

## **Nesting incidence, exploitation and trade dynamics of sea turtles in Balabac Strait Marine Biodiversity Conservation Corridor, Palawan, Philippines**

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### **ABSTRACT**

The study assessed the nesting incidence, threats to nesting habitats, exploitation and trade dynamics of sea turtles in the Balabac Strait Marine Biodiversity Conservation Corridor (MBCC). The most number of nests found belonged to the green sea turtle *Chelonia mydas* and only very few were of hawksbill sea turtle *Eretmochelys imbricata*. The shoreline vegetation was the most preferred nesting area, followed by beach forest and open beach. The eggs and meat of sea turtles in Balabac Strait MBCC are exploited for local consumption and trade. Information on trade route and local perception on conservation issues about sea turtles is also presented herein.

Keywords: Balabac Strait, exploitation, nesting incidence, sea turtle, trade dynamics

### **INTRODUCTION**

In 2004, the Conservation International-Philippines (CI-P) declared Balabac Strait as a Conservation Priority Area (CPA) for the presence of several threatened species of vertebrates, particularly sea turtles (Anda and Tabangay-Baldera 2004). In that same year, Torres et al. (2004) together with the Exercise Luzon Sea Team conducted a rapid site assessment in several islands in Balabac Strait including Secam, Roughton and Candaraman Islands. Based on this survey, it was confirmed that there were hawksbill turtle *Eretmochelys imbricata* nests in Roughton Island. Since their assessment was only short, Torres et al. (2004) recommended further studies on sea turtle nesting incidence in other islands in Balabac Strait with suitable nesting areas.

In 2006, the Balabac Island Group was identified as a Key Biodiversity Area (CI-P et al. 2006). As a conservation action, CI-P

implemented the Sulu Sulawesi Seascape (SSS) Project, which aimed to manage the resources of Sulu and Sulawesi Seas in partnership with local stakeholders. One of the key project sites of the SSS is the Balabac Strait Marine Biodiversity Conservation Corridor (MBCC). During this project, several surveys were conducted to assess the marine biodiversity of Balabac Strait MBCC. In the May 2006 survey by Matillano et al. (2007), Camiaran Island was reported to have high nesting incidence of sea turtles. Five months later, Ramoso et al. (2006) reported that Balabac is one of the areas in the SSS that acts as a critical marine turtle habitat, with certain islands (Candaraman, Sicsican, Secam, and Camiaran Islands) confirmed to be sea turtle nesting areas. Two marine turtle species, the green sea turtle *Chelonia mydas* and the hawksbill sea turtle *E. imbricata* in their different life stages, were identified and confirmed inhabiting the seas around Balabac Island Group. Ramoso et al. (2006) further identified several threats to sea turtle populations in Balabac Strait, citing occasional butchering for local consumption in traditional festivities, intermittent poaching by foreign nationals and collection of sea turtle eggs.

It is important to note that there are four types of sea turtle habitats within Balabac Island and its vicinities, which include: (1) pelagic sites as migratory corridors (2) coralline beaches for nesting, (3) lagoons and (4) seagrass beds for juvenile development and foraging grounds for adults.

Except for the above-mentioned information, virtually nothing else is known about the sea turtles of Balabac Strait MBCC, particularly on aspects of trade dynamics and exploitation rate. The availability of such information especially on nesting incidence is significant for conservation since Balabac Strait MBCC may be one of the last strongholds of sea turtles in the Philippines. This information can be used as basis in designing conservation strategies and protection measures for sea turtle species in the Balabac Strait MBCC.

Hence, the study aimed to determine the (1) nesting incidence of sea turtles and threats to nesting habitats; (2) local knowledge on nesting areas and nesting season, and (3) exploitation and trade dynamics of sea turtles in Balabac Strait MBCC.

## MATERIALS AND METHODS

The study was conducted in selected islands and barangays within Balabac Strait MBCC (Figure 1). Nesting incidents were monitored only in Camiaran and Roughton Islands. The nesting beach in each island was divided into four sectors (north, south, east and west sectors) and was patrolled every sampling event to account for and determine the number of

new nests, and to identify the species of nesters. Identification of species was based on the nesting behavior of sea turtles and track marks. To determine nesting preference of sea turtles, the nesting beach in Camiaran was divided into three different habitat zones following Phillips (1992) namely beach forest (consisting primarily of woody and *Pandan* plants), shoreline vegetation (transitional area between the beach forest and open beach composed mostly of small shrubs and salt tolerant vines) and open beach (characterized mostly by open sand area with no vegetation).

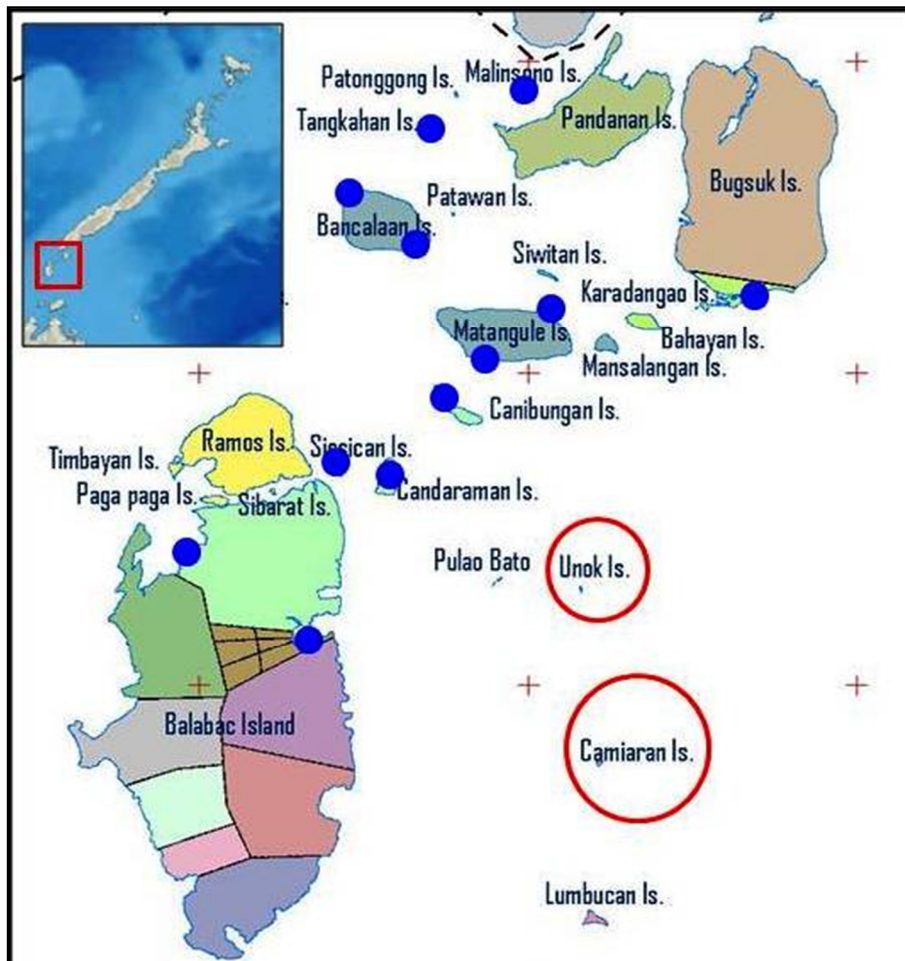


Figure 1. The Balabac Strait Marine Biodiversity Conservation Corridor (red square, top left) and enlarged map of Balabac Strait MBCC showing the two sampling sites (Unok or Roughton and Camiaran Islands) for nesting incidence (red circles) and the islands and barangay (village) visited for field interview (blue circles). (Source: Conservation International (CI); Sulu-Sulawesi Seascape Project and Microsoft Encarta 2006).

Sampling was conducted in July and November 2007. Key informant interviews (KII) with 18 respondents were conducted in May 2008 using structured questionnaire (modified after Pawikan Conservation Program) to gather information on nesting areas, nesting season, trade dynamics, species of sea turtles traded, catch and collection rate of sea turtles and its derivatives. Respondents included locals from selected islands and barangays (villages) of Balabac Island Group. For KIIs, the researchers selected the permanent residents of Balabac with knowledge about sea turtle traders.

## RESULTS AND DISCUSSION

### Nesting Incidence

Two species of sea turtles were encountered during the surveys, the green sea turtle *C. mydas* and the hawksbill sea turtle *E. imbricata* (Figure 2). During the two survey events, green sea turtles were the most frequently encountered species, especially in Roughton (Unok) Island where they were commonly seen feeding in the shallow seagrass meadows.



Figure 2. The green sea turtle (left) and hawksbill sea turtle (right). The hawksbill sea turtle was rescued from would be butchers at a cost of PhP 250.00 during one of the sampling events. (Photo: R. Antonio).

Nesting incidence surveys at Camiaran and Roughton Islands were conducted from 30 July to 01 August 2007 and 23-24 November 2007 (Table 1). In Camiaran Island, the first survey conducted in July 2007 recorded higher nesting incidence compared to the November sampling. In July, a total number of 60 nests for Camiaran Island; 40 nests in Sector 1 (eastern coast of the island), 11 for Sector 2 (southern coast), and nine in sector 3

(western coast) were encountered (Table1). Apparently, the northern coast of the island was not used as nesting site since the slope was too steep for sea turtles to climb. In November 2007 sampling, the survey team recorded only 35 nests. Thirteen were in sector 1, eight in sector 2 and 14 in sector 3.

Out of the 95 nests recorded in Camiaran Island, 94 nests belonged to green sea turtles while only one was a Hawksbill sea turtle nest. Of these, 12 nests were active, all of which were of green sea turtles. The single nest of hawksbill sea turtle was dug by fishermen who regularly visited the island. Apparently, the eggs were collected for consumption.

Table 1. Total nesting incidence of sea turtles in Camiaran Island during the two sampling periods.

Sampling Period	Location	Species	Nesting Activity	Total No. of Nest(s)	Total Active Nest(s)
First Sampling (30 July to 01 August 2007)	Sector 1	<i>C. mydas</i>	Complete	39	3
		<i>E. imbricata</i>	Complete	1	0
	Sector 2	<i>C. mydas</i>	Complete	11	4
		<i>E. imbricata</i>	None	0	0
	Sector 3	<i>C. mydas</i>	Complete	9	0
		<i>E. imbricata</i>	False nest	0	0
Total				60	7
Second Sampling (23-24 November 2007)	Sector 1	<i>C. mydas</i>	Complete	13	2
		<i>E. imbricata</i>	None	0	0
	Sector 2	<i>C. mydas</i>	Complete	8	2
		<i>E. imbricata</i>	None	0	0
	Sector 3	<i>C. mydas</i>	Complete	14	1
		<i>E. imbricata</i>	None	0	0
Total				35	5
Grand Total				95	12

In Roughton, 12 nests were recorded in July 2007 while in November, only five nests were recorded. No active nests were documented out of the 17 nests encountered. Two of the 17 nests belonged to hawksbill sea turtles while the remaining 15 were of green sea turtles (Table 2). In the course of interview with the island's caretakers, it revealed that the residents immediately collect the eggs in the morning after they are laid, hence there were no active nests recorded.

Table 2. Total nesting incidence of sea turtles in Roughton Island during the two sampling events.

Sampling Period	Location	Species	Nesting Activity	No. of Nest(s)	No. of Active Nest(s)
First Sampling (30 July to 01 Aug. 2007)	Western Side of the Island	<i>C. mydas</i>	Complete	10	0
		<i>E. imbricata</i>	Complete	2	0
<b>Total</b>				<b>12</b>	<b>0</b>
Second Sampling (23-24 Nov. 2007)	Western Side of the Island	<i>C. mydas</i>	Complete	5	0
		<i>E. imbricata</i>	None	0	0
<b>Total</b>				<b>5</b>	<b>0</b>
<b>Grand Total</b>				<b>17</b>	<b>0</b>

Of the three nesting habitats, the shoreline vegetation was the most preferred nesting area of sea turtles in Camiaran Island, with a total nest count of 58 (41 during the first sampling and 17 for the second sampling). Thirty nests were recorded in beach forest and eight nests in open beaches. These results suggest that sea turtles prefer to nest in shoreline vegetation in Camiaran. This is maybe because the beach forest of Camiaran Island is elevated, while the open sandy areas were shifting due to constant beach erosion, which makes the nest vulnerable to flooding during high tide. In Setiu, Terengganu, Malaysia, majority of green sea turtles nest in open areas and dunes which provide less hindrance from the vegetation and grassy zone. The dunes are also usually located in flat areas, which are more convenient for digging body pits than in sloping areas (Abd Mutalib et al. 2014).

### Threats to Nesting Habitats

The two survey events revealed drastic changes in nesting areas of Camiaran Island. Beach forest conversion is continuous as documented by Matillano et al. (2006). Coconut trees were planted to replace the denuded beach forest. Beach erosion was observed in Sectors 1 and 3 in Camiaran. These sand shifting patterns occur regularly as changes in monsoon winds and wave and current actions erode sand back and forth the northeastern and southwestern coasts of the island. However, the removal of beach forest in this island may aggravate sand shifting patterns as evident on the northeastern portion of Camiaran. Beach conditions, seasons, air temperature and amount of rain are known to influence turtle nesting activities (see Abd Mutalib et al. 2014). In addition to this, drifted garbage from neighboring populated islands including drifted nylon ropes were documented during the second sampling. Plastic cellophane wastes were



also common in many areas within Balabac Strait, particularly in South Mangsee generally in the vicinities of highly populated islands. These kinds of waste had long been identified as hazardous for sea turtles as these could be mistaken as food.

### Local Knowledge on Nesting Areas, Nesting Season and Trade

Most (83%) of the respondents cited Secam Island as the primary turtle nesting area within Balabac Strait MBCC which corroborate with the report of Ramoso et al. (2006). This was followed by Candaraman, Roughton, Sicsican, Camiaran Island, Patongong Island and Bgy. Sebaring (Table 3).

Table 3. Identified nesting areas and observed nesting seasons within the Balabac Strait MBCC.

Site	Green Sea Turtle	Hawksbill Sea Turtle	Remarks
Bgy. Sebaring	No Information	No Information	Locals stated that turtles nest throughout the year
Camiaran Island	July to November	July to August	High nesting incidence recorded in July 2007
Candaraman Island	June to August	No information	Many sea turtles forage in seagrass meadows in shallow areas of the island
Roughton Island	January to April	January to April	Sea turtles were frequently sighted feeding in seagrass beds around the island.
Sicsican	No information	No information	Locals reported irregular nesting activity in this island.
Patonggong Island	April to June	No information	Locals claimed that many sea turtles were sighted around the island, with high incidence of nesting during northeast monsoon.
Secam Island	No Information	No information	Locals claimed that nesting activity is throughout the year.

For the nesting season, most of the sightings of nesting females were in the months of June to August in Candaraman Island. For other islands however, the respondents provided varying information usually stating that there is no specific month for nesting (Table 3). Interestingly, majority (88%) agreed that there is a pronounced nesting incidence during the northeast monsoon (November to February). The information on nesting season obtained in this study appeared similar to Setiu, Terengganu, Malaysia which

occurred from February until September. However, the peak in Setiu occurs between April and August (Abd Mutalib et al. 2014).

### Exploitation and Trade Dynamics

Trade (Figure 3) and consumption of sea turtle and its derivatives (eggs, carapace, scutes, and raw meat) persisted within the Balabac Strait MBCC, most especially in the town proper and other remote barangays of the municipality (at least eggs and meat) at the time of this study. The green sea turtles are exploited primarily for their meat and cartilage, and the hawksbill sea turtles are mainly taken for its carapace which is used to make a variety of turtle by-products (e.g. jewelry and combs).

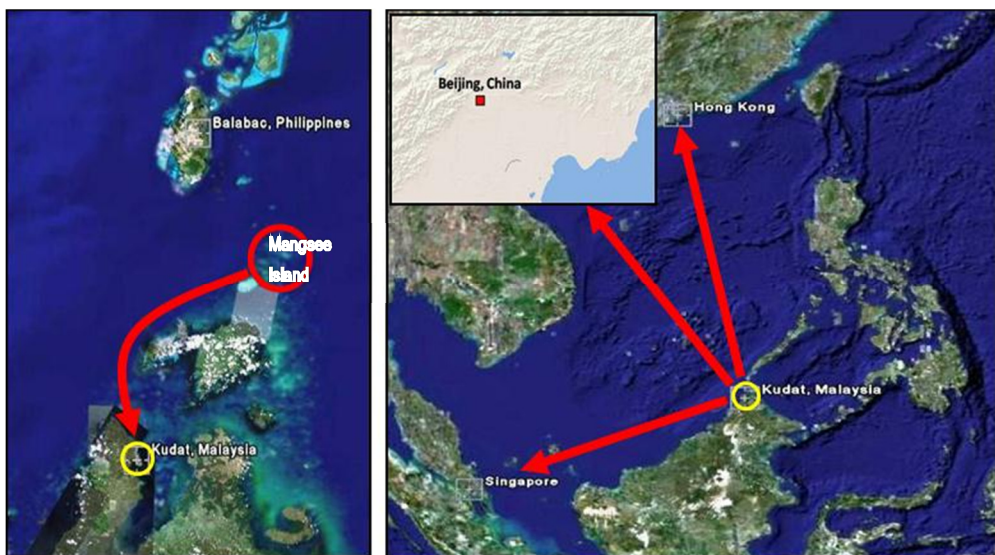


Figure 3. Trade routes of live sea turtles from Mangsee Island (left) to the international market (right). (Map Source: Google Earth 2008 and Microsoft Encarta 2007).

Informants confirmed that live animals were collected in the vicinities of Mangsee Islands, Salinsingan Island, and Simanahan Reef. Gill nets and spear gun were the most common gears used to capture sea turtles within the reef area or seagrass beds. At times, individuals were captured right after laying eggs. Captured sea turtles were then transported from Mangsee Island to Kudat, Malaysia where sea turtle traders kept the animals in pens/net cages for at least a month until there were enough animals (approximately 50 individuals) for one shipment. Reports indicated that Kudat acts as stocking area and transshipment point of sea turtles collected in the waters of Balabac Strait MBCC. By the time when enough numbers of turtles were ready for shipment, the traders transported the animals from



Kudat to Singapore, Hong Kong and mainland China via Chinese fishing vessels (Figure 3).

The individual price of sea turtles depends on size. Turtle traders classify sea turtle size as small (dinner plate size), medium ( $\pm 50$  cm long), and large ( $>90$  cm). For small sea turtles, the traders paid the poachers PhP 200.00, while medium sized costs about PhP 500.00 at the time of this study. A large individual commanded a prize of not lower than PhP 2,500.00. In 2009, the exchange rate between US Dollar and Philippine Peso was 1:46.

### Trade of Sea Turtle Derivatives

**Eggs.** For years, sea turtle's eggs in Balabac Strait MBCC were collected by local fishermen and coastal inhabitants as alternative source of protein, either by just directly taking the eggs from the nests or immediately collecting when the nesters deposit their eggs. Regardless of knowing that it is illegal to collect sea turtle eggs, continuous harvesting still occurs within Balabac Strait MBCC. Data gathered through interviews indicated that there were six islands and one mainland Balabac barangay which serve as the main source of sea turtle eggs that are traded within the area. These are Secam, Sicsican, Candaraman, Roughton, Camiaran, Lumbucan and Bgy. Sebaring.

Collected eggs were sold to pre-contacted buyers from the town proper of Balabac between PhP2.00 and PhP 5.00/egg for green sea turtles eggs and PhP 1.50 per hawksbill sea turtle egg. These buyers then retailed the eggs at the town proper of Balabac at PhP 20.00 for three eggs or usually at PhP 5.00/egg. However, depending on the season and the number bought, the seller might sell for a discounted price of PhP 80.00/150 eggs (Table 4).

Table 4. Collection area, trading hotspots, and prices of sea turtle eggs within Balabac Corridor as of May 2008.

Species	Collection Area/Source	Price of Eggs at source(PhP)	Retail price (PhP)	Trading Area
<i>C. mydas</i>	Secam, Sicsican, Candaraman, Camiaran, Lumbucan Island and Sebaring	2.00 to 5.00 each	3.00 to 5.00 each	Town proper, Bgy. Caguisan and Bgy. Bangkalaan
<i>E. imbricata</i>	Camiaran, Candaraman, and Bgy. Sebaring	1.50 each	4.75 each	Town proper and Bgy. Bangkalaan

The sea turtle eggs that have been collected in Secam Island and Bgy. Sebaring are usually sold in Bgy. Bangkalaan. Newly collected sea turtles eggs from Bgy. Sebaring were found for sale in the island during the last survey, involving both green and hawksbill sea turtle's eggs (Figure 4). Green sea turtle's eggs are commonly sold at a price of PhP 5.00/egg or 4 eggs/20 pesos. Hawksbill sea turtle's eggs are cheaper, sold at PhP 4.75/egg or 5 eggs for PhP 20.00. Traders reported that the eggs are always out of stock, suggesting a very high demand in the area. On the contrary, eggs that have been collected from Roughton Island are mainly intended for consumption by the island's care takers and owner.



Figure 4. Eggs of green (left) and hawksbill (right) sea turtles displayed for sale in Bgy. Bangkalaan, Balabac, Palawan. (Photo: R. Antonio).

It is worth noting that in some areas in Balabac Strait MBCC, collection of sea turtle eggs is more of a daily activity, as in the case of Roughton Island where there are permanent residents. The egg collectors would regularly patrol known nesting beaches and collect the eggs from all nests that they can find. Regardless whether there are only two or ten nests, it seems that the general rule is to immediately collect the eggs, otherwise, other people may find the nest and collect them before one could go back to these active nests. In Camiaran Island however, collection of eggs is usually daily if there are transient fishers that stay for extended period of time, however, in times when fishing is off season, particularly during high monsoon winds, some of the nests survive.

An informant from Bgy. IV reported that the volume of eggs being traded in town proper ranged between 450 and 600 eggs per transaction in 2008, which is usually three times a month. A third of the eggs were supplied by collectors from Sicsican Island while the rest were mainly from collectors in Secam Island.

The sources of eggs sold in Bgy. Bangkalaan are mainly from Secam Island and Bgy. Sebaring. Interviewed egg vendor from Bangkalaan Centro stated that three times a month, an egg collector from Bgy. Sebaring delivered about 500 sea turtle eggs consisted of both green and hawksbill sea turtles. In Sitio Tabudniyayo (part of Bgy. Bangkalaan) about 400 eggs were sold, usually on a monthly basis.

Considering the information gathered, the projected local consumption of turtle eggs in the town proper is from 1,350 to 1,800 eggs per month (16,200 to 21,600 eggs per year). In Bgy. Bangkalaan, it ranged between 1,200 and 1,680 eggs per month or 14,400- and 20,160 eggs per year (Table 5). This projection only takes into account the volume of eggs for sale and not including those that are collected for household consumption. This projection also did not take into account the seasonality of egg exploitation, i.e. whether there are increases or decreases in the volume of eggs traded in relation to nesting season.

Table 5. Volume of sea turtle eggs traded in the identified areas of the Balabac Strait MBCC.

Species	Collection Area/Source	Market Site	Volume of Eggs ( pieces)		
			Per Transaction	Per Month	Annual Projection
<i>C. mydas</i>	Secam, Sicsican, Candaraman, Roughton, Camiaran, Lumbucan Island and Bgy. Sebaring	Town Proper	450-600	1,350-1,800	16,200-21,600
		Bangkalaan	400-500	1,200-1,500	14,400-18,000
<b>Subtotal</b>			950-1,100	1,550-2,300	18,600-27,600
<i>E. imbricata</i>	Camiaran, Candaraman, Roughton, and Bgy. Sebaring	Town Proper	100-200	300-600	3,600-7,200
		Bangkalaan	100-150	300-450	3,600-5,400
<b>Subtotal</b>			200-250	600-1,050	7,200-12,600
<b>Total</b>			<b>1,150-1,350</b>	<b>2,150-3,350</b>	25,800-40,200

**Scutes.** Sea turtle scutes are also a hot commodity in Balabac Strait MBCC. Scutes of hawksbill sea turtles are important for the curio trade (i.e. for making jewelries and combs) and are obtained in a very brutal way. Most scutes collectors do not actually kill the turtle during the process of scutes removal. It takes about an hour to remove complete sets of scutes (13 scutes: 8 marginal and 5 central) from one turtle but not without subjecting the carapace to heat first. Another way of removing the scutes is by grilling the live turtle while lying on its back until the entire carapacial scutes pop up completely. After then, the alive but badly burned turtle is returned back into

the sea, where it will eventually die due to the wounds inflicted on it. This method has been previously documented by Van Dijk and Shepherd (2004). The poachers usually return the dying animals to the sea after removing the scutes, in the vain and false hope that it would survive and re-grow its scutes (Van Dijk and Shepherd 2004). These activities were reported not only in Mangsee Island but also in other parts of Balabac Strait particularly in Sitio Palaisan and Sitio Lumbucan. Like live individuals, a complete set of sea turtle scutes (Figure 5) is also categorized as small, medium, and large. A small set of scutes cost PhP 600.00, while medium set sold for PhP 900.00. Large sets command a higher price of PhP 1,500.00 (Figure 5).



Figure 5. A carapace of green sea turtle (Curve Carapace Length: 52 cm) collected from Malinsuno Island in May 2008. This carapace cost the researcher PhP 120.00 (left). To the right are fragments of carapacial scutes of hawksbill sea turtles from Canibungan Island.

Respondents from Malinsuno Island stated that sometime in 2007, about 50 dead hawksbill sea turtles were found drifting in the open water of the northwestern part of the Balabac Strait MBCC. Most of the dead turtles showed evidence of being subjected to excessive heat notably with no carapacial scutes left. The locals claimed that this high concentration of dead turtles came from the fishing vessel of Chinese fishermen which were frequently sighted poaching in the municipal waters of Balabac Strait. It is also worth noting that on April 13, 2008 one of the two Chinese fishing vessels (Quang Mei) sighted near Lumbucan Island was apprehended by local law enforcers. Sea turtles were found in the fishing boat (Anda 2008).

**Meat.** The meat of both species of sea turtles is utilized in Balabac Strait MBCC. It is a delicacy especially in some religious and traditional festivities within the corridor. This practice is also common in other areas of the Sulu Sea. Based on interviews, four primary sites were identified and confirmed to have slaughtering activities of sea turtles namely Sitio Palaisan,

Sitio Malinsuno, Sitio Mariahangin, and Bgy. Sebaring. The turtles were slaughtered either for everyday consumption or for trading purposes but were more commonly butchered during celebrations. Trading of sea turtle meat was more commonly reported in Sitio Palaian where residents would even sell sea turtle meat at the town proper of Balabac. Sea turtle meat was also available on order basis especially during Christmas season. The local price of sea turtle meat in the town proper of Balabac was PhP 20.00/caltex (about 750 ml). For meat consumers who prefer whole animals, turtle hunters sold a medium sized turtle at around PhP 200.00-250.00. The turtles were made available upon request or placement of orders.

In Sitio Malinsuno, sea turtles were slaughtered either for household consumptions or even just as “pulutan” or appetizer during liquor drinking sessions. The first author was able to document one such event during the field survey conducted in May 2008 in Malinsuno, involving a hawksbill sea turtle. The turtle was rescued by the researcher after paying PhP 250.00 for the animal. Respondents from Malinsuno Island also cited that at least ten sea turtles are being slaughtered in Sitio Mariahangin every year during foundation day celebration (June 27<sup>th</sup>). Interestingly, respondents also claimed that sea turtle meat is more preferred than beef. It was also evident that the locals are the regular hunters and consumers of sea turtle meat in the Balabac Island Group.

## CONCLUSION AND RECOMMENDATIONS

All five marine turtle species found in the Philippines (Marine Wildlife Watch of the Philippines 2014) are protected under the Republic Act 9147 otherwise known as Wildlife Protection Act of the Philippines. Under the Wildlife Act, jurisdiction over marine turtles and many other terrestrial and marine flora and fauna is under the DENR and the Palawan Council for Sustainable Development (PCSD) (Marine Wildlife Watch of the Philippines 2014). The two species encountered in this study are in the IUCN Red List with *E. imbricata* categorized as “Critically Endangered” and *C. mydas* categorized as “Endangered” (IUCN 2016).

The recorded nesting incidence in this study Balabac implied the importance of Balabac Strait MBCC as conservation spot for sea turtles not only as foraging area or migratory route from the Sulu Sea but Balabac Strait MBCC also serve as important nesting area of these two globally threatened marine species.

So far, five islands and one island Barangay were identified as important for conservation of the sea turtles within the Balabac Strait MBCC namely; Camiaran Island, Roughton Island, Secam Island, Sicsican Island,



Candaraman Island, and Bgy. Sebaring. These islands serve as major nesting sites for sea turtles in the corridor.

For nesting incidence, Camiaran Island have considerably higher occurrence of nesting compared to Roughton Island, however, for other islands, the researcher still has no idea of relative occurrence of nesting. Though the three surveys were not able to document or deduce nesting season, local information suggests a year round nesting incidence, with pronounced frequency during northeast monsoon season.

There is still rampant and continuous hunting of sea turtles within Balabac Strait by foreign poachers and local community members, which may cause significant population decline of sea turtles in the corridor. Egg collection may also significantly cause further population decline as it interferes with recruitment.

Results of the interviews revealed local awareness of laws regarding conservation of sea turtles, however, in the absence of law enforcers, the locals took advantage of this situation, particularly that even in the municipal proper, there seems to be no prosecution of traders who sell turtle meat and eggs. Hence, butchering and collection of sea turtle eggs are still proliferating in the Balabac Strait MBCC.

Marine turtle conservation actions are strongly recommended within the Balabac Strait MBCC. The Balabac LGU under the Municipal Agriculture Office and the DENR officer should conduct regular monitoring of the identified nesting areas. Secondly, it is also recommended that concerned agencies within the corridor regularly check the known egg vendors within the town proper to curb incidents of egg trading. Community managed hatcheries maybe established in several islands to protect the sea turtle eggs from poachers. Marine turtle eggs when transferred to hatcheries have low predation but high hatching rates (Abd Mutalib abd and Fadzly 2015).

Should there be a follow up study on nesting incidence in the area, this should be conducted by someone who resides in Balabac Island at least during the entire duration of the research. This is to minimize delays caused by travel from Puerto Princesa to Balabac, which is often hampered by unfavorable weather conditions. The researcher should be based in Balabac to take advantage of prevailing good weather conditions to sneak into the targeted islands during calm days, making it more plausible to monitor nesting incidence at least once a month for each targeted nesting area. Nesting incidence monitoring should also include the other identified nesting areas within the corridor. For trade related studies, it is strongly recommended to conduct undercover visits to maximize trade data gathering since information is usually withheld by respondents.

Lastly, it is recommended that more information and education campaign activities be conducted to integrate conservation values to the local community for them to support conservation initiatives for sea turtles and other threatened species within the Balabac Strait MBCC.

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