay.
- 12) Prime Minister of Government Decision 07-Ttg of January 03,1997 relating to the Establishment of a National Management Committee of Viet Nam's Global Environment Fund.
- 13) Prime Minister of Government Decision 25/2000/QĐ-TTg of December 21, 2000 on the Approval of a Feasibility Project on Southern Coastal Wetlands Protection and Development in Cù Mau, Bắc Liêu, Sãc Tr'ng and Tru Vinh Provinces, Viet Nam.
- 14) Ministerial Circulars 04-TS/TT of Aug. 30, 1990 and 01/2000/TT-BTS of April 28, 2000 by Minister of MoFI relating to some amendments to the Ministerial Circular 04-TS/TT relating to guidance for implementing the Ordinance on Fishery Resource Protection and Development.
- 15) Decision 344/2001/QĐ-BTS dated May 2, 2001 by Minister of MoFI relating to the sectoral management of fishery exports and imports during the period of 2001-2005.
- 16) Decree 48/2002/NĐ-CP of April 22, 2002 relating to amendments and additions to the list of endangered and rare species of wild fauna and flora issued by the Decree 18-HĐBT dated Jan. 17, 1992 (specifically the listing of marine turtles).
- 17) MOSTE Decision 57/2002/QĐ-BKHCMNT of August 05, 2002 on the Issuance of Rules for Organizational Structures and Operations of the National Focal Point, Directorate, Coordinating and Executing Agencies of the Project on "Preventing Trends in Environmental Degradation in South China Sea and Thailand Bay".

Specifically relating to the prohibition of harvesting of marine turtle species

- 1) Table 7A, Ministerial Circular 01/2000/TT-BTS of April 28, 2000 by MoFI relating to amendments and additions to the MoFI Circular 04/TS-TT of August 30, 1990 relating to a guidance for implementing the Ordinance on Fishery Resource Protection and Development.
- 2) Article 12, Ordinance on Fishery Resource Protection and Development stipulates, "that any fishing and consumption activities of high economic value, valuable and rare, or endangered species included in the list of target protected species, shall be banned. Any breeding of these species for the purposes of the resource regeneration or scientific investigation and research must be subject to the MoFI guidance".

Specifically relating to the prohibition of any acts that cause damages to marine habitats

Article 8 of the Ordinance on Fishery Resource Protection and Development, provides for strict prohibition of any acts:

- 1) That make aquatic species paralysed or massively killed by using or releasing toxic substance or explosives for fishery exploitation, leading to pollution of their living environments, namely:

- 2) Discharges or spills of toxic substances with their concentrations that are excessive the permissible limits.
- 3) Destruction of mangrove and watershed forests, coral reefs, submerged vegetation beds and other special habitats.
- 4) New construction or demolition that may cause changes in works relating to waters and living environments leading to heavy damages to fishery resources. In special cases that acts 3 and 4 cannot be avoided, they must be subject to permits issued by the Chairman of the Council of Ministers (now the Prime Minister).

To ensure that the aforementioned regulations are effective, many written provisions and their jurisdictions have been developed and implemented by the responsible Government Agencies, these are listed in Appendix I.

3.4 Remaining issues relating to the national legislation of marine turtle species conservation.

While marine turtle has been included in the list of endangered and rare species of fauna, there are no specific legal documents dealing specifically with the conservation of marine turtles.

The existing regulations only relate to acts that directly cause damages to species of marine turtles. Other contents such as remedy of degradation, regeneration, replenishment of marine turtle populations or their habitat protection (feeding areas, migratory ways, protection corridors, nesting sites, and others) have not been provided for.

Insufficient or poor jurisdiction over the treatment of offences to ensure the effectiveness of relevant management decisions (regulations have been established for international but not domestic trade in marine turtles leading to an increased trade in marine turtle products nationwide).

4. Species summaries

Taken directly from the IUCN 2002 Baseline survey

Hamann, M, Chu The Cuong, Nguyen Duy Hong & Pham Thuoc. 2002. Baseline survey of marine turtle abundance and distribution in the Socialist Republic of Viet Nam 2002. Unpublished report to the Ministry of Fisheries and IUCN – Viet Nam Office.

Although records of sea turtles distribution in Viet Nam were published as early as 1777 (see Dinh Hong Thanh 2002 for a review of existing literature of marine turtles in Viet Nam), Bourret (1941) provided the earliest comprehensive assessment of the distribution of marine turtles in the Indo-china region. He commented that five species of marine turtles were abundant along the entire length of the coast and described four species from the Hoang Sa (Paracel) archipelagos. However, existing data on nesting turtles in Viet Nam is limited to three green turtle rookeries, Con Dao Island National Park, the mainland beach at Nui Chua (Ninh Thuan Province), and the islands in the Gulf of Thailand (Nguyen Thi Dao 1999); WWF unpublished data). Based on these studies, the average green turtle nesting population of Viet Nam is estimated to be 250 females per year (based on 230 at Con Dao, plus 10 and 10 at Nui Chua and Gulf of Thailand islands respectively). Whether these three rookeries, which are each separated by approximately 500km, represent separate genetic management units is currently unresolved. Additionally, it is apparent from both Government and Non Government Organisation surveys that hawksbill, loggerhead and leatherback turtles are also found in Viet Nam (Pham Thuoc 2001; Tran Minh Hien 2002). However, some confusion exists regarding the identification of olive ridley and loggerhead turtles, and while it is likely

that both species exist in Viet Nam's waters, whether either or both of these species nest on Viet Nam's beaches is yet to be resolved (Nguyen 1978; Pham Thuoc 2001; Tran Minh Hien 2002, Dinh Hong Thanh 2002).

The determination of management units for marine turtles in Viet Nam is not possible until the molecular genetic project has been completed. Additionally, the accuracy of the genetic study would be made more difficult due to the extremely low numbers of nesting turtles in some regions. With this in mind we have analysed the current information for each species at a National level, with no regard for possible genetic variation. Following the individual species summaries are a series of table that (1) identify the national distribution, abundance and threats and (2) provide an index and conservation priority to the various nesting beaches in Viet Nam.

4.1 Loggerhead turtle (*Caretta caretta*)

Nguyen Thi Dao (1999) suggests that (1) loggerhead turtles were once the most numerous species of marine turtle in Viet Nam, (2) a hybrid clutch of loggerhead and green turtles was found at Con Dao, and (3) olive ridleys turtles are not present in Viet Nam. While we have no information to indicate former loggerhead turtle population sizes in Vietnamese waters, it is our conclusion that loggerhead turtles do not currently nest along the coast and probably have not since the 1970s (see Table 4.1). The 'hybrid' hatchling pictured in Nguyen Thi Dao (1999) has five costal scales (both left and right), consistent with loggerhead turtles. However, abnormal scale counts occur relatively frequently in hatchling sea turtles and it is presumably not unusual for olive ridley turtle hatchlings to have a five costal scales (Mast 1989; Guinea 1990; Schäuble et al. in press). Foraging areas for this species occur in (1) the waters around Co To and Thanh Lan Islands (Quang Ninh province), (2) the coastal waters of the south-central provinces from Quang Ngai to Ninh Thuan, and (3) around the Con Dao Island group (see Table 4.1).

While it is difficult to determine whether numbers of loggerhead turtles residing in Viet Nam's waters have changed or remained stable over time, large declines in the two Pacific Ocean breeding populations (northern Pacific population centered around Japan and the southern Pacific population centered around eastern Australia (Limpus & Couper 1994; Suganuma 2002) suggest that regional foraging populations have suffered at least some level of decline. Both the negative impacts of fisheries by-catch and the positive effects of TEDs on loggerhead populations in other areas of the world are well documented, (Crowder *et al.* 1994; Limpus & Couper 1994; Suganuma 2002). There is currently no requirement for the use of Turtle Excluder Devices (TEDs) in Vietnamese fisheries, and our data indicate that the biggest threats to loggerhead turtles in Vietnamese waters are bottom trawling and the gill net fisheries. Thus, fisheries-based issues need to be addressed in the immediate future to prevent the regional extinction of loggerhead turtles.

4.2 Leatherback turtle (*Dermochelys coriacea*)

It is our conclusion that historically (> 30 years ago), nesting by leatherback turtles would have been relatively common along the central coast beaches of Viet Nam (see Table 4.2). Extrapolating from our data we estimate that the annual nesting population to have been in the order of 500 females per year. Moreover, our survey results also indicate that fewer than 10 females currently nest along Viet Nam's beaches each year. Our data indicate that leatherback turtle populations in Viet Nam have been significantly reduced through a combination of (1) coastal and offshore fisheries such as gill nets and bottom trawling, and (2) the near 100% harvest of eggs and nesting turtles along most of its nesting range. We speculate, based on evidence from overseas fisheries (Witzell 1984; McCracken 2000), and because there are

approximately 12000 long line vessels operating in Viet Nam's exclusive economic zone, that long line fishing may pose a serious, and as yet, unquantified threat to leatherback turtles in Viet Nam and the broader Southeast Asian region. This potential impact warrants investigation. It is doubtful that this population is recoverable without (1) immediate local and international action aimed at elimination of all fisheries-based mortality, and (2) elimination of the collection of eggs and nesting turtles from beaches.

4.3 Olive Ridley turtle (*Lepidochelys olivacea*)

It is our conclusion that olive ridley turtles were once common along most of the outer islands of Bai Tu Long Bay and the beaches in the central coast of Viet Nam (Ha Tinh to Phu Yen; Table 4.3). Indeed, according to Bourret (1941) they may have been the most common species nesting in Viet Nam. Although it is difficult to place a figure on historical or current nesting population sizes, we estimate, based on our data, that at least several hundred females nested along the Viet Nam coast each year prior to the 1980s, and current nesting levels are somewhere in the order of 100 females per year (Table 4.3). The remaining important nesting sites for this species are located on beaches in Quang Ninh Province (Quan Lan Island), Da Nang City (Son Tra Peninsula) and Quang Binh (scattered along entire sandy coastline). The largest threats to the survival of olive ridley turtles in Viet Nam is their incidental capture in fishing gear, particularly bottom trawl nets and gill nets. Of particular concern is that in at least five Provinces (Ha Tinh, Thua Thien Hue, Quang Ngai, Binh Dinh and Phu Yen), captures of females during courtship or interesting periods are relatively common. If we extrapolate from our survey data it is possible to conclude that many hundred olive ridley turtles are being killed each year in these fisheries. Additionally, the harvest of nesting turtles and eggs continues, and approaches 100%, in many coastal areas. Clearly, these rates of mortality are not sustainable, and need to be significantly reduced in the short term for the population(s) to survive.

4.4 Hawksbill turtle (*Eretmochelys imbricata*)

In the early 20th century hawksbill turtles were regarded as relatively common along the entire Vietnamese coastline (Bourret 1941). Since that report (Bourret 1941), several authors have conducted surveys of the hawksbill turtle trade in Viet Nam and each have concluded that widespread and large-scale commercial trade exists and has probably done so for decades (see references in TRAFFIC Southeast Asia-Indochina 2002). This commercial trade has largely been unmonitored and unregulated, and little information exists from which to estimate historical nesting or foraging population sizes for hawksbill turtles. However, our data do suggest that approximately 500 females per year may have nested in the islands of the Gulf of Tonkin, and nesting populations of unknown size occurred in the Vietnamese and Cambodian islands of the Gulf of Thailand (Table 4.4). Additionally, there is some evidence to suggest that "many" hawksbill turtles used to nest in the Con Dao Island group.

While it appears from both our data and previous reports that some direct harvest does and has occurred to supply the commercial market, today it seems that most of the hawksbill turtles are captured either incidentally in gill nets placed around coral/rocky reef areas or are taken opportunistically by divers targeting commercial species of crustaceans and mollusks (see also TRAFFIC Southeast Asia-Indochina 2002). The combined annual take of hawksbill turtles could be in the order of several hundred, and could be as high as a thousand, turtles per year, especially around the islands along the southern coast of Viet Nam (Table 4.4). The hawksbill turtle is listed by the 2002 IUCN Red List for Threatened Species as Critically Endangered, and is listed in Appendix 1 of CITES. Moreover, the commercial sale and export of hawksbill turtles and turtle products in Viet Nam is illegal under both local (Group I of Decree 48/CP) and international (CITES) laws. Our data indicate that the nesting populations

of hawksbill turtles in Viet Nam are dangerously close to regional extinction. Unless urgent action is taken to eliminate the incidental capture and the illegal commercial use of hawksbill turtles, extinction of local, and perhaps regional populations are imminent within the next hawksbill turtle generation (35years, Meylan and Donnelly 1999).

4.5 Green turtle (*Chelonia mydas*)

In the early 20th century green turtles were regarded as relatively common along the entire Vietnamese coastline (Bourret 1941). Likewise, data indicate that nesting by this species occurred in several areas along the coast (Table 4.5). Effective management of Viet Nam's green turtles will be difficult until genetic population structures are better understood. We estimate that prior to the 1970s (see Table 4.5):-

- Approximately 100 females nested each year on the islands in the Gulf of Tonkin
- Approximately 500 females nested each year along the mainland beaches and nearshore islands of south-central Viet Nam (Quang Nam to Ninh Thuan).
- In the order of low 100's of females nested each year on the islands in the Gulf of Thailand.

Additionally;

- Based on information from Con Dao National Park it appears that the nesting population around the Con Dao Island group has remained at a similar size (~230 females per year) for the last few decades.

There is currently no information on the size or status of the nesting population on most of the offshore islands, including Bach Long Vi, Paracel Islands (Hoang Sa), Spratly Islands (Truong Sa), Phu Quy.

Our data indicate that in each of the first three areas (Gulf of Tonkin, south-central Viet Nam and the Gulf of Thailand) annual breeding populations have declined significantly, most likely to around 10 females per year in each location (Table 4.5). Data from Con Dao National Park suggest that this nesting rookery has remained relatively stable for the last eight years. Fishing activities such as shark/stingray nets and Cau Kieu have significantly depleted green turtle populations in the past, however, the largest current threat to green turtles in Viet Nam is incidental capture in gill and trawl nets and opportunistic take by divers targeting commercial species such as crustaceans and molluscs. Extrapolation of our data indicates that this take could be in the order of hundreds of turtles per year (Table 4.5).

Table 4.1. Current summary of the Loggerhead turtle (*Caretta caretta*) in Viet Nam. For an explanation of terms please see Table 4.6

Province	Presence	Nesting			Foraging	Exploitation			
		Evidence	Historical frequency	Current frequency		Harvest of nesting ♀	Harvest occurring at sea	Level of at sea harvest	Use/type
Quang Ninh	?d	-	-	-	✓	✗	✗	unknown	?e
Hai Phong	✗	-	-	-	✗	✗	✗	-	-
Thanh Hoa	✗	-	-	-	✗	✗	✗	-	-
Nghe An	?d	-	-	-	?d	✗	✗	-	-
Ha Tinh	✗	-	-	-	✗	✗	✗	-	-
Quang Binh	✗	-	-	-	✗	✗	✗	-	-
Quang Tri	?d	-	-	-	?d	✗	✗	-	-
Thua Thien Hue	✗	-	-	-	✗	✗	✗	-	-
Da Nang City	✗	-	-	-	✗	✗	✗	-	-
Quang Nam	✗	-	-	-	✗	✗	✗	-	-
Quang Ngai	✗	-	-	-	✓	✗	✓1	<1py/pcom	e
Binh Dinh	✗	-	-	-	✗	✗	✗	-	-
Phu Yen	✗	-	-	-	✓	✗	✓1	<1py/pcom	e
Khanh Hoa	✗	-	-	-	✓	✗	✓1	unknown	?e
Ninh Thuan	✗	-	-	-	✓	✗	✗	-	-
Binh Thuan	✗	-	-	-	✗	✗	✗	-	-
Ba Ria-Vung Tau	✗	-	-	-	✓	✗	✓1	unknown	?e
Ca Mau	?d	-	-	-	?d	✗	?d	-	-
Kien Giang	✗	-	-	-	✗	✗	✗	-	-

Table 4.2. Current summary of the Leatherback turtle (*Dermochelys coriacea*) in Viet Nam. For an explanation of terms please see Table 4.6

Province	Presence	Nesting			Foraging	Exploitation			
		Evidence	Historical frequency	Current frequency		Harvest of nesting ♀	Harvest occurring at sea	Level of at sea harvest	Use/type
Quang Ninh	✗	-	-	-	✓	✗	✗	-	-
Hai Phong	✓	i	unknown	nil	✓	✓ + eggs	✗	-	-
Thanh Hoa	✗	-	-	-	✗	✗	✗	-	-
Nghe An	?d	-	-	-	?d	?d	?d	-	-
Ha Tinh	✗	-	-	-	✓	✗	✓1	<1py/pprov	ne
Quang Binh	✓	i	20n/pn	nil	✓	✓ + eggs	✓1	nil	ne
Quang Tri	?d	-	-	-	?d	?d	?d	-	-
Thua Thien Hue	✓	i	10n/pn	nil	✓	✓ + eggs	✓1	<1py/pprov	e
Da Nang City	✗	-	-	-	✗	✗	✗	-	-
Quang Nam	✗	-	-	-	✗	✗	✗	-	-
Quang Ngai	✓	i	unknown	-	✓	✓ + eggs	✓1	<1py/pprov	ne
Binh Dinh	✗	-	-	-	✓	✗	✓1	<1py/pprov	ne
Phu Yen	✗	-	-	-	✓	✗	✓1	<1py/pprov	ne
Khanh Hoa	✗	-	-	-	✗	✗	✗	-	-
Ninh Thuan	✓	i,p	unknown	<10n/py	✗	✓ + eggs	✗	-	-
Binh Thuan	✓	i	10n/pn	nil	✗	✓ + eggs	✗	-	-
Ba Ria-Vung Tau	✗	-	-	-	✗	✗	✗	-	-
Ca Mau	?d	-	-	-	?d	?d	?d	-	-
Kien Giang	✗	-	-	-	✗	✗	✗	-	-

Table 4.3. Current summary for the Olive Ridley turtle (*Lepidochelys olivacea*) in Viet Nam. For an explanation of terms please see Table 4.6

Province	Presence	Nesting			Foraging	Exploitation			
		Evidence	Historical frequency	Current frequency		Harvest of nesting ♀, eggs	Harvest occurring at sea	Level of at sea harvest	Use/type
Quang Ninh	✓	t,i	unknown	<10 n/py	✓	✗, ✓ eggs	✓1	unknown	?e
Hai Phong	✗	-			✓	✗	✓1	<1py/bt	e
Thanh Hoa	?	i	unknown	?	✓	✗	✓1	1-2py/pcom	e
Nghe An	?d	-			?d	?d	?d	-	-
Ha Tinh	✓	i	unknown	<10 n/py	✓	?	✓1 court	<1py/bt	e
Quang Binh	✓	i	unknown	<20 n/py	✗	✓ + eggs	✗	-	-
Quang Tri	?	-			?d	?	?d	-	-
Thua Thien Hue	✓	i	20-30♀py	<10 n/py	✓	✗, ✓ eggs	✓1 court	<5py/bt	e
Da Nang City	✓	t,i	unknown	~10 ♀/py	✗	✓ + eggs	✗	-	-
Quang Nam	✓	i	20-30♀py	<5 n/py	✗	✓ + eggs	✗	-	-
Quang Ngai	?	i	5-7♀py	no data	✓	?	✓1 court	<1py/bt	e
Binh Dinh	✓	i	1-2n/pn	<5 n/py	✓	✓ + eggs	✓1 court	<1py/bt	e
Phu Yen	✓	i	unknown	<5 n/py	✓	✓ 100%	✓1 court	<1py/bt	e
Khanh Hoa	✗	-	-	-	✗	✗	✗	-	-
Ninh Thuan	✗	-	-	-	✗	✗	✗	-	-
Binh Thuan	?	i	-	-	✗	?	✗	-	-
Ba Ria-Vung Tau	✗	-	-	-	✗	✗	✗	-	-
Ca Mau	?d	-	-	-	?d	?d	?d	-	-
Kien Giang	✗	-	-	-	✗	✗	✗	-	-

Table 4.4. Current summary for the Hawksbill turtle (*Eretmochelys imbricata*) in Viet Nam. For an explanation of terms please see Table 4.6

Province	Presence	Nesting			Foraging	Exploitation			
		Evidence	Historical frequency	Current frequency		Harvest of nesting ♀	Harvest occurring at sea	Level	Use/type
Quang Ninh	✓	i	unknown	<10n/py	✓	✓	✓3	<1py/pcom	e,s
Hai Phong	✓	i	60n/pn	<10n/py	✓	?prob	✓3	<1py/pcom	e,s
Thanh Hoa	✗	i	-	-	✓	-	✓2	<1py/pcom	e,s
Nghe An	?d	i	-	-	?	-	?	-	-
Ha Tinh	✗	i	-	-	✓	-	✓2,3	<1py/dive	e,s
Quang Binh	?d	i	-	-	✓	-	✓2,3	<1py/dive	e,s, pois
Quang Tri	?d	i	-	-	?	-	?	-	-
Thua Thien Hue	✗	i	-	-	?	-	?	-	-
Da Nang City	?d	i	-	-	?	-	?	-	-
Quang Nam	?d	i	-	-	✓	-	✓3	<1py/dive	e,s
Quang Ngai	?d	i	-	-	✓	-	✓2,3	~5py/dive	e,s
Binh Dinh	✗	i	-	-	✓	-	✓2,3	unknown	?e,s, pois
Phu Yen	✗	i	-	-	✓	-	✓2,3,5	100-200py [#]	e,s, pois
Khanh Hoa	?d	i	-	-	✓	-	✓	unknown	?e,s, pois
Ninh Thuan	✗	i	-	-	✓	-	✓	unknown	?e,s
Binh Thuan	✗	i	-	-	✓	-	✓	unknown	?e,s
Ba Ria-Vung Tau	✗	i	-	-	✓	✓h +eggs	✓1,2,3	unknown	?e,s
Con Dao	✓h	l	unknown	nil in 8 yrs	✓	✓h +eggs	✓1,2,3	unknown	?e,s
Ca Mau	?d	i	-	-	?	?d	?	-	-
Kien Giang	✓	i	<10n/py	Thu Chu	✓	✓h +eggs	✓1,2,3	100's py	e,s, pois

Table 4.5. Current summary for the Green turtle (*Chelonia mydas*) in Viet Nam. For an explanation of terms please see Table 4.6

Province	Presence	Nesting			Foraging	Exploitation			
		Evidence	Historical frequency	Current frequency		Harvest of nesting ♀	Harvest occurring at sea	Level	Use/type
Quang Ninh	✓	t,i	<10n/py	Coto Is. Quan Lan	✓	h	✓1,2	<1py/pbtgn	e
Hai Phong	✓	i	<10n/py	Dau Be	✓	h	✓1,2	<1py/pbtgn	e
Thanh Hoa	✗	i	-	-	✓	h	✓1,2	<1py/pbtgn	e
Nghe An	?d		-	-	?d			-	-
Ha Tinh	✗	i	-	-	✓	✗	✓1,2	5-10py/pgn	e
Quang Binh	✓	h	no current	Xuan Hoa	✓	✗	✓1,2	<1py/pbtgn	e
Quang Tri	?	i	-	-	?	-	-	-	-
Thua Thien Hue	✗	i	-	-	✓	✗	✗	unknown	-
Da Nang City	✗	i	-	-	✗	✗	-	-	-
Quang Nam	✓	i	<10n/py	Tam Hoa	✓	✓+eggs	✓1,2	<1py/pgn	e
Quang Ngai	✓	i	<10n/py	Ly Son	✓	✓+eggs	✓1,2, court	<1py/pgn	e
Binh Dinh	✓	i	<10n/py	Bai Xep, Cu Lau Xanh	✓	✓+eggs	✓1,2, court	~5py/pgn	e
Phu Yen	✓	i	<1n/py ^a <10n/py ^b	a = Song Cau, b = Long Thuy	✓	✓+eggs	✓1,2,3,5 [#]	100-200py	e
Khanh Hoa	?	i	-	Bai Dai	✓	?	✓1,2,5	<1py/pbtgn	e,s
Ninh Thuan	✓	i,t,eggs	2001 = 23n 2001 = 1n	Nui Chua; Bai Thit	✓	h	✓1,2	unknown	e
Binh Thuan	?	i	-	? Phu Quy & Cu Lao Cau	✓	?	✓1,2	unknown	e,s
Ba Ria-Vung Tau	✗	i	-	-	✓	✗	✓1,2	<1py/bt	e,s
Con Dao	✓	l	~250♀/py	Con Dao	✓	h	✓1,2	<1py/bt	h = e,s
Ca Mau	?d	-	-	-	?	-	-	unknown	-
Kien Giang	✓	i,	<10♀/py	Tho Chu, An Thoi	✓	✓+eggs	✓1,2,3	100's py	e,s

Table 4.6 Guide to table abbreviations used in tables 4.1 to 4.5.

Symbol	Description	Symbol	Description
✓	Present	nil	No nests recorded in last 5 to 10 years
✕	Absent	py/pbtgn	Per year per bottom trawl or gill net boat
?	Uncertain based on survey data	py/pbt	Per year per bottom trawler
?d	Uncertain but doubtful	py/pgn	Per year per gill net operator
?prob	Uncertain but likely	Py/pprov	Per year per province
i	Interview data (this survey)	Py/pcom	Per year per commune
t	Tracks/bodyprints observed	Py/pdive	Per year per dive boat
p	Photograph confirmation	1	Accidental catch in bottom trawl
h	Historical (pre 1965) records only	2	Accidental by-catch in drift/set gill nets
l	Published literature	3	Taken ad hoc by divers (targeting crustaceans, mollusks)
py	Turtles per year (foraging)	4	Nets to catch ♀ when they are courting or inter-nesting
n/pn	Nests per night	5	Cau Kieu
n/py	Nests per year	e	Eaten by fishers families or sold in markets for food
/py	Females per year	s	Sold for shell or stuffed turtle
nil	No nests recorded in last 5 to 10 years	?e	Probably eaten
py/pbtgn	Per year per bottom trawl or gill net boat	#	Mixture of greens and hawksbills, mainly hawksbills
py/pbt	Per year per bottom trawler	court	Turtles captured mainly during courtship

Table 4.7. Nesting beaches required for monitoring each management unit of marine turtles in Viet Nam. Priority level refers to the need for continued surveys and beach monitoring programs to be established. Or in the case of “?” conduct baseline surveys to determine the size of the nesting population. Estimated cost for one year of monitoring (USD).

Nesting beaches	Green (northern)	Green (southern)	Green (Gulf of Thailand)	Green (Spratly)	Hawksbill	Olive ridley	Leatherback	Priority	Estimated annual cost
Northern									
Dau Trui	✓	✗	✗	✗	✗	✓	✗	M	
Minh Chau	✓	✗	✗	✗	✗	✓	✗	L	
Son Hoa	✓	✗	✗	✗	✗	✓	✗	M	
Quan Lan	✓	✗	✗	✗	✗	✓	✗	L	
Xuan Hai	?	✗	✗	✗	✗	✓	✗	L	
Bao Ninh	?	✗	✗	✗	✗	✓	✓	L	
Xuan Hoa	?	✗	✗	✗	✗	✓	✓	L	
Ngu Thuy	?	✗	✗	✗	✗	✓	✓	L	
Bai Chai	?	✗	✗	✗	✗	?	✗	L	
Bai Nam ¹	✗	✗	✗	✗	?	?	✗	H	
Bai Tre ¹	✗	✗	✗	✗	?	✓	✗	H	
Bai Bac ¹	✗	✗	✗	✗	?	?	✗	H	
Southern									
Cu Lanh Xanh ¹	✗	?	✗	✗	?	✗	✗	H	
Bai Tien ¹	✗	?	✗	✗	✗	✗	✗	H	
Bai Xep ¹	✗	?	✗	✗	✗	✗	✗	H	
Bai Dai (nth) ¹	✗	?	✗	✗	✗	✗	✗	H	
Bai Cay Bang ¹	✗	?	✗	✗	✗	✗	✗	H	
Bai Dai ¹	✗	?	✗	✗	✗	✗	✗	H	
Ninh Chu	✗	✗	✗	✗	✗	✗	✓	L	
Bai Thit	✗	✓	✗	✗	✗	✗	✗	H	
Bai Ngang	✗	✓	✗	✗	✗	✗	✗	H	
Con Dao	✗	✓	✗	✗	✓	✗	✗	H	
Gulf of Thailand								H	
Tho Chu	✗	✗	✓	✗	?	✗	✗	H	
An Thoi	✗	✗	✓	✗	?	✗	✗	H	
Spratly Is.	✗	✗	✗	?	?	✗	✗	H ¹	
Paracel Is.	✗	✗	✗	?	?	✗	✗	H ¹	

1. baseline survey data required

5. Threats to marine turtles in Viet Nam

At all stages of their life cycles marine turtles are subject to various impacts that may compromise their survival or capacity to breed successfully. These impacts have the potential to decrease population sizes and threaten the species with endangerment. Listed below are summarised threats that have been identified by the research team. Although in most cases quantifiable data do not exist and some certainty is sought in others, this should not prevent actions that will ameliorate preventable mortality. A more detailed description of each of these threats is presented below.

Table 5.1 Potential human-related impacts/threats associated with species marine turtle in Viet Nam. ✓ = threat present, ✗ = threat absent or not recorded, ? = the impacts are suspected but have not been documented. # loggerheads, although they do not nest in Viet Nam, reside in Viet Nam's waters these are threats to a distant nesting population(s).

Human-related impacts	Green (southern)	Green (northern)	Green (Gulf of Thailand)	Green (Spratly)	Hawksbill	Hawksbill (Spratly)	Olive ridley	Leatherback	Loggerhead#
Defence activities	✗	✗	?	✓	✗	✓	✗	✗	✗
Diseases	✗	✗	✗	✗	✗	✗	✗	✗	✗
Sand mining	✗	✓	✗	✗	✗	✗	✓	✗	✗
Tourism Develop.	✓	✓	?	✗	?	✗	✓	✗	✗
Egg collecting	✓	✓	✓	?	✓	?	✓	✓	✗
Incidental catch - lines	✓	✓	✓	?	✓	?	✗	✗	✓
Incidental catch – gill nets	✓	✓	✓	?	✓	?	✓	✓	✓
Incidental catch – Cau Kieu	✓	?	?	?	✓	?	✗		✓
Incidental catch - trawl nets	✓	✓	✓	?	✓	?	✓	✓	✓
Ingestion of / Entanglement in marine debris*	?	?	?	?	?	?	?	?	?
Direct take – Viet Nam	✓	✓	✓	?	✓	?	✗	✗	✗
Direct take - overseas	?	?	?	?	?	?	?	?	✗

5.1 Direct and indirect take of nesting and foraging turtles and eggs

Direct harvest

The direct take of turtles and eggs from the nesting beaches is a principal factor underlying the decline in nesting numbers of all marine turtle species in Viet Nam. It appears that nesting activity is now so scattered, both spatially and temporally, that the likelihood of direct take of females ashore for nesting is greatly reduced. However, our survey data indicate that near 100% harvest of the eggs still occurs in most of the non-protected locations. Population modeling data indicates that it will take 35 to 50 years for the effects of egg harvesting to be reflected in a corresponding decline in the nesting turtle numbers (Heppell et al. 1996; Chaloupka 2001). It is clear that Vietnamese nesting populations cannot sustain this practice. In fact the only option that will benefit marine turtles is 100% protection of nesting turtles and their eggs. Similarly, while some fishing techniques (such as Cau Kieu (lone line fishing) and gill nets) have been adapted or used to specifically target marine turtles in foraging areas, catch rates have now declined to the point where, for most fishers, it is no longer economically feasible solely target marine turtles. Hence most of the foraging turtles are caught accidentally in fishing gear. However, the opportunistic capture of both green and hawksbill turtles by fishers diving for other economically important marine products such as mollusks and crustaceans poses a significant threat to these species. This take could involve hundreds of turtles from each species, and needs to be eliminated in the near future if Viet Nam's foraging populations of these species are to survive.

Indirect take

The incidental capture of marine turtles is a large and widespread problem, with a large percentage of these either drowning in fishing gear or being killed for food when caught in nets and brought aboard alive. The fishing methods of most concern are, (1) bottom trawling, (2) drift and set gill nets, and (3) Cau Kieu (long lining).

A report by The The Asia Development Bank (1999) estimated that between 1993 and 1998 there was an average of 40,000 registered vessels operating within the waters of the 18 coastal provinces that we surveyed. Of the registered vessels operating in Viet Nam, 34.2% are bottom trawlers and 20.4% are gill-netting vessels. Hence, approximately 13,680 and 8,160 bottom trawlers and gill net vessels exist in these 18 provinces. Our survey data indicate that turtles are caught as bottom trawl or gill net bycatch in 15 of these provinces, with catch rates varying from one turtle per province per year up to 100's of turtles per year.

Without immediate planning and actions to address these fisheries-based issues, many national and international marine turtle populations will remain at serious risk of regional extinction. Turtle Excluder Devices in trawl nets, restricted (closed season/area zones) and restricted tow or net setting times have helped to alleviate high turtle mortalities in several countries and these should be examined in the context of Vietnamese fisheries.

Trade issues

While most olive ridley, leatherback and loggerhead turtles that are killed, indirectly or directly, are eaten by fishers or sold for food, many green turtles and most hawksbill turtles are illegally sold for the production of stuffed turtles or shell products (see TRAFFIC Southeast Asia-Indochina 2002 for a report on this trade). Discussion of this trade and recommendations for its management are provided in section 4 of this report, and can be found in TRAFFIC Southeast Asia-Indochina (2002). Continuation of this trade, which places a monetary value on marine turtles, will lead to the inevitable extinction of hawksbills in this region.

5.2 Impacts on foraging habitat and food sources

The number of fishing and tourist boats along the Viet Nam coastline has increased significantly in the last two decades. Associated with this increase, there has been an increased marine noise and pollution levels e.g. oil/fuel residue, rubbish (including plastics, discarded net and other foreign material). These factors have negatively affected marine turtle populations in other areas of the world through ingestion, entanglement, injury, obstruction or by degrading the foraging or nesting habitats (Witzell and Teas 1994; Bugoni et al, 2001; Leitch 2001), and it is likely that they have contributed in some way to the demise of marine turtles in Viet Nam. In fact, these factors are likely to constitute the largest non-by-catch or consumptive threat for marine turtles in Viet Nam. In some areas of the coast rafts of rubbish were evident (eg; Ha Long Bay), and many beaches were littered with a variety of debris. This does not only impact marine turtles but also threatens the health of the marine ecosystem and dependent industries such as tourism and fishing. Unless this problem is addressed in the short term, Viet Nam's valuable coastal and marine ecosystems will be under serious threat of becoming irreparably damaged.

Coral reefs in Viet Nam have long suffered from explosive and cyanide fishing and seagrass and mangrove habitats have experienced decades of clearing, harvesting, sedimentation and other anthropogenic impacts. Considerable effort has been made in recent years by various Government and Non-Government Organisations to stop these destructive fishing techniques, and to promote the wise use of marine and coastal habitats. Discussion of these habitats and their current status is provided in section 7, 8 and 9 of this report. However, preservation of the remaining marine turtle foraging populations will partly rely upon the cessation of destructive fishing and effective management of seagrass, coral reef and mangrove habitats.

5.3 Impacts to nesting turtle habitat

Sand mining

Sand mining on Minh Chau and Quan Lan Island may pose a threat to marine turtles if the mining area is extended to the beaches where nesting currently occurs (Son Hoa and Dau Trui). We are unsure whether current sand-mine operations have impacted upon nesting distributions in this area. Along the mainland coast sand mining exists in numerous areas, however we are currently unaware of any conflicts with marine turtle nesting beaches. Further marine turtle surveys in Phu Yen and Khanh Hoa provinces will be required to determine if any negative impacts are likely along those beaches, which have suspected marine turtle nesting.

Tourism

The beaches on which turtles are still occasionally seen nesting are mostly undeveloped and mainly located on offshore islands, or away from tourist developments. However, the beaches on Son Tra peninsula (Da Nang City) and several beaches in Quan Lan and Minh Chau are earmarked for tourist development. If these beaches are developed, marine turtle nesting rookeries may be threatened by a variety of factors such as beach removal or alteration, physical obstruction to the dunes, lighting, noise, and increased beach use by people.

Marine debris

Once thrown in the water, whether the original receptacle is a gutter, drain, creek, river or ocean, rubbish has to end up somewhere. Most of the beaches we visited had extremely high levels of marine debris. Much of this debris was glass, plastics and polystyrenes, and other items associated specifically with fishing such as floats, nets, and light bulbs. This is a problem for marine turtle nesting because it may impede movement and nest digging, lead to injury and infections, and in some cases may cause turtles to be trapped.

6. A summary of the report, 'the trade in marine turtle products in Viet Nam'

Summary of the TRAFFIC 2002 report, prepared by TRAFFIC Southeast Asia – Indochina

TRAFFIC Southeast Asia-Indochina. 2002. *The trade in marine turtle products in Viet Nam.* Unpublished report to the marine turtle conservation and management team for Viet Nam. TRAFFIC Southeast Asia-Indochina, Hanoi, Viet Nam.

6.1 Introduction

Five species of marine turtles, including the Hawksbill (*Eretmochelys imbricata*), Green (*Chelonia mydas*), Loggerhead (*Caretta caretta*), Olive Ridley (*Lepidochelys olivacea*), and Leatherback (*Dermochelys coriacea*), are found in the waters of Viet Nam. Once plentiful, these species were used by the people of Viet Nam for food and ornamental purposes. Due to a range of human activities, however, the populations have declined dramatically and their use increasingly limited. Amongst the activities contributing to their decline is the commercial trade in marine turtle products.

Studies of the exploitation of Hawksbill Turtles in Viet Nam undertaken from 1992 to 1993 concluded that the trade in this species was exerting enormous pressure on Hawksbill Turtle populations and that it had increased enormously from previous years with the opening up of the country's economy and the growing number of tourists visiting Viet Nam and buying turtle products (Le Dien Duc and Broad, 1995).

In 2002, TRAFFIC found that there continues to be a significant trade in marine turtles and their products in Viet Nam. Marine turtle products are openly sold from Mong Cai, along the border with China to the Con Dao archipelago, an hour flight from the southeast coast of Viet Nam. In its survey of 22 provinces, TRAFFIC counted close to 29,000 marine turtle products on sale, most of which were for ornamental purposes. While four species of marine turtle were found in trade, as shown in Table 6.1, by far, the majority of specimens or products were made from Hawksbill and Green Turtles.

Table 6.1. Marine turtle products for sale in the Socialist Republic of Viet Nam, 2002

Item	Quantity
Hawksbill (tortoiseshell) products	28,277
Stuffed Hawksbill Turtles	343
Stuffed Green Turtles	216
Stuffed Loggerhead Turtles	1

Source: TRAFFIC Southeast Asia - Indochina

The turtles are killed largely to produce jewellery, hair ornaments and accessories, and stuffed mounts. Whilst Hawksbill Turtles are mainly harvested for their shells, Green and Leatherback Turtles are harvested for their eggs and meat, or for stuffed mounts.

While marine turtle products are sold internationally and domestically, the international trade has apparently increased since the early 1990s. Nevertheless, while demand from outside of Viet Nam, especially from Japan, South Korea, and China, appears to be the main force driving the trade, local demand is also substantial in some areas. Domestically, marine turtle products are sold to foreign and national tourists, and wealthy Vietnamese. Although the trade is widespread, it is concentrated in large cities and tourist areas, such as Ho Chi Minh City, Vung Tau, Nha Trang, Ha Noi and the processing center of Kien Giang province in the southern Viet Nam. The trade involves many different people, including fishermen, middlemen, craftsmen, retailers, wholesale dealers and exporters. It can entail cargoes containing large quantities (e.g., 40 foot containers) or a few dozen products on sale in a local souvenir shop.

Perhaps the most significant aspect of the marine turtle trade is that it continues despite the fact that all five species of marine turtles are listed as protected species in the country's national legislation. Furthermore, all five species are listed on CITES Appendix I (see Annex 2 for the global conservation and Vietnamese legal status of marine turtles). While turtle species have only been protected by national legislation

since April 2002, commercial exports should have stopped in 1994 when Viet Nam became a signatory to CITES. However, there are no records of marine turtles being confiscated, either by the Ministry of Fisheries, Viet Nam's CITES Management Authority, or the General Department of Customs.

6.2 Conclusion

Based on recent population surveys, it is becoming increasingly apparent that Viet Nam's populations of marine turtles cannot sustain current levels of harvest (for food and/or trade) and accidental capture. But without enforcement of the conventions and legislation designed to protect them, these rates of decline will continue. Stronger enforcement of CITES and domestic legislation protecting marine turtles, along with education of both buyers and sellers of marine turtle products, is essential if Viet Nam's marine turtle populations are to survive.

6.3 Recommendations of the TRAFFIC survey (taken from report)

The following recommendations are seen as essential if marine turtle populations in Viet Nam waters are to survive.

1. Enforcement of legislation prohibiting the trade in marine turtles and marine turtle products in Viet Nam must be increased and improved. It is recommended that:
 - a. The Ministry of Fisheries together with the Ministry of Agriculture and Rural Development issue a joint Decision stipulating the confiscation of all marine turtle products on sale in Viet Nam within six months of convening the meeting on the National Action Plan on marine turtles.
 - b. Relevant enforcement agencies monitor compliance with the Decision and prosecute offenders in accordance with the law.
 - c. The Ministry of Fisheries educate and inform relevant enforcement agencies about the serious impact that the trade in marine turtles has on wild populations, and of the need to protect marine turtle populations.
 - d. The Ministry of Fisheries assist enforcement personnel to identify marine turtle species, parts and products. This could be facilitated by the publication of such tools as identification guides, for distribution to relevant personnel.
 - e. The Ministry of Agriculture and Rural Development and relevant partners, including NGOs, assist enforcement agencies in the training of field staff on the implementation and enforcement of CITES and Decree 48/CP.
 - f. National enforcement agencies focus enforcement efforts in the main locations where tortoiseshell items are made (Ha Tien and Phu Quoc) and sold (HCMC, Ha Tien, Nha Trang and Vung Tau). Target middlemen in Vung Tau city for enforcement action, as they are responsible for purchasing large quantities of turtles from fishermen,

as well as for much of the international wholesale export of stuffed turtles.

2. Government and NGO partners continue monitoring the marine turtle trade in Viet Nam to measure the success of enforcement efforts and to keep abreast of changing market trends, trade routes and other relevant information. The current population status of all marine turtle species in the wild should continue to be monitored, and local individuals and organisations should be trained to carry out such monitoring projects.
3. Viet Nam sign and implement the Convention on Migratory Species (CMS). (See Table 2.1)
4. With the support of the Marine Turtle Conservation and Management Team for Viet Nam, the government undertake an awareness campaign informing dealers of the illegality of the trade in marine turtles and the Decision concerning confiscation.
5. Government and NGO partners implement campaigns designed to raise public awareness of the need to protect marine turtles, and to reduce consumption of marine turtle products. Such campaigns should:
 - a. Encourage the mass media to focus on the conservation needs of marine turtles and the illegality of the trade.
 - b. Create and distribute information for international travellers at airports and other points of entry and exit.
 - c. Create and distribute information designed specifically for children.

7. Fisheries and Turtle excluder research with regard to marine turtle conservation in Viet Nam.

Prepared by the Research Institute of Marine Fisheries, Hai Phong

7.1 Turtle excluder devices

The turtle excluder device, or TED, was first introduced to the U.S shrimp fishery in the late 1980s in an attempt to reduce the bycatch of marine turtles. Research and development to improve TED performance occurred over the last two decades and now TEDs are widely used in shrimp fisheries in many countries throughout the world. Current research indicates that TEDs can reduce bycatch by over 97%, and if installed and used correctly can lead to increased profit margins by decreasing labour costs and increasing catch quality (Salini et al. 2000). In response to international concerns of decreasing marine turtle populations throughout the world, in May 1996 the United States Court of International Trade ordered the US Department of State to enforce Section 609 of the Environmental Protection Act globally. Essentially placing strict trade embargoes on shrimp that was exported from nations that did not use TEDs. In 1996 representatives from four nations (Thailand, Malaysia, Pakistan and India) began what was to be a successful appeal to the WTO to have this embargo lifted. The debate continues, and “shipment by shipment” exports are permitted.

Consequently, on May 2001, Research Institute for Marine Fisheries (RIMF) cooperated with the Southeast Asian Fisheries Development Centre (SEAFDEC) to conduct trials of juvenile and trash excluder devices (JTED) by bottom trawlers (75Hp) operating in

the Gulf of Tonkin. These experimental trials were restricted both spatially and temporally in Viet Nam, and results were limited. AS such JTEDs remain to be applied in both commercial and small-scale fisheries boats in Viet Nam.

7.2 Fishing Industry

There are more than 2000 fish species in Viet Nam sea waters, of these approximately 130 species are economically important. According to the latest evaluations, the marine fish stock in Viet Nam's exclusive economic zone is 4.2 million tons, of which the annual allowable catch is 1.7 million tons. The allowable catch includes 850,000 tons of demersal fish, 700,000 tons of small pelagic fish and 120,000 tons of oceanographic pelagic fish.

Additionally, there are more than 1,600 species of crustaceans and 2,500 species of mollusks with an annual allowable catch of 50,000-60,000 and 60,000-70,000 tons respectively. Of which, marine shrimp, lobster, slipper lobster, and crabs (various species), squid and octopus are highest valued species. Aside from marine fauna, each year approximately 45,000-50,000 tons of seaweed such as *Gracilaria verrucosa* and Sargassum can be exploited.

The distribution of fish stocks and the capacity to exploiting demersal fish species exist mainly in areas below 50m in depth (56.2% of the EEZ), followed by the areas of 51-100m in depth (23.4% of the EEZ). According to RIMF statistics, the allowable capacity of exploiting marine pelagic and demersal fish in the regions near the coast can be maintained at 600,000 tons. If other marine species are included, the stable annual allowable exploiting capacity is 700,000 tons a year, lower than the output harvested annually in this region during the past years. Meanwhile, resources in offshore waters are considered large and relatively unused. Fish resources also differ depending on the geographic region. The south-east sea area provides that largest catch volume of marine products, (accounting for 49.7% of the nation-wide catch), followed by the Gulf of Tonkin (16.0%), the Central sea area (14.3%), the South western area (11.9%), emerging hills (0.15%), oceanographic pelagic fish (7.1%).

Capacity of marine fishing vessels and fleet size

After over a decade of renovation, the capacity of fishing vessels developed rapidly. In 1986, there were 31,680 fishing vessels in Viet Nam with a total engine capacity of 537,500 HP and 29,000 artisanal fishing vessels including rafts and wooden boats of 1-3 tons each. In 2002, while the estimated number of artisanal vessels remained relatively stable, the number of motorized fishing vessels has increased to 72,000 vessels with the combined total engine capacity increasing to 2.5 million HP. Of these, approximately 6000 are fitted with large engines (> 90 HP) and these constitute the offshore fleet. Other advances in the fleets (vessels with engine capacity < 45 HP) include GPS position systems (21%) echo-sounders (63%) two-way radio communication facilities (12.5%) and long-distance radio.

The fishing methods in Viet Nam are diversified and abundant both in scale and nomenclature. It is estimated that there are more than 20 fishing methods applied in Viet Nam of which can be broadly classified into six major fishing practices. According to statistics recorded at 19 localities in 1997, the structure of fishing methods are estimated as follows:

In Offshore waters (of approximately 6,000 vessels)

- Trawling is used by 34.2% of vessels
- Purse seining is used by 21.1% of vessels
- Gillnetting is used by 20.4% of vessels
- Long line fishing is used by 17.3% of vessels
- Lift netting is used by 5% of vessels
- Other fishing methods are used by 2% of vessels

In the coastal waters;

- Trawling is used by 19,227 vessels
- Purse seining is used by 16,735 of vessels
- Gillnetting is used by 4,666 of vessels
- Long line fishing (including Cau Kieu) is used by 11,612 vessels

Labour force

Until 1997, the fishing industry had 423,583 labourers, of which 309,171 persons performed the coastal fishing, and 114,412 were employed in offshore fishing.

8. An overview of the conservation status of coral reef and seagrass habitats in Viet Nam

Information on the north coast of Viet Nam was prepared by the Hai Phong Institute of Oceanology and information from southern Viet Nam was compiled by the National Institute of Oceanography. These reports to the Marine Turtle Project of Viet Nam have been summarized and combined into a single assessment of habitat in Viet Nam. As much as possible the original text has been retained. Original reports can be obtained by contacting IUCN-Vietnam Office, marineturtle@iucn.org.vn

8.1 Coral reefs

Distribution in northern Viet Nam

Corals and coral reefs in northern Viet Nam (from Mong Cai, Quang Ninh province to Haivan pass, Thua Thien-Hue province) have been surveyed from 1986 to 2002 by the Hai Phong Institute of Oceanology. Until now, 234 species, 62 genera and 14 families of hard coral (Scleractinia) have been recorded (Table 8.1). These represent about 62.5% and 77.5% of the species and genus of Viet Nam's hard corals respectively. Maps showing the distribution of coral reefs in Viet Nam are shown in Fig 8.1.

Distribution in southern Viet Nam

Coral reefs are the most biologically diverse marine habitats in Viet Nam, and over 350 species of scleractinian corals are found in South Viet Nam's coastal waters (Figure 8.1). All coral reefs in the northern half of the country are fringing reefs, and although these are also the most common reef type, in the south, the more complex coastline and the less significant impacts of rivers has favored the development of platform reefs. In particular, atolls in the Spratly archipelago enclose reefs hundreds of meters in length with high species diversity and cover. There are 28 reef areas in the coastal waters of Viet Nam, with approximately 20 of these reefs located in the southern half of the country (Figure 8.1). Generally speaking, of the five distinct marine areas of Viet Nam (1) western Gulf of Tonkin, (2) middle-central Viet Nam, (3) south-central Viet Nam, (4) southeastern Viet Nam and (5) southwestern Viet Nam. South central has the most diverse coral diversity with records of 66 hermatypic coral genera (Vo Si Tuan, 1998). The specific areas with significant reef abundance and high coral coverage include Cu

Lao Cham islands (Quang Nam Province), Van Phong bays (Khanh Hoa Province), Nha Trang bays (Khanh Hoa Province), Ninh Thuan coast, Ca Na Bay (Binh Thuan Province), Con Dao islands (Ba Ria-Vung Tau Province), Phu Quoc Island (Kien Giang Province), Nam Du and Tho Chu islands (Kien Giang Province).

Table 8.1. The distribution of genus and species and live coral coverage in some sites.

Location	Survey year	Genera (n)	Species (n)	Coverage	
				Range	Average
Tran Island	1996	25	42	-	-
Ba Mun-Saunam	1987	33	71	-	-
Co To Archipelago	2000	37	103	18.3-75.3	51.2
Thuong Mai-Ha Mai Islands	2000	34	91	12.2-45.7	31.6
Ha Long Bay	1998	44	146	5.0-65.0	34.2
Cat Ba Islands	1998	43	132	5.0-68.0	47.7
Long Chau Archipelago	1999	45	122	24.0-68.0	42.1
Bach Long Vi Island	1995	31	99	2.6-94.0	31.0
Hon Me Island	1996	20	36	-	-
Son Duong-Mui	1998	20	70	20.0-80.0	50.0
Ron Islands					
Con Co Island	1996	30	79	13.6-47.3	23.8
Son Cha-Hai Van	2001	49	129	30.0-74.0	50.5
North Viet Nam	All years	62	234	-	-
South Viet Nam	All years	66	>350	-	-
Viet Nam	All years	80	374	-	-

8.2 Exploitation status of coral reefs in Viet Nam

In general, almost all coral reefs are used and impacted to some extent by humans for a large variety of purposes. Moreover there are some fishing methods and target species that are highly exploited have become traditional employment areas for some people.

- Exploitation of coral reef species for food is a major and common aim in all reefs areas, from the mainland coast, near-shore and offshore islands. Sought after species are numerous and include all edible fauna and flora. The exploitation methods are diverse and include various forms of line fishing, netting or diving. In some areas, fisheries still use forbidden fishing methods as poisons, explosions, electricity and bottom trawling. Generally fishing effort depends on the area, for example in some areas fishing can occur all year round, while in some areas it is restricted by the seasons and usually doesn't depend on the tide.
- Exploitation to produce fine art; The major species used for art are beautiful corals, shells that have fine shape and are colorful (eg; ốc sứa (Cyrpea sp), ốc lười (Conus sp), ốc tù và (Turbo sp), ốc kim khôi (Cassis sp), ốc gai (Lambis sp), ốc bàn tay), lobsters, sea turtles, several of these species have now become rare, and in some cases endangered.
- Exploitation of coral rocks and cube shape corals to make and decorate aquariums
- Exploitation of reef species to produce medicine is still rare, and only concentrates on some of the familiar species such as sea snakes, seahorses, holothurians and algae.

8.3 Current status of coral reefs in Viet Nam

The coverage of coral reef in northern Viet Nam generally falls between 25 and 50% coverage, and is thus regarded as average following the coral reef grading criteria set out by the World Conservation Union (IUCN). Only coral reefs in Co To and Son Tra-Hai Van could be classified as good quality (between 50-70%) and Con Co classed as poor quality (23.8%).

During 1994 – 1997, 15 reef areas were been surveyed with a total of 142 study sites. The results from these surveys showed the overall condition of the coral reefs has decreased. Based on the IUCN criteria for assessing coral reefs, only 1.4 % of the total study reefs in southern Viet Nam were considered to be in excellent condition. In contrast, the number of poor reefs occupied 37.3 % and the reefs considered to be in fair and good conditions occupied 48.6 % and 31 % respectively. These data indicate that the conditions of the reefs located in offshore islands, or at the sites most distant from population centers are significantly better than those located close to the populated coastal zone. Moreover, data collected at 30 transects of monitoring done during 2000 or 2001 show the same situation of coral cover in these same reefs. Change in the trends of coral cover and coral reef communities could be assessed based on long-term monitoring in some sites (Vo Si Tuan, 2002). Fish density data show the over-exploitative situation in almost reefs. Density of Reef Check indicators is very low, often being zero, except for butterfly fish. Density of fish families measured by the LIT method described low number of economically significant groups (for food and aquarium). Fish abundance is higher in the protected areas, e.g. Con Dao National Park. For coral reef benthos, density of economic species is very low because they are very easily over-exploited. Lobster, edible sea cucumber, giant clam, triton shell, and cone shell populations are severely depleted in almost all reef areas. The monitoring data also indicated the variation in the numbers of some target species. Specifically, the dangerous increase in the numbers of crown of thorn starfish and the decline of the *Diadema* sea urchin in Nha Trang. Sea urchin numbers increased after typhoon Lynda (Nov. 1997) and then decreased after the bleaching event in Con Dao in 1998. Giant clam density in Con Dao waters is decreasing.

8.4 Seagrass beds

Distribution in northern Viet Nam

Up until now, 9 species belonging to 3 families of seagrasses have been recorded in northern Viet Nam, making up 60% of the total seagrasses in Viet Nam (Table 8.2). Maps showing the distribution of coral reefs in Viet Nam are shown in Fig 8.2

In northern Viet Nam, due to the usually high turbidity of near shore coastal waters (from 0.7 to 3.0 m deep) especially in and around estuaries, sea-grasses only distribute in shallow locations, normally from middle tide area to 3-5m deep. Only *H. decipiens* has been recorded in deeper waters (28 to 30m).

Distribution of seagrass beds in southern Viet Nam

In southern waters of Viet Nam, seagrass beds have been observed in the shallow coastal waters, lagoons, bays, estuaries and islands. Similar to the north, although some seagrass species such as *Halophila ovalis* and *Halophila decipiens* can grow in deeper waters (10 to 15m in depth), the highest abundance of seagrasses occurs in the littoral and sublittoral zones from 0.5 to 5m in depth. Seagrasses often form monospecies meadows, or mixed meadows on diverse substrates include mud, muddy sand, sand or

sand mixed with dead coral pieces. According to recent data, the total area of seagrass beds in south Viet Nam (from Da Nang to Kien Giang province) is approximates 4,000 ha with the most important areas consisting of Binh Dinh lagoons (Binh Dinh Province), Khanh Hoa bays and lagoons, Ninh thuan inshore waters, Phu Qui islands (Binh Thuan province), Con Dao islands (Ba Ria-Vung Tau province) and Phu Quoc island (Kien Giang province).

Table 8.2. Species composition and distribution of seagrasses in the Northern Viet Nam

Taxon	Distribution
Fam. Hydrocharitaceae	
<i>Halophila beccarii</i> Asch.	Quảng Ninh, Hải Phòng, Nam định, Thanh Hóa, Thừa thiên-Huế
<i>H. decipens</i> Ostenf	Quảng Ninh, Hải Phòng
<i>H. ovalis</i> (R.Br.) Hooker	Quảng Ninh, Hải Phòng, Hà Tĩnh, Quảng Bình, Quảng Trị, Thừa thiên-Huế
<i>Thalassia hemprichii</i> (Her.) Ashch	Thừa thiên-Huế
Fam. Cymodoceaceae	
<i>Ruppia maritima</i> Lin	Quảng Ninh, Hải Phòng, Thái Bình, Ninh Bình, Thanh Hoá, Nghệ An, Thừa thiên-Huế
<i>Halodule pinifolia</i> (Miki) Den Hartog	Hà Tĩnh, Quảng Bình, Thừa thiên-Huế
<i>H. uninervis</i> (Forsk.) Asch	
Fam. Zosteraceae	
<i>Zostera marina</i> Lin.	Quảng Bình, Quảng Trị, Thừa thiên-Huế
<i>Z. japonica</i> Asch.	Quảng Ninh, Hải Phòng, Ninh Bình

Density in northern Viet Nam

Data on the density of seagrasses in the northern Viet Nam was primary surveyed in April and May 1997 (Table 8.3).

- The biomass of *Zostera japonica* varied between study sites: in Đầm Buôn (Quảng Ninh Province), the coverage reaches 30 to 80 %, with biomass ranging from 880 to 2336 fresh gram/m²; in Gia Luận (Hải Phòng) the coverage is 15 to 65 %, with biomass ranging from 144 to 1472 fresh gram/m².
- The biomass of *Z. maritima* are relatively similar between sites: in the Gianh River mouth, Thanh Thạch, Nhật Lệ river mouth (Quảng Bình Province), the coverage reaches to 50-100 %, and biomass ranges from 1500 to 4000 fr.gr/m²; While in the Tùng River mouth (Quảng Trị Province) the coverage averages 80-88 %, and biomass ranges from 2000 to 3600 fr.gr/m².
- Three seagrass species in Lăng Cô lagoon (Thừa thiên-Huế) are similar in coverage but differ with regard to biomass.

Table 8.3. Coverage (%) and masses (fresh gram per square meter) of seagrass in northern Viet Nam

Locations	Name of species	Coverage	Mass
Đầm Buôn (Quảng Ninh)	<i>Zostera japonica</i>	30-80	880-2336
Gia Luận (Hải Phòng)	<i>Zostera japonica</i>	15-65	144-1472
	<i>Halophila ovalis</i>	-	560-976
Gianh estuary	<i>Zostera maritima</i>	50-100	1600-3600
Thanh Thạch (Quảng Bình)	<i>Zostera maritima</i>	70-90	1600-4000
Nhật Lệ estuary	<i>Zostera maritima</i>	50-80	1400-4000
Tùng estuary (Quảng Tr i)	<i>Zostera maritima</i>	80-100	2000-3600
	<i>Halophila ovalis</i>	30-40	120-220
Lăng Cô (TT-Huế)	<i>H. pinifolia</i>	50-60	1680-3880
	<i>Thalassia hermerichi</i>	35-50	200-5000

Utilization status in northern Viet Nam

People in coastal areas of Quảng Ninh, Thái Bình, Thanh Hóa, Quảng Trị, Thừa Thiên - Huế exploit seagrass species such as *Z. marina*, *Z japonica*, *Ruppia maritime*, *Halodule uninervis* to produce fertilizer for rice, beans, potatoes and fruit trees. In Thừa Thiên-Huế, local people exploit about 100 thousand tons of seagrasses every year to produce fertilizer and cattle and poultry feeds. In others place, people use seagrass to feed fishes.

Current status of seagrass beds in southern Viet Nam

The surveys show that seagrass beds in southern Viet Nam are common with high diversity of species. However, there are only some areas with large-scale seagrass beds, eg; the coastal waters of Khanh Hoa province, Phu Quoc Island, and the Con Dao Islands. Coverage of most seagrass meadows are considered high with different dominant species among areas. For example, the cover in Phu Quoc of *Enhalus acoroides* ranges 51- 75% with a density of 70 – 100 shoots/sq.m, *Thalassia hemprichii*: 51 – 75% with a density of 450-570 shoots/sq.m. The area dominated by *Halophylla ovalis* often have low cover but high density because of small size of the individual plants, eg. 5-15% and 2200-5500 shoots/sq.m at Con Dao.

In recent years, significant declines in the seagrass abundance have been observed. Some observations show decline of 20-30% of seagrass in Con Dao (Nguyen Xuan Hoa & Tran Cong Binh, 2002). There are also losses of approximately 10ha in My Giang and approximately 20% seagrass declines area in the Thua Trieu lagoon (Khanh Hoa).

9. Summary of threats to coral reef and seagrass areas in Viet Nam

Information on the north coast of Viet Nam was prepared by the Hai Phong Institute of Oceanology and information from southern Viet Nam was compiled by the National Institute of Oceanography. These reports to the Marine Turtle Project of Viet Nam have been summarized and combined into a single assessment of habitat in Viet Nam. As much as possible the original text has be retained. . Original reports can be obtained by contacting IUCN-Vietnam Office, marineturtle@iucn.org.vn

The recent treats to coral reefs and coral reefs have been mentioned in some recent publications (Vo Si Tuan, 1998, Dang Ngoc Thanh & Vo & Truong, 1997, Nguyen Huu Dai et al, 2000) and RRA interviews in the framework of ADB 5712-REG project.

Over-fishing, especially non-selective and illegal forms from poisons (cyanua), explosives and fine mesh nets has decreased somewhat but is still serious in many provinces where destroyed coral reefs have been observed everywhere along the coast. Other forms of non-selective fishing such as sluice traps, electric fishing, gill nets and the traditional trawling net continue to take their toll on marine fisheries and destroy most coastal habitats. Seagrass beds are also cleared by excavation to collect benthic molluscs. Data from the live fish trade are difficult to determine, but fishermen illegally take the fish and sell them at sea to larger ‘tenders’ for onward transport. Capture methods employ divers and cyanide poisoning to stun the fish, which in turn kill coral and other biota outright.

Much of the seafront is being physically developed as tourism areas. Marine and coastal tourism is driving a new demand for souvenirs. The wildlife trade is largely uncontrolled in Viet Nam, and many endangered or protected marine species can be found in local markets, particularly at large tourism centers such as Ha Long Bay

(Quang Ninh), Cat Ba (Hai Phong), Vung Tau, Nha Trang. Marine turtles, principally Green and Hawksbill turtles, have been heavily hunted for tourist souvenirs with the centers of trade at Nha Trang, Vung Tau and Ha Tien. Fewer and even smaller animals such as molluscs, sea stars and urchins are being taken every year and are openly sold to tourists in great numbers in the major coastal recreational centers. Coral, particularly varieties of *Acropora*, are most sought after for the tourist trade. Potentially large numbers of coral and coral reef fish species are also collected for inland and export market of aquaria trade.

The urban development and expansion of industry along the coast is beginning to add to the pollution load, particularly poisonous heavy metal waste that is often released into the sea without attempt to reduce toxicity. The expansion of ports and unregulated bilge cleaning is now becoming a more frequent source of coastal pollution. Eutrophication is beginning to become serious in some areas. Algal blooms have been observed with more frequency in the coastal waters of Binh Thuan province, Van Phong Bay (Khanh Hoa province) and at the mouth of the Dong Nai River. Construction also causes direct impacts to coral reefs and seagrass beds by occupation of shallow areas and sediment discharge to the habitat. The coastal waters of Viet Nam have always suffered from the influence of large rivers making turbidity high and visibility low. Human activities make increase impacts by sedimentation to coral reefs and seagrass beds. In northern Viet Nam, deforestation in riverheads is a cause of rising sedimentation in some seagrass beds; for example, *Halophila ovalis* beds around Tuần Châu Island and *Z. japonica* in Đầu Gỗ area (Hạ Long Bay, Quảng Ninh).

Coral reefs and seagrass beds in South Viet Nam also face threats of natural impacts. Typhoon Lynda (1997) destroyed large areas of the habitats in Con Dao (Vo Si Tuan, 2002, Nguyen Xuan Hoa, Tran Cong Binh 2002). Bleaching event in 1998 causing serious damage for some reef areas. While in northern Viet Nam, floods in Central Viet Nam (2000-2001), El-Nino in 1997-1998, typhoons and the outbreak and high abundance of crown thorn starfish (*Acanthaster planci*) have affected seagrass and/or coral reefs in some areas.

10. Current research and management initiatives

10.1 DANIDA/CMS funded initiatives 2001 to 2002

Date	Activity	Outcomes
June 2001	Danida/CMS/OC/NFWF/NMFS Funded Workshop on sea turtle biology and conservation	50 participants from Government, NGO and International organizations; Workshop proceedings to be published early 2003 by IUCN
December 2001	1 st Round Table meeting on sea turtle biology and conservation	Papers and invited contributions will be incorporated in the proceedings of the 1 st national workshop
February 2002	DANIDA funded Marine Turtle Conservation Project officially starts (14month project)	Five components, involving three NGOs (IUCN, WWF and TRAFFIC) and Ministry of Fisheries. See below for more specific accounts of each NGO
September 2002	7 th COP CMS (Bonn Convention)	IUCN and CMS supported 3 Vietnamese Government Officials to attend the meeting; The Government of Viet Nam announced its intention to sign CMS by the 8 th COP.
October 2002	1 st meeting of the Marine Turtle National Project Steering Committee	Results from WWF, IUCN and TRAFFIC surveys were presented. Delegation of tasks to complete the projects objectives.
November 2002	1 st Workshop for the Development of a National Action Plan for Marine Turtle Conservation in Viet Nam	A comprehensive list of issues and recommendations were drawn up and discussed by 60 participants from Government, NGO and Research Institutions.
May 2003	Expected completion of the National Action Plan for marine turtles in Viet Nam,	

10.2 MoFI activities funded by the DANIDA Project

1. Between June and September 2002, with the assistance of IUCN, comprehensive surveys were undertaken along the entire Vietnamese coastline to assess the distribution, abundance and threats to marine turtles in Viet Nam. This report has been completed and has been circulated for comments by interested parties (see section 4 of this report for a summary).
2. Production of the National Action Plan has begun and it is estimated that it will be completed by June 2003.
3. An Educational consultant has been employed to work with IUCN/TRAFFIC and WWF staff to design a “sea turtle” educational package for school children. This will be completed by early 2003 and used in schools in mid 2003.

10.3 WWF supported activities

1. WWF began supporting the Con Dao National Parks marine turtle project in 1995 and have contributed support annually.
2. In 2001 WWF provided funds to the Department of Science, Technology and Environment (DoSTE) in Ninh Thuan Province so they could begin baseline surveys of nesting turtles on the beaches adjacent to the Nui Vhua Nature Reserve. In 2001 23 green turtle nests were recorded and protected by project staff. In 2001 one green turtle nest was found and protected. Funding for this project is guaranteed for 2003, under the DANIDA funded project.
3. In 2002 WWF began a marine turtle project in Kien Giang Province. As of the end of 2002, one workshop in Rach Gia for local Government employees was held to provide background information on marine turtle conservation and biology. Three marine turtle related surveys have been completed on the island (a) TRAFFIC-trade survey, (b) WWF marine turtle and dugong distribution

survey and (c) IUCN baseline survey. Additionally, MoFI staff traveled to the offshore island of Tho Chu to initiate marine turtle activities in this remote location.

4. WWF have produced a childrens story book and marine turtle identification poster for general distribution, and their staff are working closely with IUCN and TRAFFIC to develop a raising awareness strategy for marine turtles in Viet Nam.

10.4 TRAFFIC activities funded by the DANIDA Project

1. Between June and September TRAFFIC staff and consultants conducted a comprehensive survey of the trade of turtle products in Viet Nam. The report has been finalized and presented to the Vietnamese Government (see section 4 of this report).
2. TRAFFIC staff are currently working with IUCN and WWF to design an enforcement leaflet that aims to raise the awareness of enforcement agencies in Viet Nam.

10.5 Con Dao National Park Nesting Beach studies

A systematic survey of nesting turtles has been running on up to five of the 15 Islands within the Con Dao National Park since 1994. Data from 1994 to 1998 was obtained through Nguyen Thi Dao (1999) and data from 1999 to 2001 was obtained with permission from the project sponsors, WWF-Indochina Program. These data are summarised in Table 10.1.

Table 10.1. Summary of the green turtle nesting surveys at Con Dao National Park (Ba Ria - Vung Tau). * incomplete survey, 1 = number of nests/number of females (average = 2.9 clutches per year), 2 = number of nests/2.9. Data from 1994 to 1998 (Nguyen Thi Dao1999) and from 1999 to 2001 (WWF unpublished data).

Year	Number of nests	Number tagged females	Average clutches per year¹
1994*	338	117 ²	-
1995	905	312 ²	-
1996	358	123 ²	-
1997	780	269 ²	-
1998	630	217 ²	-
1999	988	283	3.5 ¹
2000	584	227	2.6 ¹
2001	777	295	2.6 ¹
Average	670	230	2.9

The remaining data is currently being analysed for other reproductive trends and life history characteristics.

10.6 Research Institute for Marine Fisheries: sea turtle projects

Under the leadership of Professor Pham Thuoc, RIMF staff undertook a baseline survey of marine turtle distribution in Viet Nam in 1999. This report formed the base for the MoFI/IUCN survey in 2002. Two RIMF staff attended the SEASTAR2000 conference in Bangkok in December 2002. Currently RIMF are seeking funding to support (1) a satellite tagging project and (2) a genetic project to identify management units. RIMF have also nominated themselves to host the 2003 SEASTAR meeting.

10.7 National Institute of Oceanology

1. NIO staff undertook a survey of marine turtles in the Khanh Hoa Province, this report includes data on distribution, abundance and threats with the Province.
2. NIO staff are actively involved with assessing aspects of the coastal habitats, including coral reef systems, seagrass pastures and mangroves as they relate to marine turtles and fisheries management.

10.7 Hai Phong Institute of Oceanology

1. HIO staff are actively involved with assessing aspects of the coastal habitats, including coral reef systems, seagrass pastures and mangroves as they relate to marine turtles and fisheries management.

10.8 Other activities as they relate to the IOSEA MoU, Conservation and Management Plan

Objective 1.

Programme 1.1 – Completed, and a series of recommendations have been delivered so that future studies can fill in the gaps (see MoFI/ IUCN and TRAFFIC survey reports).

Programme 1.2 – Underway, Discussions have begun (NAP workshop and Steering Committee meeting) to develop best management practices. Raising awareness campaigns are under way and organised for 2003.

Programme 1.3 – Underway, These specific socio-economic areas have been identified, especially as they relate to trade. Discussions have begun between relevant organizations to address the issues.

Programme 1.4 – Early stages, Following initial research of TEDs by RIMF and SEAFDEC, little work has been conducted. However, recent talks with RIMF staff (10 Jan 2003) have identified specific areas that pilot studies might be identified.

Programme 1.5 – subsections a), b) completed, Decree 48/2002/N§-CP of April 22, 2002 and detailed report by TRAFFIC address these points.

Objective 2.

Programme 2.1 - subsections a) completed, see IUCN baseline survey and other recent documents listed in that publication. **Subsection b) and c) underway**, Marine protected areas have been established in Hon Mun (Khanh Hoa Province) in 2000 and will be established in Cu Lao Cham (Quang Nam Province) from March 2003, and plans have been considered for Cat Ba Island (Hai Phong), Phu Quoc (Kien Giang Province) and Co To (Bach Long Vi; Quang Ninh Province).

Programme 2.2 – subsections c) and d), HIO and NIO have been conducting extensive surveys of seagrass, mangrove and coral reef habitat distribution and quality over the last 10 years. Seagrass restoration trials have begun at these institutes.

Objective 3.

Programme 3.1

Subsection a) completed by IUCN and MOFI.

Subsection b) Completed and being continued by Con Dao National Park and WWF

Subsection c) Has not been initiated, however a funding source has been identified

Subsection d) One satellite transmitter was attached in 1999 to a green turtle at Con Dao. More funding to support this has been applied for.

Subsection e) Vietnam does not currently have sufficient data to conduct population dynamics and survival rates, beyond summaries of nesting females at Con Dao since 1995.

Subsections f), g) and h) Have not yet been instigated in Vietnam

Programme 3.2

Vietnam Government officials have attended meetings in Bonn (CMS) (3 officials travelled), and Bangkok (SEASTAR) (2 persons from RIMF attended) as initial steps towards international collaboration. Tentative plans have been drawn up by RIMF in an effort to host the 2003 SEASTAR meeting.

Programmes 3.3 and 3.4 – Are areas that have been identified in the draft NAP as priority areas, and in some cases, such as the standardisation of data collection, initial work has begun. Several (approximately 10) Vietnamese Government and Non-Government staff will attend the Kuala Lumpur Sea Turtle Symposium in March 2003.

Objective 4.

This objective is in stage one: An Educational Consultant has been employed on a short contract at IUCN to develop and Education package for schools, this is due for completion by April, and the package used by teachers in late 2003. WWF have funded the production of a children's book and poster.

Objective 5.

This objective is in early stages: Vietnam is signatory to CITES, and work has begun to stem the illegal trade of marine turtle products domestically and internationally. MoFI is striving to have turtle products off the shelves by 2004.

A three person Vietnamese delegation went to the 7th COP (CMS) in Bonn to discuss Vietnam's accession to CMS. It is the intention of the Vietnam Government that they will sign CMS prior to the 8th COP.

A national action plan for the protection of marine turtles in Vietnam is being prepared by MoFI under the guidance of the Project Steering Committee and will be completed by May 2003.

Objective 6.

This objective is in early stages:

- Nominations have been assessed for Vietnam's representative on the Advisory Committee
- Funding was secured to initiate these initial steps (from DANIDA) and early steps have been taken to obtain additional funding.

11. Figures



Figure 8.1 Coral Reef distribution and monitoring sites in Viet Nam, Map provided by NIO

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APPENDIX I

- **Paragraph 3, Article 5, Decree 48-CP**, stipulates:
 - (i) A fine of VND 50.000 to 100.000 per kg of harvested fishery products shall be imposed on acts to exploit those aquatic organism species included in the list of species that their exploitation is banned.
 - (ii) A fine of VND 20,000 to 30,000 per kg of harvested fishery products shall be imposed on those who involve in the transport, processing and consumption of these species. In addition to the fines, the offenders shall be forced to release aquatic living organisms back to their living environments; the fishery products harvested, or being transported, processed, and consumed shall be confiscated

- **Paragraph 1, Article 4, Decree 48-CP:**
 - (i) A fine of VND 2.000.000 -5.000.000 shall be imposed on, and exhibits shall be confiscated from, those whose acts to commit violations: to destroy submerged rocks, coral reefs, submerged vegetation beds; illegal demolition or construction of submerged and/or floating works within waters;
 - (ii) A fine of VND 2.000.000 - 5.000.000 shall be imposed on those who pollute one 1 hectare of water.

- **Paragraph 1, Article 6, Decree 48-CP**, provides for a fine of VND 200.000 - 1.000.000 that shall be imposed on any acts of fisheries without the operational permit issued by the authority.

- **Paragraph 1, Article 7, Decree 26-CP:** stipulates a fine of VND 500.000- 1.500.000 that shall be imposed on the following cases:
 - (i) Any exploitation of biological resources that are taken not in accordance with stipulated seasons, locations, methods and use of destructive fishing facilities leading to biodiversity loss and unbalanced ecosystems.
 - (ii) Use and exploitation of protected areas without permits issued by the authority;
 - (iii) Use and exploitation of protected areas in ways against regulations provided for in the permits. A larger fine of VND 30.000.000 if any violation is re-committed or more seriously committed (Paragraph 2 of this Article).

- **Paragraph 1, Article 8, Decree 26-CP** stipulates that any acts to exploit and trade endangered and rare species of fauna and flora included in the lists of the ministries of Agriculture and Rural Development and Fisheries, shall be punished by a fine of VND 500.000 to 2.000.000 for the first offence, and of up to VND 30.000.000 if the circumstances are more serious but less than the case that a criminal accountability is investigated.