

# The research, conservation and management of sea turtles in Viet Nam

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## ABSTRACT

It is recognized that there are five species of sea turtle to reside in Viet Nam. However, there are only three species often nest on beaches. Major nesting beaches are concentrated on offshore-islands in the Tonkin Gulf, Central Coasts and Islands in the Southern part of Viet Nam. Our results showed that locals have harvested nesting turtles and approximately amount of 50% of eggs for each species during nesting season, with the exception of Tho Chu Island, Con Dao National Park and Nui Chua Natural Reserve Area. Continuation of those threats will lead to the extinction of sea turtles in Viet Nam in the forthcoming decades. The current threats for marine turtles are including: (i) the incidental and opportunistic capture by fishermen and locals; (ii) the direct take of nesting females and their eggs at beaches; (iii) the urbanization, illegal trade issues, sand mining, tourism development and marine debris... The largest risk for marine turtles are bottom trawlers, especially in "Cao bay" trawling with big mesh-size net, gillnet operation, long-line net with several hook operators and diving activities. In general, most green, hawksbill and olive ridley turtles are captured by those methods. The immediately taken action to preserve sea turtles and other wildlife, based upon the collaboration between Local, National Sectors and Regional Organizations are the best choice.

**KEYWORDS:** loggerhead, olive ridley, leatherback, green and hawksbill turtle, Tonkin Gulf, national park, reserve area.

## INTRODUCTION

The seawaters and remote islands of Viet Nam are recognized as a critical habitat for sea turtles of the world. Research, conservation and management activities on sea turtles have been conducted in coastal provinces of country as well as in other countries of ASEAN/SEAFDEC members. There are 5 species, which had been found in Vietnam Seawater and they have been threatening species (Hamann Mark, 2002).

Since early 1998, the Ministry of Fisheries has appointed the Research Institute for Marine Fisheries (RIMF) as National Institution taking responsibility for research activities and proposing the general framework in managing and protecting sea turtles in Viet Nam.

## OBJECTIVES

Our program objectives on the sea turtle conservation are:

- ▶ To facilitate in regarding to the research, conservation and management for sea turtles between ASEAN/SEAFDEC Countries and Viet Nam,
- ▶ To enhance the common awareness in term of protecting the sea turtles and their habitats,
- ▶ To introduce some advanced technologies in monitoring,

controlling and surveying for sea turtle resource with integrated coastal zone management approaches,

- ▶ To primarily set-up the National Database as well as National Action Plan for Sea Turtle Conservation and Management beyond 2010.

## RESULTS AND DISCUSSION

### *The distribution of sea turtles*

### *Nesting season and hatch rate*

Annually, hundred of sea turtles went to shoreline for nesting on sand beaches. Nesting season for sea turtles differs among different species. In general, nesting season lasts from March to November. Con Dao (Ba Ria-Vung Tau), Tho Chu (Kien Giang) and Nui Chua (Ninh Thuan) Reserve Park are the main nesting sites and so on.

Nesting behaviour of sea turtles showed that turtles nest at nighttimes. Hatch rate of sea turtles depends on the interaction of numbers of factors, such as salinity, humidity, temperature, gas flow, rainfall, tidal inundation, erosion, and predation. The hatch rate ranged with average of 67,93% during the period of 1994 till 2003 (Table 2; Figure 2).

Table 1: Nursing grounds of sea turtles found in Vietnam

No	Nursing ground	Sea turtle species
1	Con Dao Archipelago (including 14 places)	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i> , <i>Caretta caretta</i>
2	Nui Chua Natural Reserve Area (Ninh Thuan)	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i> , <i>Lepidochelys olivacea</i>
3	Quang Ninh (including Vinh Thuc Island and Minh Chau beach)	<i>Chelonia mydas</i>
4	Bach Long Vi Island (Hai Phong)	<i>Chelonia mydas</i>
5	Spratly Archipelago	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i>
6	Phu Quy Island	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i>
7	Phu Quoc Island	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i>
8	Tho Chu Archipelago	<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i>

Table 2: The hatch rate of Sea turtles in 1994 -2003.

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Hatch rate (%)	19.92	35.32	74.37	75.29	78.32	80.31	81.15	84.38	73.23	76.99

Source: (RIMF\_MoFI, WWF and IUCN, 2003).

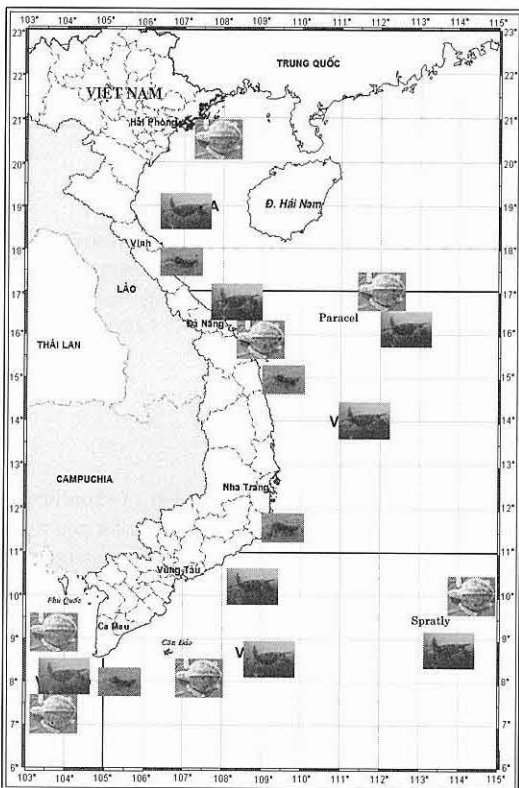


Fig. 1. The Map of distribution for Sea Turtles in Viet Nam Seawater

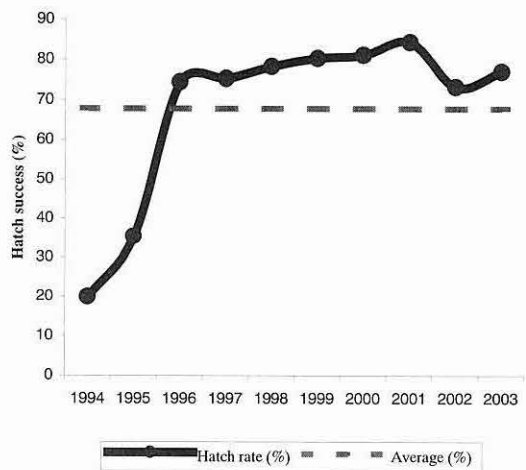


Fig. 2. Hatch rate of the Sea Turtle in Viet Nam

**Threats to marine turtles in Viet Nam:**

At all stages of their life cycle marine turtles are subject to various impacts that may combine their survival and 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 previous and recent researches and surveys, which of these threats is presented below (Table 3).

Table 3. Potential human-related impacts/threats associated with species marine turtle in Viet Nam. 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 Development	✓	✓	?	×	?	?	✓	×	×
Illegal egg collecting	✓	✓	✓	?	✓	?	✓	✓	×
Incidental catch - lines	✓	✓	✓	?	✓	?	×	×	✓
Incidental catch - gill nets	✓	✓	✓	?	✓	?	✓	✓	✓
Incidental catch - Longlines	✓	?	?	?	✓	?	×		✓
Incidental catch - trawl nets	✓	✓	✓	?	✓	?	✓	✓	✓
Ingestion of, or Entanglement in, marine debris	?	?	?	?	?	?	?	?	?
Illegal direct take - in Viet Nam	✓	✓	✓	?	✓	?	×	×	×
Direct take - overseas	?	?	?	?	?	?	?	?	×

Table 4: The number of released hatchlings during the period of 1994-2003.

Year	1994	1995	1997	2001	2002	2003	Total	Average per year
Hatchling (individual)	6,000	28,500	70,000	90,000	140,450	161,210	496,160	82,693

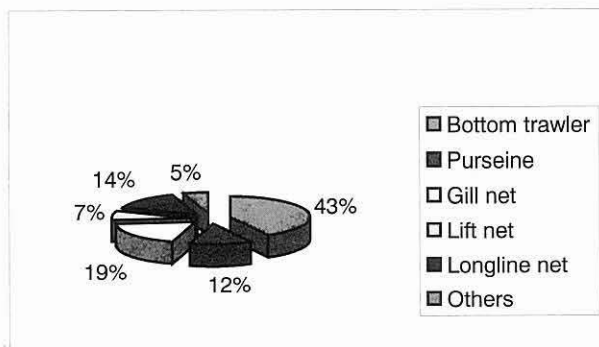


Fig. 3. Percentage of fishing gear in fisheries sector of Viet Nam

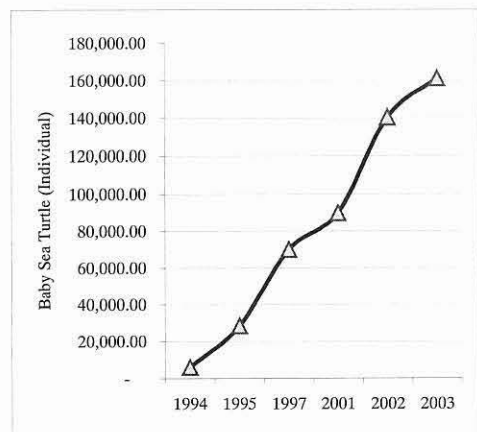


Fig. 4. Amount of baby sea turtle released into Seawater

### *Direct and indirect take of nesting and foraging turtles and eggs*

Interview-based studies were carried out in 1998-2002 by RIMF and 2002 by IUCN\_VN, in Thanh Hoa (Tonkin Gulf), Quang Nam, Da Nang and Khanh Hoa provinces (Central of Vietnam), Phu Quy, Con Dao, Tho Chu and Phu Quoc Islands (Southern part and Gulf of Thailand). The results showed that almost marine turtles were incidentally caught by various types of fishing gears especially by bottom trawls, gillnets, long-line and sometime by purse seine. However, number of marine turtles incidentally caught by fishing gears as by-catch in Viet Nam was estimated to be less or more than 30 individuals per year (Mark Hamann *et al.*, 2002).

### *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. However, data from a joint (IUCN, RIMF and MoFI, 2002) survey indicates that most of the eggs harvested in the non-protected locations. It is clear that Vietnamese nesting populations cannot sustain this practice. In addition, fishing techniques such as longline fishing and gill nets, have been adapted or used to. Hence most of the foraging turtles are caught accidentally in fishing gear. However, the opportunistic capture of both green and hawksbill turtles by fishermen want diving for other economically important marine products such as molluscs 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. The fishing sector in Vietnam has grown considerably over the last 10 years. By 2002, while the number of artisan vessels has remained similar, the number of registered vessels had increased to 79,000. Most of these (69,000) work in the coastal zone. Of these registered vessels (Source: Research Institute for Marine Fisheries-RIMF):

- 42.3% are registered as bottom trawlers
- 12.3% are registered as purse-seining vessels
- 19.2% are registered as gill net vessels
- 7.0% are registered as lift netting
- 14.2% are registered as long lining vessels
- 5.0% are registered as other.

Fishers using SCUBA, Hookah or free divers, dive around the coral/rocky reef areas, usually around islands. In some locations these divers attempt to catch fish using cyanide, however, most are diving to collect commercially valuable species of finfish, mollusc and crustacean such as lobster and abalone.

### *Incidental 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 accidentally caught in nets and brought on boat alive. The fishing methods of most concern are, (1) bottom trawling, (2) drift and gill nets, and (3) longlines.

RIMF (2002) reported that between 1993 and 2001 there were the average of 69,000 registered vessels operating within the waters of total 23 coastal provinces in Viet Nam. Of the registered vessels operating, nearly 42.3% are bottom trawlers and 19.2% are gillnetting vessels. Survey data compiled by MOFI, RIMF and IUCN indicates that turtles are caught as bottom trawl or gill net bycatch in 15 of targeted provinces, with catch rates varying from one turtle per province per year up to 10 of turtles per year (Pham Thuoc *et al.*, 2002).

### *Trade issues*

Several green turtles and hawksbill turtles are illegally sold for the production of stuffed turtles or shell products (Thomson, 2002). This trade has been reported on by several authors (Baird, 1993; Duc and Broad 1995), and although it is difficult to ascertain actual numbers of turtles that are killed each year, or the rate in which products turn over in stores, the number of products for sale with significant numbers of turtle shell products being sold to international and domestic tourists. While most olive ridley, leatherback and loggerhead turtles that are killed, indirectly or directly, are eaten by fishers or sold for food (Baird, 1993).

### *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 has been an increase in 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, and obstruction or by degrading the foraging or nesting habitats, 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 to constitute the largest non-by-catch or consumptive threat for marine turtles in Viet Nam. Marine debris 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 sea grass and mangrove habitats have experienced decades of clearing, harvesting, sedimentation and other anthropogenic impacts. Considerable efforts have been made in recent years by various Government and Non-Government Organisations to stop these destructive fishing operations, to promote the suitable use of marine resources and coastal habitat protection (RIMF).

#### *Impacts to nesting turtle habitat*

##### *Sand mining*

It is unknown whether current sand-mine operations have impacted upon nesting distributions in Minh Chau and Quan Lan Island, however, if the mining area is extended to the beaches where nesting currently occurs (Son Hoa) threats to the stability of the nesting beaches are inevitable. Along the mainland coast sand mining exists in numerous areas, however it is unknown whether any conflicts with marine turtle nesting beaches exist. Continued marine turtle surveys in Phu Yen and Khanh Hoa provinces will be required to determine if any negative impacts are likely along those beaches.

##### *Urbanization and 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. Many mainland beaches in Viet Nam have extremely high levels of marine debris. Much of this debris consists of 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.

##### *Management activities*

##### *National and NGO programs*

In 1995, the Programme "Salvation of Sea Turtles in Vietnam" has been launched and supported by WWF Indochina. Observations on nesting behaviour of marine turtles have been conducted during reproduction period in Con Dao Island. Nesting on nesting sites in Con Dao

are recorded and marked, and those being threatened be washed away by wave should be removed to safe sites. Nearly, emerged hatchlings are rearing in tanks for period of time then is released to sea. However the baby turtle in 1996, 1998, 1999 and 2000 are not yet statistically completed and missed. Present research has been conducted in relation to sea turtles in Viet Nam. The topic titled "Study on marine turtles resources", to determine measures to protect and develop their resources in seawaters of Viet Nam since 1998 only and with very limited budget granted by Ministry of Fisheries of Viet Nam. The main objectives of the study are as follows:

- To estimate the abundance and distribution of sea turtles.
- To study on tagging, nesting behaviour and biology.
- To study on affect of fishing gears on sea turtles.
- To establish sanctuaries.

On the other hand, activities on conservation of sea turtles in Con Dao have been carried out since 1995 with assistance of IUCN VN and WWF Indochina in both technical and financial terms.

Turtles, dugong, sharks and fish rays are not wanted in prawn trawl nets. Turtle Excluder Devices (TEDs), which reduce those target in terms of 'bycatch', but improve the value of the prawn catch. TEDs are metal grids placed inside the trawl net, which block the entry of larger sea-life and allow prawns to pass through. However, TED implementation has not been applied yet in Viet Nam.

With the help of governmental agencies, RIMF coordinated with SEAFDEC/TD developed the Juvenile Trash Excluder Device (JTED). It now requires that JTED be encouraged for using on Swallowed Fishery Operating in order to minimize juvenile mortality. During the period of 9-15th May 2001, JTEDs introduced into Viet Nam in collaboration between SEAFDEC/TD and RIMF. The experiment and demonstration were carried out at Cat Ba bay at Hai Phong City. The result had been less or more successful. Fishing boats, which installed with a JTED with 3 distances of bars, included of 20, 30 and 40 cm interval (see more detailed in SEAFDEC/RIMF report concerned). Those results also showed that 28 trial hauls with 3 different bar distances has not been found the best distance of bar. It may have been caused by too small targets as well as is not enough haul of trial. However, those rigid sorting grids JTEDs have higher separating performance than rectangular and semi-curve ones for release juvenile and trash fishes. The highlight issues are still thinking about how much the survived rate of juveniles after escaping of JTEDs that is not known (Nguyen Phi Toan *et al.*, 2001).

Based on the previous results, RIMP staffs

had carried out another JTED trial operations in the South of Viet Nam. This trial lasted 2 months from September till October, 2003 in the outermost of buffering Zone at Con Dao National Park to reassess the survived rate of Juveniles. Generally, the result showed that the percentage of the rate of Juveniles escaped is 20% higher than it was in 2001 (Nguyen Phi Toan personal information unpublished).

Tagging activities have been also initially conducted since 1998 especially on Green Turtle, Hawksbill in some coastal areas at Viet Nam, especially at Con Dao National Park in the collaborative program among SEAFDEC member countries as well as WWF Indochina project for the sea turtle conservation (Nguyen Duy Thuong, 1999).

Satellite telemetry of marine turtles has been proven to be a valuable tool for initiating conservation awareness programs in local communities and communicating that management of marine turtles is the responsibility of numerous user groups from a variety of agencies and locations. A project using modern satellite telemetry is initiated by WWF Indochina, NOAA at Con Dao National Park to increase the awareness and understanding about marine turtle migration. This primary allowed Con Dao NP staffs to access information and follow the track of the turtle as she migrates back to her foraging area.

However, the difficult problems being faced in research and conservation of marine turtles in Viet Nam are shortage of financial support, lack of training opportunities, insufficient knowledge to technology and its applications, etc.

#### *Some Conservation Activities at Con Dao National Park:*

- 1994-2003: It is recognized that On 5 Island (rookeries), there are 2082 Sea Turtles for nesting, which included 4 Hawksbill.
- 8/1998 till 2003: there are 1230 turtles had been tagged by SEAFDEC tags as well as several tags had been made by Con Dao National Park.
- 1995-2003, 376.680 hatchling of 6252 egg clutched had been released into sea.
- Two green turtles had been used in terms of Satellite tracking studies to determine their pathway and foraging ground at southern part of VN Seawater. Unfortunately, a green turtle lost PTT with its ID: TE 19590 (USA) at Hon Cai Lon Island. Another one attached PTT on 3rd July 2001. It surfaced during 8 day and moved to nearby Vung Tau. It travelled total period of 30 day and nesting on Phu Quy Island, which is far from the started point of 342 km (Con Dao report, 2003).

#### **RECOMMENDATION**

There is a strong urge to provide the resources necessary to enforce the prevention of trade in sea turtle products. It may be building on experience and knowledge gained by other ASEAN/SEAFDEC nations and continuing research and evaluation in terms of useful TED's and JTED's in the Vietnamese trawl fisheries.

It is strongly urged to collect baseline biological data on foraging area populations. If implemented, this would be the first systematic foraging ground study as well as to

conduct baseline surveys of sea turtle distribution, abundance, status and threats in our region.

It is strongly urged to continue supporting the extremely valuable nesting beach tagging studies and uses modern satellite telemetry techniques to increase the awareness and understanding of local Vietnamese community about sea turtle migration at Con Dao National Park, Nui Chua (Ninh Thuan) Reserve Area and Tho Chu Island (Kien Giang). There is a need of enhancing awareness and developing the suitable Eco-Tourism Activities as well as banning the illegal market of Sea Turtle businesses. In addition, the coordination with the Regional and International Organization in order to protect the Sea Turtles and other wildlife is very necessary.

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