HEPCA

CARING FOR THE RED SEA

Red Sea Turtle Conservation and Research Project

Annual Report

January – December 2011

Acknowledgments

HEPCA is very grateful to all the people that contributed to this project by sharing data, pictures and enthusiasm.

We are especially grateful to Catherine, Matt, Sarah-Jane and Mahmoud, Kirsten, Alex, Beverly, Lyndsay and all their guests for their invaluable help in collecting and reporting data to us. HEPCA would also like to thank all the volunteers and interns that took part to the Red Sea Turtle Project: Rob, Anjelika, Kenzie, Maha, Tamer, Moamen, Bana, Emma and Islam.

We would like to extend our gratitude to all the people at Wadi Gimal National Park for their logistic support and contributed expertise. Finally we would like to thank all the staff at Tonodba for the support during the field surveys.

HEPCA is very grateful to IdeaWild to provide equipment to conduct the field surveys. This project was co-sponsored by Boomerang For Earth Conservation.

Table of contents

Introduction 5

Priorities for research and conservation 6

HEPCA Red Sea Turtle Conservation and Research Project 6

Importance of this project 6

Summary of activities held in 2011 7

1. Activity I: Red Sea Turtles Research Project 7

Description 7

Overall Goal 8

Research questions 8

Study area 8

Methods 9

Preliminary results 10

Preliminary conclusions 15

2. Activity II: TurtleWatch-Egypt 17

Description 17

The TurtleWatch package 18

Preliminary results 18

Preliminary conclusions 22

3. Activity III: Red Sea Turtles Catalogue 23

Description 23

Some Results 24

4. Red Sea Turtle Stranding and Salvage Network 24

Description 24

Some Results 24

Some Conclusions 25

5. Activity V: Capacity building, education, awareness 25

Description 25

Summary of activities 26

What is on for 2012? 26

Appendix 1.1. Detailed transects followed during each field survey.....

Appendix 2.1. The TurtleWatch Manual.....

Appendix 2.2. The TurtleWatch Datasheet.....

Appendix 2.3. Red Sea Turtles Identification sheets .....

Appendix 3.1 Catalogue of marine turtles of the Egyptian Red Sea .....

Appendix 5.1. Booklet: Responsible behavior when encountering a marine turtle .....

Introduction

Five of the seven sea turtle species existing in the world, can be found in the Egyptian Red Sea: the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*), the leatherback turtle (*Dermochelys coriacea*), the loggerhead turtle (*Caretta caretta*) and the olive-ridley turtle (*Lepidochelys olivacea*). Sea turtles are long-living reptiles characterized by slow growth, late sexual maturity and high mortality rates during their first developmental stages (eggs, hatchlings, juveniles). For this reason, they are considered extremely vulnerable to every kind of over-exploitation and population recovery can take decades. All the five species are enlisted in the IUCN Red List either as critically endangered (leatherback and hawksbill turtles), endangered (loggerhead and green turtles) or vulnerable (olive-ridley turtle). Furthermore they are all enlisted in Appendix I of the Convention on International trade of Endangered Species (CITES), meaning that trade of sea turtles and derived products is forbidden in signatory countries.

Green turtles are widely distributed in tropical and subtropical waters, near the continental coast and/or around islands. They are known to forage on shallow seagrass beds and undertake long migrations from rookeries to feeding areas. Usually these migrations are performed along the coastline even if there are some exceptions (i.e. Ascension Island population). Green turtles are known to nest in the Red Sea. Nesting surveys were carried out in Saudi Arabia (from 1986 to 1987 and from 1989 to 1997), in Yemen 20 years ago and more recently through a UNEP study, in Egypt 25 years ago and recently from 2001 to 2009 on annual basis and briefly in Somalia. While major nesting areas of this species have already been identified, information on feeding grounds are substantially lacking.

Hawksbill turtles have a circumglobal distribution, inhabiting tropical and to a lesser extent sub-tropical waters of the central Atlantic and Indo-Pacific regions. Hawksbill turtles are known to live in clear waters and feed on number of invertebrates including corals and sponges. In the Red Sea region, data on this species are available from Sudan, Yemen, Egypt and Saudi Arabia. Nesting sites have already been identified; foraging grounds are usually located on fringing reefs.

The loggerhead turtle is widely distributed in tropical and sub-tropical waters around the world. They are carnivorous and feed predominantly on invertebrates and particularly small crustaceans. Nesting sites of this species have been observed in the Gulf of Aden and it is only sporadically seen in the Red Sea. Reports of loggerhead turtles come mainly from Yemen. Olive-Ridley and leatherback turtles are only sporadically seen in the Red Sea region, usually for feeding. No nesting activity for these two species has been observed.

Sea turtles play an essential role in keeping the Red Sea healthy and full of life. Green turtles, also known as “sea cows”, maintain healthy seagrass beds which host spawning fish, their juveniles and a great number of other invertebrates like mollusks and crustaceans that are at the bottom of the entire food chain. Hawksbill turtles feed on corals and sponges and therefore keep the balance between these two populations. This balance has proven to be critical for a healthy coral reef. Both leatherback and olive-ridley turtles feed on jellyfish, small size fish and other animals living in the water column. As jellyfish and small fish usually feed on fish eggs and larvae, these two turtle species reduce the pressure on many other different fish species inhabiting the Red Sea.

So, sea turtle conservation is not just about turtles, but also concerns the habitats they use and that we also enjoy, like the coral reefs. A healthy sea turtle population depends on us and how we use the resources we share with these animals.

In the Red Sea, the main threats to sea turtles come from irresponsible coastal development that destroys nesting beaches and feeding grounds such as sea-grass beds and coral reefs; artificial lighting on main nesting beaches that disorients both nesting turtles and hatchlings; garbage and plastic bags which could be ingested by mistake by turtles and will provoke a slow and painful death; pollution in the water that is often associated with diseases like the fibropapilloma tumor; irresponsible anchoring that destroys both sea-grass beds and coral reefs; high speed boats and jet-skis that can seriously wound sea turtles and cause their death; incidental fishing in particular in industrial trawlers and purse seines. While general information on potential threats is available, detailed sources of mortality and quantitative data are substantially lacking.

Priorities for research and conservation

The Regional Intergovernmental organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA/GEF 2004) and IUCN (IUCN 1996) group established as priorities for sea turtles in the RSGA region the following topics:

- Knowledge on sea turtle nesting and feeding grounds;
- Data on populations size and status;
- Identification of critical habitat and description of their conditions;
- Acquire qualitative and quantitative information on threats and mortality sources;
- Use of standardized methods;
- Participation of local communities;
- Public awareness and education.

HEPCA Red Sea Turtle Conservation and Research Project

In February 2011, HEPCA decided to launch the first Red Sea Turtle Project which is aimed at:

1) Increase scientific knowledge of marine turtles especially in their feeding and nesting grounds by providing long-term data on abundance, distribution, population structure, short term movements and major threats;

2) Improve conservation of marine animals by promoting awareness, involving everyday users in the data collection and prepare the base for future management plans.

Importance of this project

On a long-term, this project will 1) provide data on trends of marine turtles populations in the Egyptian Red Sea, 2) identify high use areas that could be submitted to special management, 3) determine the status of habitats used by marine turtles (seagrass beds and coral reefs in particular), 4) provide strong scientific data to be used as a tool to protect the coast-line from further irrational development, and 5) identify specific measures to reduce threats to marine turtles in the Egyptian waters.

On the short-term, this project aims at 1) promote responsible behavior while encountering sea turtles, 2) promote reduction of noise and light pollution on main nesting beaches and surrounding areas, 3) promote “turtles sanctuaries” in areas where turtles are known to aggregate and feed, 4) involve tourists and divers (professional and recreational) in sea turtle research, 5) promote the importance of seagrass beds (not only for marine turtles but for the entire ecosystem).

Summary of activities held in 2011

In order to achieve its goals, HEPCA launched in 2011:

1) Red Sea Turtle Research Project: a research project based in the Southern Egyptian Red Sea aimed at estimating abundance and distribution of marine turtles in their feeding and nesting grounds.

2) TurtleWatch-Egypt: a project directed to dive centers that would like to be involved in collection of marine turtle data.

3) Red Sea Turtles Catalogue: this is the first catalogue done for the Red Sea. It has three major aims: 1) it will provide a long-term photographic database that can be used by researchers to understand short-term movements and growth patterns, and obtain more realistic estimates of sea turtle abundance; 2) involve different sectors of users in sea turtle conservation and 3) it can be used as a tool to spread awareness among different users.

4) Red Sea Turtle Stranding and Salvage network: quantifying sea turtle mortality and understanding mortality causes is one of the main steps in order to provide specific conservation measures to protect these animals. The stranding and salvage network relies on Red Sea users who were requested to report to HEPCA on dead or injured/sick marine turtles found stranded on the beach or at sea.

5) Capacity building, education and awareness events: a fundamental component of this project is to provide trainings to Egyptian students in order to create experts on this sector that has been under-studied in the country in the past. Furthermore this project aims at promote awareness among different categories of people (from children to dive guides and visitors) on sea turtle threats and responsible behavior.

In this annual report, we are presenting a short summary of each activity conducted up to present. Further developments and plans for 2012 are discussed in the last chapter of this report.

1. Activity I: Red Sea Turtles Research Project

Description

The Red Sea Turtle Research project was created to understand marine turtle behavior in their main feeding grounds in the Southern Egyptian Red Sea. A research team conducts monthly surveys in the area from Marsa Abu Dabbab to Wadi Lahmi and collect data on abundance and distribution of marine turtles with a special emphasis on endangered green turtles. Also data on population structure, behavior and movements are collected.

Overall Goal

At present virtually no data is available on sea turtles feeding grounds in the Red Sea. This information is fundamental to implementing a proper management plan for the conservation of these wonderful animals. Thus, the overall goal of this project is to gather information on sea turtle populations along the Southern Egyptian coast of the Red Sea through standardized methods and to provide baseline data on their abundance and distribution, estimates of nesting population, and main causes of mortality. Results will include:

- Assessment of the status of marine turtle populations, demarking nesting beaches and feeding grounds;
- Quantification of human impact due to recreational activities, coastal development, fisheries and pollution;
- Reduction in mortality causes in marine turtle populations;
- Increased public awareness and the participation of the local community on turtle conservation processes.

Research questions

1. What is the relative abundance of marine turtles in known feeding grounds?
2. What is the population structure in the same feeding grounds?
3. What is the trend of marine turtles in these feeding grounds (steady, increasing, decreasing)?
4. Which part of these feeding grounds is used regularly?
5. What do marine turtles eat in these foraging grounds?
6. What is the trend on nesting beaches?
7. What are the nesting parameters of marine turtles in the Egyptian Red Sea?
8. Are marine turtles threatened and to which extent?

Study area

We conducted detailed surveys (three censues per field expedition) in the following sites (fig. 1):

- ✓ Marsa Alam area: Marsa Abu Dabbab, Marsa Shagara and Marsa Tondoba;
- ✓ Wadi Gimal area: Marsa Fukera and Torfa El-Mahsheikh.

We conducted quick/exploratory surveys (one census per field expedition) in the following sites (fig.1):

- ✓ Marsa Alam area: Marsa Aglar, Marsa Aislan and Marsa Samadai;
- ✓ Wadi Gimal area: Shams Alam, Sharm El-Lulli, Om Al-Abath and Abu Ghosun.

Detailed transects followed during each survey are presented in appendix 1.1.

Figure 1.1. Map of the study area: a) Marsa Alam Sector, b) Wadi Gimal Sector (green arrows: quick surveys; red arrows: detailed surveys). Background image from GoogleEarth.

Methods

Standardized surveys of nesting sites

We monitored two nesting beaches, Ras Honkorab and Om Al-Abath, both within Wadi Gimal National Park limits. These sites are considered the most valuable in-shore nesting sites in the Southern Red Sea. Each beach was visited once during the field survey. All crawling activities were recorded and classified as new (done in the previous 24 hours) or old and as true (eggs deposition) or false (no eggs deposition) attempts. Based on the shape of the track we identified the species and also collected data on the track width as an index for the female size. At the end of the nesting season, hatching evidence and hatchling numbers were also collected.

Transect sampling to estimate relative abundance

At each monitoring site, we conducted snorkeling surveys. When a turtle was spotted we recorded the observation time and, when possible, the species, approx. size, gender (when discernable) and activity at first sight. To determine the location of the sightings, we used the observation time from an underwater-watch that was synchronized with a GPS at the surface recording our transects tracks. When possible we also took photographs and videos of the animal. Estimated number of turtles was adjusted for each transect by removing re-sightings of the same individual based on size, distinguishing features, time, and specific locations.

Population structure

To describe the population structure, we collected data on marine turtles size and gender. The turtle size was estimated using a measuring stick underwater, then turtles were divided into three groups according to their size-class: juveniles (sexually immature individuals), sub-adults (possibly sexually mature individuals) and adults (sexually mature individuals). For this we used the data available in the literature for both green and hawksbill turtles (table 1). Sub-adult and adult turtles possessing an elongated tail (TL>=20cm) were classified as males while those possessing a shorter tail were classified as females. Gender was not determined in juvenile turtles as secondary characters are usually not yet developed.

Table 1.1. Measurements of straight carapace length used to distinguish among juvenile, sub-adult and adult turtles.

	Juvenile (cm)	Sub-adult (cm)	Adult (cm)
Green turtle	< 70	70 – 90	> 90
Hawksbill turtle	< 50	50 – 60	> 60

In-water behavior

During the in-water observation, the initial behavior of turtles was recorded and categorized as follow: solitary behavior (feeding, resting, swimming, cleaning); social behavior (interaction with another animal). We also recorded the response of turtles to human presence, human behavior, number of divers and snorkelers around a turtle.

Photo-identification

Photo-identification methods developed for marine turtles are based on the visual comparison of the facial profile photographs according to the shape and pattern of the scutes in Chelonidae. Turtles were photographed (both profiles when possible) within a distance of 2-7m. Other relevant marks on the carapace were also recorded and photographed, when possible.

Preliminary results

Nesting sites

From July to September 2011, 19 tracks were counted during the monthly nesting survey. No new tracks were observed in October and November. 89% of the tracks (n=17) was observed in Ras Honkorab while in Omm Al Abath, only 11% of the tracks was reported (n=2). 58% of the tracks belonged to green turtles (n=11), 10% to hawksbill turtles (n=2) and for 32% of the tracks we were unable to identify the species (n=6). Of the tracks 58% were classified as new (made within 24 hours, n=11), while 42% were classified as old (made more than 24 hours earlier, n=8). Only 31% of the tracks were classified as true tracks and presence of eggs was verified, although the eggs were not counted (n=6). 69% of the tracks were classified as false crawls, meaning that the turtle came out of the water but di not lay eggs.

In October and November, tracks of hatchlings were observed from one nest only while another one was flooded by a high tide.

Distribution and abundance in feeding grounds

In total 453 sightings of turtles were recorded between July and November 2011: 87% sightings of green turtles (n=395), 6% sightings of hawksbill turtles (n=26) and 7% sightings of turtles for which we could not identify the specie (n=32). 66% of the sightings occurred in the Wadi Gimal area (from Marsa Fukera to Wadi Lahmi, n=297) while 34% of the sightings was recorded in the Marsa Alam area (from Marsa Abu Dabbab to Marsa Tondoba, n=156). In four sites (Sharm El Nabaa, Marsa Aglar, Marsa Asalay and Marsa Samadai) we did not observe any turtle however there are reports of sightings from divers and dive guides.

The relative abundance of turtles was calculated using two methods: 1) the belt transect method was used in all the sites to allow comparison among sites; 2) in Marsa Abu Dabbab, where identification of individual turtles is possible, we also used the Capture-Mark-Recapture (CMR) model.

Using the belt transect, we estimated a total population of 199 green turtles for the monitored areas. The biggest aggregations of green turtles were found in Torfa (n=130) and Marsa Abu Dabbab (n=30) (table 1.2). For the hawksbill turtles, the total population was estimated as being around 24 individuals with the biggest aggregations found in Sharm El Lulli (n=10), Torfa (n=7) and Marsa Shagara (n=4) (table 1.2).

Table 2.2. Estimates of marine turtle abundance in the monitoring sites from July to November 2011.

	Green turtles	**Hawksbill turtles**
Marsa Alam Area		
Marsa Abu Dabbab	34.55	0.29
Marsa Shagara	0.60	3.98
Marsa Aglar	0.00	0.00
Marsa Asalay	0.00	0.00
Marsa Samadai	0.00	0.00
Marsa Tondoba	10.54	0.51
Wadi Gimal area		
Marsa Fukera	16.79	0.00
Shams Alam	0.00	0.12
Torfa	130.82	6.50
Sharm El Luli	15.74	10.49
Omm Al-Abath	2.26	0.00
Abu Ghosun	0.00	1.18
Wadi Lahmi	0.00	1.26
TOTAL	**198.50**	**24.33**

Using the CMR method in Marsa Abu Dabbab, we obtained an estimate of 45 individuals (higher that the estimate obtained with the belt transect method). It is important to keep in mind that the following assumptions were made in order to use the CMR method:

- There are no new individuals in the population (no new born, no new migrants);
- All the individuals remain in the area (no emigration, no death)

- While the survival rate remains constant over time, the probability of recapture (or re-sighting in our case) varies with the time.

It is important to stress that this is only a preliminary analysis and the assumptions made here have the aim of simplifying the process only.

Quick note – Some maths: How do we estimate marine turtles abundance?

What is the belt transect method?

Suppose we swim along a line of length ***l*,** and we count all turtles observed within a distance *w* of the line (see figure 1.2). Then we have counted all turtles in an area ***a = w*l.*** If the number of turtles counted is ***n***, then the density of turtles (***d***) in our sampled area is ***d = n/a***. If we assume that the density of turtles in our sample is the same as the overall density of turtles in the study area, we can calculate the total number of turtles (***N***) as ***N=d*A***.

Figure 1.2. Scheme of the belt transect sampling method. L= length o the transect, w=distance from the transect line within which turtles are counted.

For this method, in order to have accurate estimates, it is important to chose transects where the number of sea turtles are representative of the full area. For example, if we have a big bay half of which has extensive seagrass beds (favorite habitat of green turtles) and the other half has only sand and some patches of corals, it is important that our transects cover both halves (the seagrass one and the sandy one) in order to have a real abundance estimate for the entire bay. If we cover only the seagrass area we would end up overestimating the number of turtles in the bay; while monitoring only the sandy area we will obtain an underestimated number of turtles.

What is the CMR method?

The CMR method is commonly used in ecology to estimate abundance of populations. It is based on the fact that researchers capture animals in one area (this is called ***first sample***), mark them with a unique identifier and release then unharmed. After a while, the researchers go back to the same area and again capture some individuals. Some of the individuals in this ***second sample*** will have been marked during the initial visit and are now known as ***recaptures***. Other animals captured during the second visit will not have been captured during the first visit to the study area. These unmarked animals usually are given a tag or band during the second visit and then are released.

Let's say that we are visiting the same place only twice, during the first visit we mark and release the ***first sample***, while during the second visit we mark and release the ***second sample***. The second sample will contain some ***recaptures*** and some new (non-marked) individuals. Let's assume that the two visits to the study area are close enough in time so that no individuals die, are born, move into the study area (immigrate) or move out of the study area (emigrate) between visits. Let's also assume that no marks fall off animals between visits to the field site by the researcher, and that the researcher correctly records all marks.

Given those conditions, estimated population size (N) is:

$$N = \frac{MC}{R},$$

where

N = Estimate of total population size

M = Total no of animals captured and marked on the first visit (***first sample***)

C = Total no of animals captured on the second visit (***second sample***)

R = No of animals captured on the 1st visit that were recaptured on the 2nd visit (***recaptures***)

If we do more than two visits in the same site and proceed in the same way, the model becomes more complex and will give more precise estimates, however the principle will not change.

In our case we are not capturing and marking animals, instead individual turtles in Marsa Abu Dabbab are photographed and individuals are recognized using photo-identification techniques based on marks on the carapace and the head profiles. The principle of the analysis is the same but it is less stressful for the turtles that are not taken out of the water, tagged and then released.

The number of turtles in each site remains steady in most of the sites, except in Torfa were we noticed a decrease of animals following the nesting season for two months and then another increase.

Population structure

Data on turtle sizes were available for 342 sightings (75% of the total): 320 green turtles and 22 hawksbill turtles (figure 1.3). Based on their size, green turtles were classified as follow: 45% juveniles (n=145), 45% sub-adults (n=144) and 10% adults (n=32). Hawksbill turtles were classified as follow: 18% juveniles (n=4), 36% sub-adults (n=8) and 45% adults (n=10) (Figure 1.3).

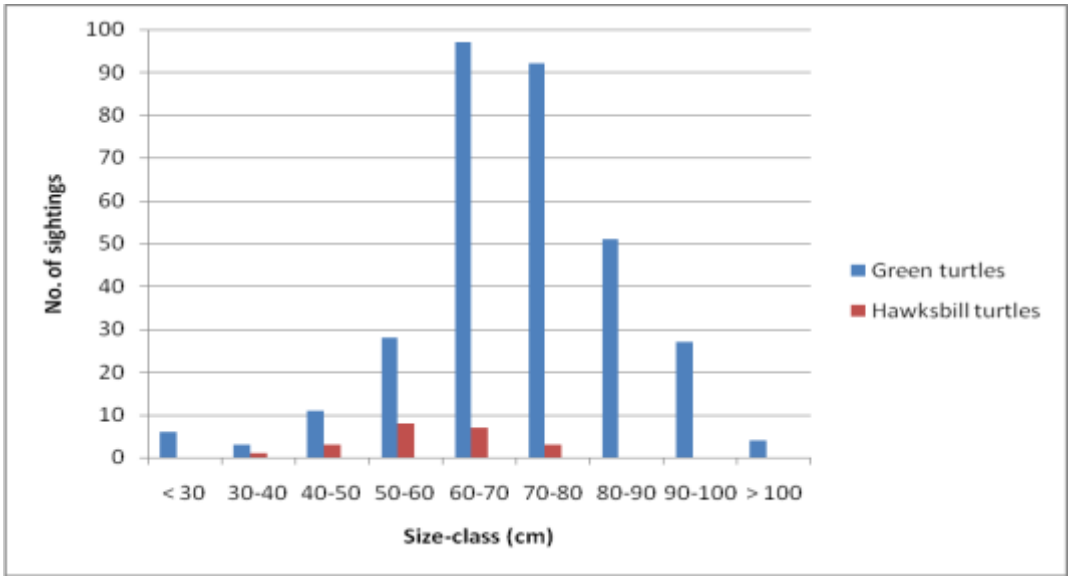


Figure 1.3. Size-class distribution of marine turtles observed from July to November 2011.

For the green turtles, we did not find any difference in the proportion of adults, sub-adults and juveniles between the nesting and non-nesting season (Fig. 1.4). Gender was determined in all the adult and sub-adults turtles (green turtles: n=176; hawksbill turtles: n=18). For the green turtles we observed 54% females (n=96), 17% males (n=30) and 29% unidentified individuals (n=50). For the hawksbill turtles we observed 50% females (n=9), 28% males (n=5) and 22% unidentified individuals (n=4).

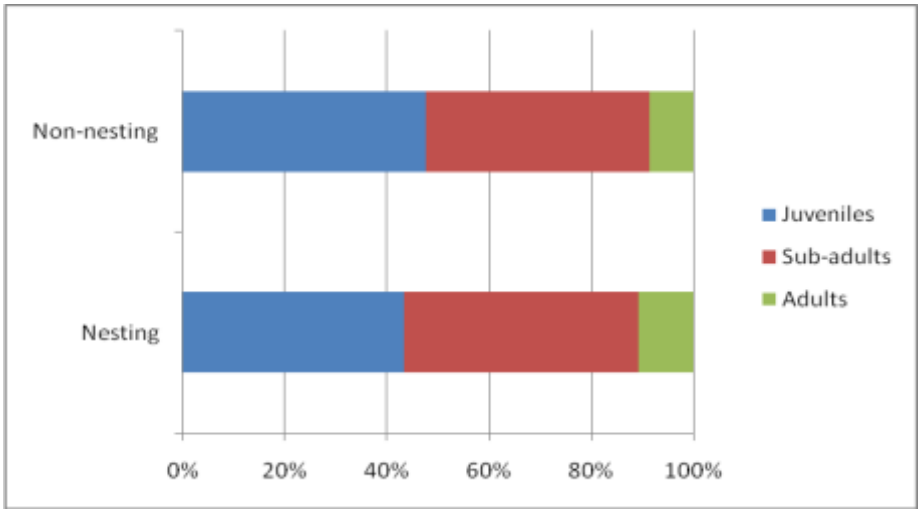


Figure 1.4. Proportion of adult, sub-adult and juvenile green turtles sightings during the nesting and non-nesting seasons.

In-water behavior

The behavior at initial sighting was recorded for 428 observed turtles (377 green turtles, 25 hawksbill turtles and 26 unidentified turtles). No social behavior (courtship, mating, reproduction, contests) was recorded, however in multiple occasions more than one turtle was observed at the same time.

Green turtles were observed feeding (42%, n=160), swimming (36%, n=134), resting (17%, n=63), breathing (3%, n=12) and cleaning (2%, n=8). Hawksbill turtles were observed swimming (35%, n=12), feeding (31%, n=10), resting (23%, n=2) and breathing (11%, n=1) (figure 1.5).

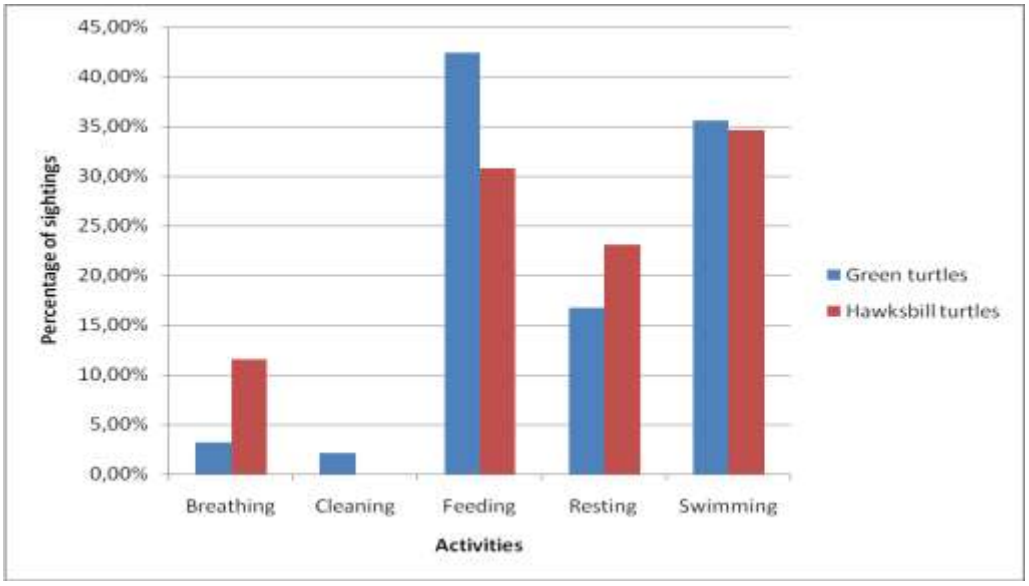


Figure 1.5. Percentage of activity at initial sighting per species of turtle observed from July to November 2011

Photo-identification

We identified a total of 25 individuals out of the 453 sightings. One individual was seen eight times, two individuals were seen seven times, two individuals were seen five times, six individuals were seen four times, five individuals were seen three times and nine individuals were seen two times (total number of re-sightings = 89). Individual turtles were identified in Marsa Abu Dabbab (20 individuals), Marsa Shagara (2 individuals), Marsa Fukera (2 individuals) and Sharm El Lulli (1 individual).

Preliminary conclusions

Nesting sites

Monthly surveys on scattered nesting sites are not enough to understand patterns of marine turtles and identify trends. For this reason, HEPCA will start in 2012 a new monitoring project with regular surveys of important feeding grounds in order to obtain accurate data to be used for analysis.

From the surveys done in 2011, the following can be said:

- The nesting season goes from April (when a first nest was reported by a dive guide in Marsa Fukera) to September (when the last new track was observed). This is slightly longer than what was found from previous studies (May to end of August), the peak of the nesting season is around July.

- There is an overlap of nesting areas used by green and hawksbill turtles in the south, although the two species are not using the same part of the beach: hawksbill turtles usually lay eggs under overhanging vegetation while green turtles prefer open spaces. It also seems that the peak nesting season for the two species is not the same: the green turtle has a peak period during July while the hawksbill turtles have two peak periods before and after July.

- The high number of false nests/tracks indicates that when coming out of the water to lay eggs, marine turtles are stressed. In that area, sources of stress can come from: artificial light pollution from hotels and resorts nearby (some resorts can be seen at night at more than 5 km), noisy pollution (mainly due to the presence of the road and cars passing frequently), increased number of predators like wild dogs. A plan is under-studying at present in order to reduce the impact of these sources of stress.

- Natural predation is very high and only a few nests survive. Most common predators observed during our survey were desert fox and dogs. Ghost crabs were also observed regularly close to true and false nests. No egg poaching was observed and witnesses reported this to be an uncommon habit in recent years. Starting next year, a proper assessment of natural predation will be put in place and protection of nests *in-situ* will also be discussed.

Distribution and abundance in feeding grounds

The data on abundance and distribution presented here should be considered as preliminary only because 5 surveys are not enough to understand marine turtles behavior or to infer trends in population abundance. From the surveys carried out in 2011, the following can be said:

- Our surveys take place mostly on seagrass areas where green turtles are more common than hawksbill turtles. Our results stressed this point, but also for this reason data on

hawksbill turtles abundance should be considered as under-estimates of the real population.

- Two main feeding aggregation sites have been identified: Marsa Abu Dabbab and Torfa. Both of them host an important number of green turtles but are subject to different levels of explotation: in Marsa Abu Dabbab there are hundreds of divers and snorkelers every day, on the other hand Torfa is closed to the public and only few divers visit the northern entrance of the bay, mostly around the corals.

- Marine turtles are present all year round in most of the dive sites. Some of them can be considered as resident in a specific area and will be observed almost at each survey. Other turtles can be considered as migrants and will be spotted only once or twice in the same site. It is not clear from where the migrant turtles come and further studies are needed to understand if the populations of marine turtles in the Egyptian Red Sea are isolated or if they have contact with other turtles coming from surrounding regions (Oman, Indian Ocean, Saudi Arabia).

- The variation in number of turtles between the nesting and non-nesting season can be interpreted as migrations of adults from the reproduction areas to the feeding grounds and an arrival of new recruits (juvenile turtles) from the open water to more protected areas.

- The data collected up to know are in contrast with the common belief that green turtle populations in the Egyptian Red Sea are negligible and that only few seagrass meadows are still existing. The population of green turtles could potentially be higher than the population of hawksbill turtles, with the main difference that hawksbill turtles are scattered among hundreds of sites while green turtles tend to aggregate in coastal areas with dense seagrass patches.

- The importance of seagrass beds for green turtles is evident as this is where they get most of their food from. Further studies are needed to understand seasonal abundance and species diversity of seagrass in order to better understand how green turtles use these areas. Also there is a strong need to protect these sheltered areas from coastal development and promote responsible behavior while diving or snorkeling as it is done for coral reefs. In particular, divers should avoid move their fins too close to the bottom because the presence of too much sand in the water column could be harmful for seagrass plants.

Population structure

As the number of hawksbill turtles found during this study is very low we are not drafting any conclusion for the moment. However some preliminary conclusions on green turtles population structure from our field surveys in 2011 can be summarized as follow:

- The Southern Egyptian Red Sea hosts predominantly large turtles (sub-adults and adults). The juvenile turtles possibly use more protected areas close to mangroves or southern from our area. Large turtles migrate seasonally from their feeding grounds to their reproductive sites, however this migration in the case of green turtles occurs every 1 to 3 years. A long-term database will help better understanding these migration patterns.

- We identified many males having the size of sub-adults. At the sub-adult stage, it is usually hard to distinguish between male and female marine turtles, but not for turtles in the Red Sea. We do not have enough data to make definitive conclusions, however this could mean

that turtles in the Red Sea grow faster than in other sites of the world. Growth rate is usually related to the food availability, an increased growth rate is a sign of great food availability.

- There is higher number of females then males, and the number of males increase after the nesting/reproductive season when the males migrate from their reproductive areas to their normal feeding grounds. This could confirm the hypothesis of seasonal migrations and leave one question: where are the reproductive areas?

In-water behavior

Marine turtles are solitary animals. Even if they are seen feeding in the same area they do not interact unless they are in the reproductive season. We did not observe any social behavior (mating, courtship, competition) which means that the coastal areas we are monitoring are not used during the reproductive season. This is confirmed by sporadic reports from divers and dive guides that have seen mating turtles in open waters.

Turtles also use these areas for other activities like carapace cleaning and resting. These last two activities are particularly important when the temperature of the water drops and these animals slow their metabolism. For this reason it is extremely important to limit external sources of stress usually coming from divers and snorkelers. In areas like Marsa Abu Dabbab, turtles adapted to the presence of many people in the water and they tend to keep on with their activities even if surrounded by people, however when people get too close they tend to swim away in deeper waters. In other sites, like Torfa, where turtles are not used to people, the turtles swim away very fast which make the identification process more complex. In this view, it is important to have maximum number of divers and snorkelers in order not to disturb these animals too much and keep important areas closed to the public. It is also important to follow guidelines (presented in another chapter of this report) on best behavior when encountering marine turtles.

Photo-identification

The impact of photo-identification is discussed more in detail in the chapter 3 (Red sea Turtle Catalogue). For the moment, we did not find the same individual in more than one area, which could be interpreted as a high site fidelity. This behavior is well-known in green turtles but it is less understood in hawksbill turtles. However, with only 30 individuals in the catalogue, it is not possible to draw definitive conclusions.

2. Activity II: TurtleWatch-Egypt

Description

The TurtleWatch-Egypt is a project run in collaboration with dive centers along the Egyptian Red Sea coast from Sharm El-Sheikh to Wadi Lahmi. This project is based on the principle “Observe to Conserve” and aims at collecting information on turtle sightings from professional and recreational divers.

Data collected by volunteers at sea has proven to be very useful in a number of surveys targeting coral reefs, marine mammals, fish and now, turtles. Recent studies suggest that many recreational divers consider being involved in data collection or observation programs as an opportunity to contribute to the conservation of the marine environment. Marine turtles are particularly suitable for

observation and monitoring projects that require the help of non-scientist users because they are easily identifiable species that usually occupy the same areas used by divers.

The TurtleWatch package

The dive centers that decided to take part to the TurtleWatch project received by e-mail a package containing the following items:

- the TurtleWatch Manual (in .pdf) (appendix 2.1);
- the TurtleWatch survey form (in .pdf) (appendix 2.2);
- the TurtleWatch logo/ban that can be added to the dive center website;
- a set of Red Sea turtle identification sheets (in .pdf) (appendix 2.3);
- a database where to report the sightings (in .xls).

Agreements were made with all the participants that an updated database was to be sent to HEPCA at the end of every month including available pictures.

Preliminary results

Participants

TurtleWatch-Egypt was officially launched in March 2011 and at present there are 8 dive centers that are contributing to the program with their data (table 2.1).

Table 2.1. List of dive centers that have joined Turtlewatch-Egypt in 2011 (in alphabetical order).

Dive center	*Location*	*Joined in*
Big Blue Dahab	Dahab, South Sinai	September 2011
Camel Dive Club	Sharm El Sheikh	March 2011
Red Sea Diving College	Sharm El Sheikh	June 2011
Red Sea Diving Safari	Marsa Shagara Village, Marsa Alam	May 2011
Sharks Bay Umbi Diving Village	Sharks Bay	September 2011
TGI Diving El Gouna	El Gouna	December 2011
TGI Diving Marsa Alam	Wadi Gimal	December 2011
Wadi Gimal Diving Center	Wadi Gimal	May 2011

Species and spatial distribution of sightings

Up to now (15th December 2011) we collected 372 reports on marine turtles from 35 dive sites. In 132 of the daily reports (35% of the total), no turtles were observed during the two to three dives done during that day. These data of absence are also very important to understand seasonal migrations of turtles. The other 240 reports (defined here as positive sightings, 65% of the total) reported: 80 green turtles (33% of the positive sightings), 145 hawksbill turtles (60% of the positive sightings) and 15 unidentified turtles (7% of the positive sightings).

For the analysis, we divided the data into two spatial regions: Northern Red Sea (NRS, including the Sharm El-Sheikh area) and Southern Red Sea (SRS, including Marsa Alam and Wadi Gimal

areas). In the NRS, the species ratio reported by divers was one green turtle for 3 hawksbill turtles (26% of green turtles and 73% of hawksbill turtles, unidentified species not included). In the SRS, the species ratio reported by divers was 1.4 green turtles for 1 hawksbill turtle (59% of green turtles and 41% of hawksbill turtles). Figures 2.1 (a-b) show the distribution of sightings collected from the dive centers in 2011 in the NRS (a) and SRS (b).

Figure 2.1.a Map of dive sites from which turtle sightings were reported in the NRS area.

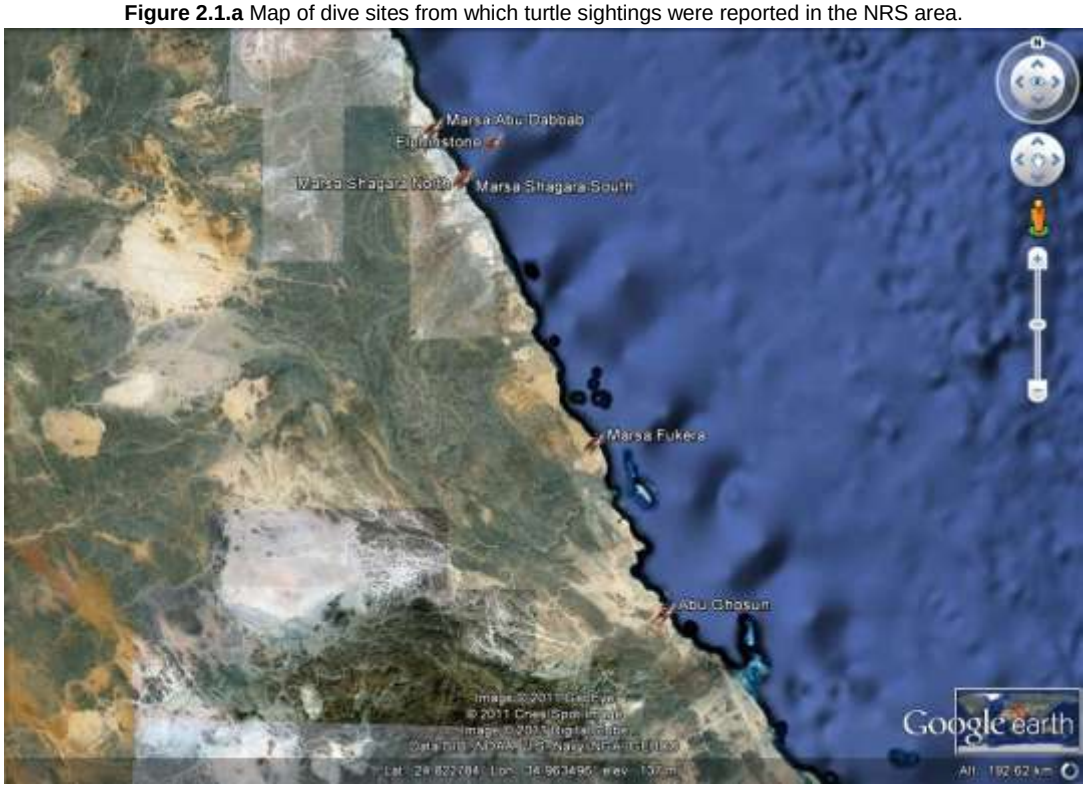


Figure 2.1.b Map of dive sites from which turtle sightings were reported in the SRS area.

Details of number of sightings are presented in table 2.2, the total number of sightings per each site is not adjusted to the number of dives. This means that the number of sightings in a spot cannot be used as a proxy to estimate the abundance of marine turtles in that place.

Table 2.2. Total number of sightings reported from march to November 2011 per site.

Site	Green turtles	Hawksbill turtles	Unidentified turtles	Total
Southern Red Sea				
Elphinstone		3		**3**
Marsa Abu Dabbab	25			**25**
Marsa Fukera	3			**3**
Marsa Shagara North	5	6		**11**
Marsa Shagara South	3	13		**16**
Abu Ghosun	1	4		**5**
Northern Red Sea				
Amphoras		3		**3**
Anemone City		2		**2**
Dunraven			1	**1**
Far Garden - Local		1	1	**2**
Fiddle garden			1	**1**
Gordon Reef		6		**6**
Jackfish Alley	7	8		**15**
Jackson Reef	5	29	3	**37**
Kormoran		1		**1**
Lighthouse	1			**1**
Local North		1		**1**
Naama bay	3			**3**
Near garden	1	2		**3**
Paradise		1		**1**
Ras Nasrani	2	6		**8**
Ras Za'atar		2		**2**
Ras Ghamilla	1	6	1	**8**
Ras Ghozlani		5	1	**6**
Ras Katy		1		**1**
Ras Mohammed	1	7		**8**
Ras Umm Sid		3	2	**5**
Shark bay	1	2	1	**4**
Shark Observatory		4		**4**
Shark and Yolanda	14	13	3	**30**
Tiran	2	1		**3**
Temple - Local		1		**1**
Thomas reef	2	8		**10**
Turtle Bay	2			**2**
Woodhouse Reef	1	6	1	**8**
TOTAL	**80**	**145**	**15**	**240**

Seasonal patterns

As the effort (number of participants) increased since the beginning of the project, we used daily average number of sightings per dive in order to understand monthly patterns of sightings. In the Northern Red Sea, turtles are present all year round (from March to November) with little variation (fig. 2.2). In the Southern Red Sea, reporting started in July which explains the absence of data for the first 4 months of the survey. Data in fig. 2.2 show a clear decrease in the number of turtle sightings at the end of the nesting season (September-October) and another increase in November.

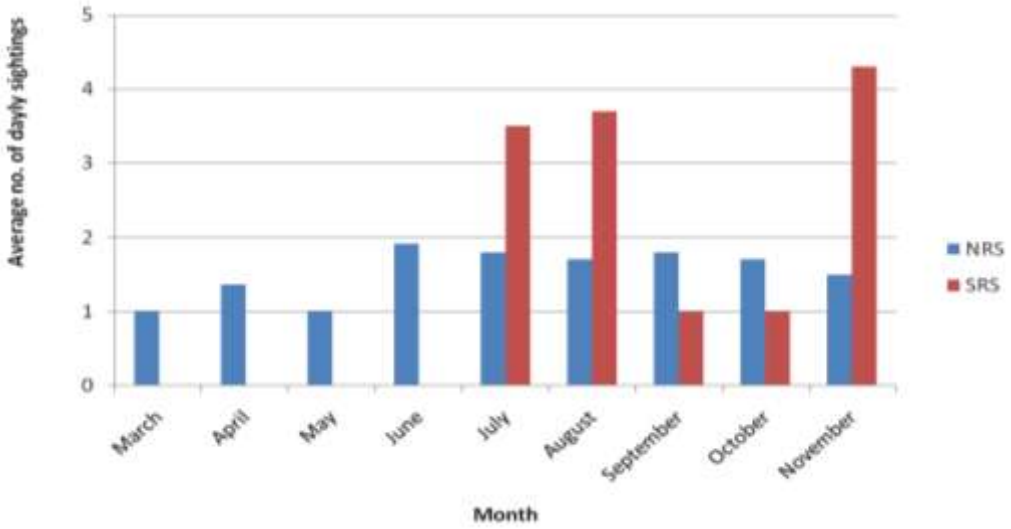


Figure 2.2. Monthly distribution of average daily sightings in the Northern (blue) and Southern (red) Egyptian Red Sea.

Population structure

Data on straight carapace length were available for 200 sightings (123 hawksbill turtles and 77 green turtles). As we did not find any statistical difference from individuals in the NRS and SRS areas, we plotted all the data together (Fig. 2.3). According to their size, green turtles were classified as follow: 40% juveniles (n=31), 9% sub-adults (n=7), 51% adults (n=39). Hawksbill turtles were classified as follow: 26% juveniles (n=32), 9% sub-adults (n=11) and 65% adults (n=80) (figure 2.3).

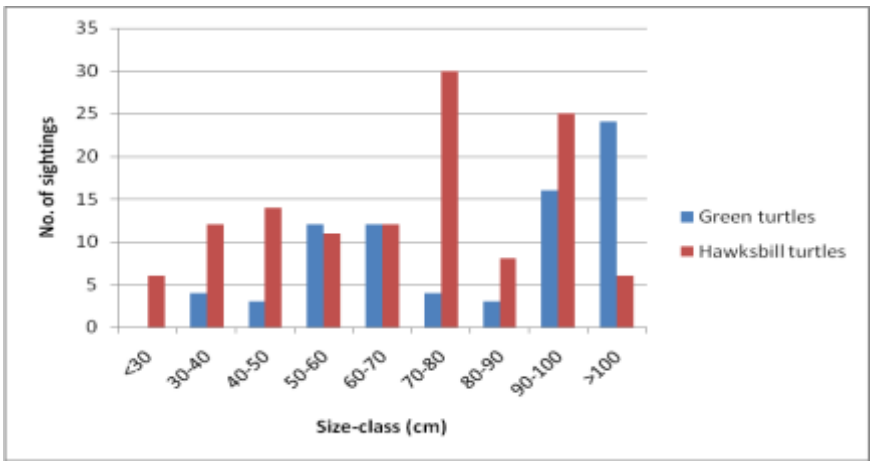


Figure 2.3. Size-class distribution of marine turtles observed from March to November 2011

Gender identification was accepted only for adult individuals resulting in 12 male and 22 female green turtles (ratio of approx.1:2, n=34, 87% of adult individuals) and 33 male and 38 female hawksbill turtles (ratio of approx. 1:1; n=71, 89% of the adult individuals) (fig. 2.4).

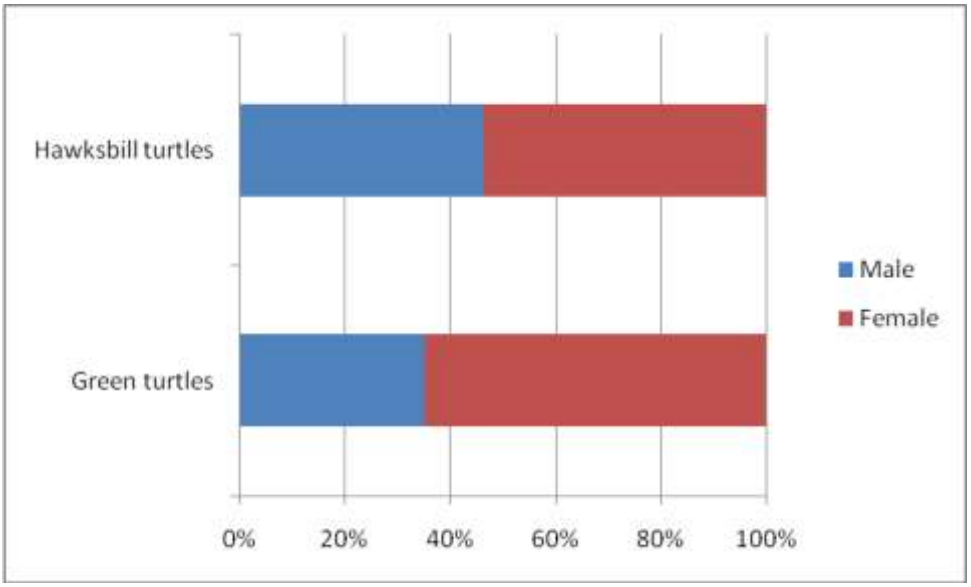


Figure 2.4. Percentage of adult female and male green and hawksbill turtles.

Preliminary conclusions

Participants

The number of dive centers taking part to the TurtleWatch represents approx. 3% of the total number of dive centers operating in the Egyptian Red Sea, however the amount of data collected is big and shows well the importance of involving every-day users into data collection. For the next year, we are hoping to increase the number of participants and manage to cover more in depth areas from which we did not get any data: Hurghada, Safagaa, Soma Bay and Quseir in particular.

Species and spatial distribution

From the data received and verified with the pictures, the participants can easily identify the two most common species of marine turtles. The fact that a majority of hawksbill turtles are seen especially in the Northern Red Sea is related to the fact that most of the dives occur along coral reefs, the typical habitat for this species. Green turtles are also known to use coral reefs but only marginally, their distribution being more intense on seagrass areas. This explains why for the Southern Red Sea area, the data collected by HEPCA research team and the divers concerning species presence are not the same: the research team works mostly on seagrass areas (thus a majority of green turtles are observed), while divers usually reports sightings from coral reefs (thus a majority of hawksbill turtles are reported).

In the NRS, marine turtles can be observed frequently in most of the diving sites. However, due to the great number of sightings in Shark and Yolanda reef and Jackson reef, these two sites can be considered particularly good if observing turtles is the goal of the diving.

In the SRS, aggregations of marine turtles have been observed regularly in Marsa Abu Dabbab. Marsa Shagara reefs also host a small but consistent population of turtles.

Seasonal/monthly distribution

The average number of sightings remained steady all along the 9 months of the project in the NRS, however there was an increase in the number of negative reports (sightings compiled even if no turtle was observed), which means that the number of turtles could decrease during the winter months either because the turtles are less active and hide in the corals or because they move to other less frequented areas. A 9-month database with a variation in the effort is not solid enough to produce solid conclusions but hopefully at the end of next year we will have a better picture of the situation. Another point that should be taken into account is that most of the dive centers tend to fill the datasheet only if and when a turtle is observed, thus the presence/absence data should analyzed very carefully before giving any conclusion.

Population structure

Before making any conclusions from these data, it is important to highlight that the magnification effect of the water is not always taken into account by the observers. This can bring to an over-estimation of the turtle size and thus an over-estimation of adult and sub-adult individuals.

From the data obtained, the populations of green and hawksbill turtles are skewed towards sub-adult and adult individuals. Few juveniles have been observed which could suggest that smaller individuals do not use the same areas as the bigger ones. It is also possible that this is related to the fact that smaller individuals are hardest to observe and tend to swim much faster. It seems that the number of adults is not related to the reproductive season.

3. Activity III: Red Sea Turtles Catalogue

Description

In ecology, it is very important to be able to identify individuals within a population as this provides realistic estimates of the population size, growth rates and also migration patterns. This information is central to the development of wildlife management plans and thus it is fundamental for the conservation of the species.

The most frequent techniques used for marine turtles identification is the use of flipper tags but this method usually requires the capture and handling of the animal. Furthermore, the tags can get lost because of incorrect application or because they have been bitten off. An alternative to attaching markers to wildlife, is to use visual identification of individuals. This is commonly done for example with dolphins where the shape of the dorsal fin and/or the presence of marks and scars allow researchers to identify each individual. This technique has some obvious advantages: animals are not physically captured (so they are not stressed) and their behavior is not affected by the identification system. Photographic identification, in which researchers photographically capture these natural markings to identify and re-identify individuals, has proven to be a useful tool in long-term monitoring of wild animal populations.

In sea turtle research, this method is quite recent but has already proven to be effective when marine turtle populations are easily accessible to snorkelers and divers. To identify individual marine turtles ideally three pictures per animal are needed: one for left profile of the head, one for the right profile of the head and one for the full carapace. In particular the head profiles have patterns that are unique to each individual. Furthermore, some turtles have specific natural marks on their carapace (extra scutes, barnacles, scratches) that make them unique.

In its effort to increase the scientific knowledge of marine turtles of the Egyptian Red Sea and to improve their conservation, HEPCA started the first catalogue of these animals. The catalogue is a joint effort between HEPCA researchers, dive centers and visitors. Pictures are being collected from different sources. This catalogue has many aims: 1) provide a long-term photographic database that is updated once per month; 2) involvement of different sectors in sea turtle conservation and 3) it can be used as a tool to spread awareness among different users.

Some Results

Since the beginning of this project that was launched in March 2011, we collected more than 500 pictures from dive centers, turtle lovers and our field team. This allowed us to identify 30 individuals that have been added to our catalogue. Photo-identification pictures are available for more individuals but only after being re-sighted, an animal is added to the catalogue. At present, 20 individuals have been identified in Marsa Abu Dabbab, 3 in Marsa Shagara, 2 in Marsa Fukeira and Jackson Reef and 1 in Yolanda Reef, Elphinstone and Sharm El-Lulli. The complete catalogue is available in appendix 3.1.

4. Red Sea Turtle Stranding and Salvage Network

Description

Collecting data on mortality causes of marine turtles of the Red Sea is one of the fundamental steps in order to propose specific measures to better protect them. For this reason HEPCA called upon its members to report any dead or injured/sick turtle found on the beach or floating at sea.

Some Results

From March to December 2011 we received 8 reports, 3 concerning sick/injured turtles and 5 concerning dead turtles found stranded on the beach. Of the three sick turtles:

- One died before being transported to Hurghada. The turtle was found floating in Wadi Lahmi with buoyancy problems. A necropsy was realized on the carcass, revealing a long-term infection in the lungs (likely a virus provoking something similar to pneumonia) and a very high number of parasites in the digestive system. The death cause was classified as natural/disease.

- One turtle, a male hawksbill, was found floating with buoyancy problems (unable to dive) in Sharm El Nagaa. The turtle was taken to a veterinary in Hurghada where the x-rays revealed a lung infection and an occlusion of the digestive system. The turtle was treated with antibiotics for the lung infection which disappeared after ten days. However the intestinal occlusion could be solved only through surgery intervention for which no specialist is available in the region. After one month and although all the cures, the turtle died as a consequence of prolonged intestinal occlusion. During the necropsy, no plastic bag was found inside but three major blocks of compacted sand. The presence of massive amounts of sand in hawksbill turtles is quite common due to their diet (mostly soft corals and sponges).

- One turtle, a female green, was found floating with buoyancy problems in Wadi Lahmi. The turtle had a problem related to the digestive system and without a proper clinic there is

very few we can do. After analysis of the situation, the turtle was released in the hope that the problem would solve naturally.

Of the 5 turtles that were reported to be stranded dead, only three were analyzed more in depth and a necropsy was carried out. It is important to pinpoint here that identify mortality causes in marine turtles could be very difficult. In particular interaction with fishing gears and specifically nets is hard to find as the turtle skin is hard and rarely evidence are found externally. Furthermore, a specialized veterinary would be needed in order to prove the cause of mortality. Here, to identify the probable cause of mortality, we used rapid field assessment techniques learnt during a training.

- Two turtles presented signs of drowning (engorged veins, dark colored lungs, bubbles in the mouth and gut, normal feeding activity). No signs of interaction with fishing gears were observed externally, however one of the possibilities is that the turtles got stuck in fishing nets.

- One turtle was found very emaciated, with an important loss of muscles and fat, indicating a long-term problem. An important number of parasites was found in the stomach which could be a sign of a long term infection or pathology.

Some Conclusions

- No data are available on detailed mortality causes of marine turtles and their health status. This project is very important in order to collect proper data on this topic. We should stress on the importance of this aspect of marine turtle conservation in order to establish a proper stranding and salvage network.

- There is a need for a specialized team member able to analyze tissue samples and prove the cause of death in an irrefutable way.

- A good point from the data obtained up to now is that no turtle affected by fibropapilloma was found or observed. The fibropapilloma is a tumor provoked by a retrovirus similar to the herpes. It is extremely contagious within marine turtles, it has high rates of mortality and seems to be related to the water pollution. Fibropapillomatosis was first described on green turtles in Hawaii but the disease spread and there are cases now in the northern Pacific as well. It is important to monitor this disease not only because of the high mortality rate but also because it could be harmful for human beings.

5. Activity V: Capacity building, education, awareness

Description

Capacity building, awareness and education are fundamental in protecting marine turtles from most of human-caused threats (irresponsible coastal development, destruction of nesting and feeding grounds, by-catch, irresponsible behavior when diving or snorkeling with turtles, etc). For this reason, since the beginning of this project, HEPCA tried to involve different users and spread the message.

Summary of activities

Internship

HEPCA accepted interns during all the field surveys carried out from July to November. In total 7 Egyptian students coming from different backgrounds received the training and were able to participate to the field work. During the surveys, interns learnt:

- Basic marine turtles biology and ecology;
- Main threats to marine turtles worldwide and specifically in the Red Sea;
- Basic field research techniques (follow a research protocol, fill the database, do photo-id).

One of the interns is now starting his master project on marine turtles of the Red Sea. He will be the first student in Egypt focusing on this topic. Part of his master will be a continuation of HEPCA research project in the field.

Education/Awareness

HEPCA produced a booklet of responsible behavior when encountering turtles in different situations (while snorkeling or diving, on a nesting beach, how to deal with hatchlings, etc) (appendix 5.1). The booklet needs some icons and will be then distributed in electronic format through the website.

During the "World Turtle Day", HEPCA organized an awareness event in collaboration with the local association "Hurghada After the 25th". Around 100 children took part to the event during which multiple workshops were organized aiming at spread message about sea turtles in a funny way.

What is on for 2012?

After the first year HEPCA decided to launch more activities on marine turtles, involve users in all the aspects of data collection and raise the number of awareness activities. Following is a list of activities planned for next year which implementation will depend mostly on funding available.

- Nesting monitoring: one of the weak points of our project in 2011 was the lack of regular monitoring of nesting beaches from Sharm El-Sheikh to the Sudanese border and far islands like Zabargad. Data from nesting beaches are fundamental to establish trends in marine turtle populations and it is fundamental to collect data in a standardized and accurate way. For this reason HEPCA will launch for next year the following projects:
    - <u>Take Action: involving users and stakeholders in marine turtle conservation:</u>

      This pilot project will take place in the area of Sharm El-Sheikh and will rely on hotels and dive centers to collect data on nesting beaches according to a predefined schedule and following the same methodology. A training will be given to interested participants by the end of April (before the beginning of the nesting season) and the participants will be asked to report on data collected on a regular base following the example of the TurtleWatch project.

This will also be a great opportunity to spread an awareness message and promote conservation best practice by convincing hotels to reduce artificial lightening, reduce the amount of obstacles on the beach, reduce noisy pollution and promote a more responsible tourism in Sharm El-Sheikh.

- Monitoring important hawksbill nesting grounds in the Hurghada area: Small and Big Giftun Islands

  Small and Big Giftun Islands are considered two key nesting sites for the critically endangered hawksbill turtle. Access to both islands has been restricted since they have been declared as protected areas. In particular, staying on the islands is forbidden unless users are on designated areas. In the case of Big Giftun, daily access is granted by a private company that also own a restaurant on site.

  Data collected in previous years show that there are around 200 nesting hawksbill turtles visiting the island every season, which usually goes from late April to the beginning of August with two peaks before and after July. Data available do not reflect recent changes due to the incredibly fast development of Hurghada. In particular artificial light pollution, noisy and number of visitors on one of the islands increased sharply. As hawksbill turtles are considered as one of the most endangered turtle species in the world, it is important to collect as many data as possible on their nesting and reproductive biology.

  We will conduct intensive mid-season nesting monitoring during 2 weeks at the peak of the season. Depending on the agreement we can reach with the Navy and the Coast Guard, we will be conducting either nigh-time or day-time monitoring.

- Intensive monitoring of nesting sites in Wadi Gemal-Hamata National Park: a community project

  Wadi Gemal-Hamata National Park (WGHNP) was declared in 2003 in order to protect the coastal and terrestrial area from unplanned development. The coastline of WGHNP includes some valuable nesting sites for both hawksbill and green turtles. Although the nesting activity is considered to be scattered all along the Egyptian Red Sea coast, there are at least two sites that have an higher concentration of nests compared with most of the other in-shore areas: Ras Honkorab and Omm Al-Abath. The two beaches have a total length of approx. 14 km. In front of both beaches there are large seagrass meadows generally used by green turtles for feeding.

  After selecting two candidates from the local Ababda community and after training, the observers will collect data on these two nesting beaches according to a calendar previously established and will fill datasheets that will be than analyzed in order to get the total amount of nesting females visiting those beaches.

- Monitoring key green turtle nesting sites: Zabargad and Sirnaka Islands

  Located in the Gabel Elba National Park, Zabargad and Sirnaka Islands are considered as the most important green turtle nesting sites in Egypt. Yearly surveys have been carried out by park rangers from 2001 to 2009 showing that up to 1500 females could lay their nests in these two islands every year. In 2009, 4 nesting females were tagged with satellite tags showing that the turtles are moving north (up to Hurghada) and south (down to Eritrea) but not leaving the Red Sea. The access to both Zabargad and Sirnaka islands is difficult due to the fact that these islands are far from the coast and staying overnight on both islands is forbidden. These two islands are key nesting sites and a regular monitoring would provide data not only on the nesting trends (number of nests, hatchling success, hatchling survival) but also on reproductive behavior of green turtles in the Red Sea (re-migration intervals, average carapace size of nesting turtles, etc.).

  For 15 to 21 days during the peak season (mid-july to mid-august) starting 2 hours after sunset, the observers will walk the beach along the high tide line and will count all the nesting females coming out to lay eggs. For each turtle, the observers will have to identify the species, measure the curved carapace length and width, apply two flipper tags if no tag is present, count the number of laid eggs differentiating between fertile and infertile eggs. The observers will also collect data on the track width and nest location (distance from the high tide line). All the measurements for the turtle will be taken while the animal is laying eggs or when it is going back to the water. The observers will mark every nest with a stick. On the stick, the observers will write the date, the number of the nest, the estimated date of hatching (60 days after the nest was laid) and the number of counted eggs.

- Using fishermen expertise to monitor important off-shore nesting sites: Rawabel and Siyal Islands

  Rawbal and Siyal islands are located within the Gabel Elba National Park and are thought to be important green and hawksbill nesting sites, however only scattered data are available as the access to the islands is complicate because land access is forbidden or restricted.

  For this project we will use a similar methodology as suggested for the Ababda Community Project, the main difference will be the monitoring calendar as for this project we are suggesting to carry out the surveys only during the nesting season (from May to September).

- Systematic assessment of artificial light pollution from hotels close to nesting areas: we will propose hotels and resorts located close to nesting sites to evaluate their artificial light pollution and we will suggest simple solutions in order to reduce this problem. Artificial light pollution is the first cause of reduction in the number of nesting events along in-shore beaches.

- Red Sea Turtle Research Project: we will continue with the scheme used in 2011 but we will accept 1 to 2 paying-fee volunteers per expedition. We will also improve our monitoring on the seagrass areas, adding studies of species of seagrass distribution and abundance.

In order to give international visibility to our project, we will present preliminary results from this project at the next International Sea Turtle Symposium in March 2012. This will also be a great occasion to establish international collaborations.

- TurtleWatch – Egypt: the project will continue as in 2011 and we hope that more dive centers will join us. The TurtleWatch project is now part of the MEGAbase program, still in a pilot phase, which aims at gather sightings on all the marine megafauna (sharks, marine mammals and turtles in particular). The participants of TurtleWatch willing to expand to the MEGAbase will be encouraged to do so and will receive all the needed material.

- Red Sea Turtle Catalogue: we will continue our photo-matching in order to identify more and more individuals. We will start accepting also pictures from previous years in order to establish how much time the same turtle has been spending in the same place. The catalogue will be available on our web-site in the TurtleWatch page.

- Red Sea Turtle Stranding and Salvage network: we need to advertise this part of our project more as the information that we can gather through this can be essential to better protect marine turtles. There is also a need for a trained veterinary able to carry out necropsies and/or take care of sick/injured turtles. A candidate has been found already and, depending on funding available, could be sent for a one month training in a clinic specialized on marine turtles rescue and rehabilitation.

  We will also add a page in our website with basic information on what to do and who to call in case of finding a stranded animal.

- Capacity building, education and awareness: we will continue accepting interns for our research project from Egyptian universities. HEPCA is also supporting the first Egyptian master student studying marine turtles of the Red Sea. Our master student will carry out his field work starting January 2012 and will focus on two protected areas: Wadi Gimal National Park and Gebel Elba National Park. Part of his activities will include training and workshops with the local community and in particular with fishermen in order to involve them in the data collection and get some data on by-catch and consumption.

  We will also increase the number of awareness days for children and the younger members of our community. Following the scheme of the “Turtle Day” organized here in Hurghada, we will have more similar events upon request. One is already planned for the beginning of February in El Quseir.

  More informative material need to be prepared and shared in small (leaflets) and big (signs on the beach) formats.

  We are planning a series of animated videos on different topics concerning the protection of marine environment.

Appendix 1.1. Detailed transects followed during each field survey

Fig. 1.1.1 Marsa Abu Dabbab

Fig. 1.1.2. Marsa Shagara

Fig. 1.1.3. Marsa Aiglar

Fig. 1.1.4. Marsa Asalay

Fig. 1.1.5. Marsa Samadai

Fig. 1.1.6. Marsa Tondoba

Fig. 1.1.7. Marsa Fukera

Fig. 1.1.8. Shams Alam

Fig. 1.1.9. Torfa El-Mahsheikh

Fig. 1.1.10 Sharm El Lulli

Fig. 1.1.11. Om Al-Abath

Fig. 1.1.12. Abo Ghosun

Appendix 2.1. The TurtleWatch Manual

HEPCA
CARING FOR THE RED SEA

Red Sea TurtleWatch

Observe to Conserve!!

Be a Contributor to Red Sea Turtle Conservation...

HEPCA
CARING FOR THE RED SEA

What's HEPCA?

HEPCA's mandate is the protection and conservation of the terrestrial and marine ecology of the Red Sea. This includes the underwater bio-network of coral reefs and the sensitive land ecosystems of the Red Sea coastline. At HEPCA's core is a no compromise attitude for the future. Our primary objective has remained essentially unchanged from day one: working towards the protection and preservation of Egypt's natural resources.

In 1995 HEPCA was registered with the Red Sea Governorate and the Ministry of Social Affairs as a Non-Governmental and Non-Profit Making Organization. Our initial objective has evolved and includes many projects and initiatives such as ; resource monitoring & management, public awareness campaigns, solid waste management strategies, scientific research and community development.

We have instigated everything from research and grass-roots mobilization, to ambitious projects like waste management plants that are handling the vast accumulation of human waste & debris plaguing the Red Sea. Furthermore, HEPCA is involved in raising public awareness with activities targeting the local community, schools, the tourism sector and service providers. Community development has always been one of the HEPCA's cornerstones and a number projects to encourage sustainability amongst local Bedouins have been some of our most important achievements.

HEPCA is most active in lobbying for legislation to protect our environment. Over the last five years we have been at the forefront of campaigns, which have resulted in the amendment of over 32 laws, articles and decrees. We work very closely with the Egyptian Environmental Affairs Agency (EEAA) and Natural Protectorates Department. Our collaborative efforts have ensured that laws protecting off-shore islands and coral reefs are enforced, and we have also assisted them in developing management and monitoring strategies.

Supported by its members and affiliated to both governmental and non-governmental agencies, HEPCA achieves its purpose and objectives through pro-active engagement and involvement with all arising environmental concerns.

We are continually searching for new ways to improve both HEPCA's efficiency and effectiveness and to maximize our contribution to society.

Visionary thinking and progressive action underlies HEPCA's continued role as a vehicle for change. With every passing day we are witnessing the transformative capabilities of HEPCA's philosophy, as members within our community and abroad take on a more active role in conservation.

Empowering HEPCA's momentous calling will always be that sense of ownership we invoke within the community and our members. It's this individual empowerment that has allowed HEPCA to serve as a platform for mobilizing grass-roots community reform.

By supporting the work of HEPCA, you too can help ensure the preservation and sustainability of the Red Sea environment for future generations!

Contents

What's HEPCA? viii

Sea turtles of the Red Sea 11

An insight from the feeding grounds 11

What is TurtleWatch? 12

The TurtleWatch package 12

How do I conduct a TurtleWatch survey? 13

- Who can participate? 13
- What do I need? 13
- How much information should I record? 13
- How to report your data 17
  - Step 1. Fill in the database 17
  - Step 2. Rename your pictures 17
  - Step 3. Send us your data 17
- When and where? 18

What happens to the collected data? 18

Contact us 18

Appendix I – TurtleWatch Datasheet 19

Appendix II – Sea turtle Identification Key 20

Appendix III – Red Sea Turtle ID sheet 22

Appendix IV – Photo Identification 25

Sea turtles of the Red Sea

Sea turtles are long-living reptiles characterized by slow growth, late sexual maturity and high mortality rates during their first developmental stages (eggs, hatchlings, juveniles). For this reason, sea turtles are considered extremely vulnerable to every kind of over-exploitation, therefore population recovery can take decades. At present there are seven species of marine turtles in the world, four of which can be found in the Egyptian Red Sea: the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*), the leatherback turtle (*Dermochelys coriacea*) and the olive-ridley turtle (*Lepidochelys olivacea*). A fifth species, the loggerhead turtle (*Caretta caretta*) usually enters the Gulf of Aden only but can sporadically reach Egyptian waters.

All these species are listed in the IUCN Red List either as **critically endangered** (leatherback and hawksbill turtles), **endangered** (green and loggerhead turtles) and **vulnerable** (olive-ridley turtle). Furthermore, they are all listed in Appendix I of the Convention on International trade of Endangered Species (CITES) which forbids their trade in signatory countries. While green and hawksbill turtles are known to nest and feed along the Egyptian coastline, olive-ridley, loggerhead and leatherback turtles are seen more sporadically only in the feeding areas.

An insight from the feeding grounds

Sea turtles spend 99% of their life in the oceans, however very little is known about the behavior of these animals in water. At present, 90% of the conservation and research efforts have focused on sea turtles at their nesting grounds; as in-water studies are usually costly, work-intensive and present a number of logistical challenges ranging from weather conditions, restricted access to key sites and the availability of experienced participants. However, very important information can be gained from in-water studies, spanning diet, genetic patterns and movements to abundance, growth and interaction with human activities. At present, there is virtually no data available from feeding grounds for marine turtles in the Red Sea apart from scattered sightings and pictures taken mostly by professional and recreational divers and snorkelers. For this reason, HEPCA decided to

launch the TurtleWatch project. The aim/objective is to gather standardized information to be used to improve our knowledge of Red Sea marine turtles.

What is TurtleWatch?

The HEPCA *TurtleWatch* program was inspired by a similar project launched in the Caribbean region in 2002 which was designed to collect information from professional and recreational divers on sea turtle abundance and distribution. Data collected by volunteers at sea has proven to be very useful in a number of surveys targeting coral reefs, marine mammals, fish and now, turtles. Recent studies also suggest that many recreational divers consider being involved in data collection or observation programs as an opportunity to contribute to the conservation of the marine environment. Marine turtles are easily identifiable species that usually occupy the same areas used by divers, thus they are particularly suitable for observation and monitoring projects that require the help of non-scientist users.

The TurtleWatch package

As a contributor of this project, you should have received by e-mail the TurtleWatch package which includes:

- the TurtleWatch Manual (in .pdf);
- the TurtleWatch survey form (in .pdf);
- the TurtleWatch logo/ban that you can add to your website;
- a set of Red Sea turtle identification sheets (in .pdf);
- a database where to report your sightings (in .xls).

The idea of an on-line package is to reduce the amount of printed paper and thus reduce the impact on the environment. However, if you prefer to have a paper copy of all the material, let us know so we can provide a copy of the manual, some copies of the survey form and a set of sea turtles identification sheets.

How do I conduct a TurtleWatch survey?

Who can participate?

The TurtleWatch program is open to all **dive centers** working in the Egyptian Red Sea area and their guests. The TurtleWatch package contains a manual that is hoped will provide you, the dive guide, with all the necessary information to conduct a TurtleWatch survey and involve recreational divers interested in the program. Remember that this program is also suitable for snorkelers. The manual is designed to be easily understandable and self-explanatory. If you are in doubt about any aspect of Turtle Watch you may have concerning how to collect data and send it to us, please feel free to contact us at: agnese@hepca.com.

What do I need?

To participate in a TurtleWatch survey, you need to be a good field observer and to report sea turtle information on a regular basis. The TurtleWatch package includes all the information you may need to conduct a survey. The following items are not necessary for the survey, but could help to gather more precise data:

- an underwater camera;
- a marked stick or an alternative measuring device which can be used to estimate turtle carapace length (see below for further details).

How much information should I record?

The TurtleWatch form is easy to fill out.

Remember, only one form per dive/snorkel trip should be filled by one designated diver, even if no turtles were seen.

Here is a description of how to complete the form item by item. Questions marked with * are required/obligatory/compulsory:

1. Dive center*: please put the name of the dive center you are working with (if you are a dive guide) or the dive center you have been diving/snorkeling with (if you are a visitor).

2. Dive guide*: please, provide your name (if you are a dive guide) or the name of your dive guide (if you are a visitor).

3. Reporter: put the name of the person that is filling out the form.

4. E-mail: put your e-mail address, if you want to be informed of how the data will be used.

5. You are*: please tick the answer that is most suitable. If none of the category applies, please specify (for example: photographer).

6. Date*: specify the date you have conducted the survey (day/month/year).

7. Dive site*: ask your guide about the name of the site, if you are not sure. Latitude and longitude positions are ideal. Please, be as precise as possible when describing the location.

8. Depth: refers to the maximum depth at which you have been diving. If you have been snorkeling, put 0 meters. ***Attention: if you are using a different unit other than meters for depth, please clarify.***

9. Water temperature: this refers to the temperature at the maximum depth. We usually measure this in degrees Celsius . ***Attention: if you are using a different unit for temperature, please clarify.***

10. Have you seen any turtles?* For us **it is equally important to know if you have or have not seen turtles** during your dive/snorkel trip.

11. If you have seen any turtles, please fill out the table and for each turtle provide the following information:

    - *Sea turtle species**: use the identification key that comes with the TurtleWatch package to help you. The easiest way to identify a sea turtle species is by counting the scutes (plates) on the carapace and on the head. Sometimes the shape alone of the turtle may allow you to identify the turtle

species. Please, state if you are sure or not of your species identification. Remember, the more honest you are, the better the quality of the data.

- *Gender*: gender can be identified only in adult or sub-adult individuals (carapace length of more than 70cm). The best way to identify the sex is by observing the tail length. If the tail extends well beyond the carapace (>20cm), it is an adult male. The tail of a female turtle is short and usually extends only slightly beyond the end of the carapace (< 10cm) (see fig. 1).

Fig.1 – Tail length in a male (1) and female (2) turtle: (a) refers to the total tail length while (b) is the proportion of the tail that usually extends beyond the carapace. Pictures modified from Research and Management Techniques for the Conservation of Sea Turtles (IUCN, 1999)

- *Estimate carapace length*: using a marked stick or another object, provide an estimate of the turtle's straight carapace length (SCL; is **the length of the carapace only, from the neck to the tail** of the turtle without considering the curvature of the carapace). Figures 2 and 3 show how you can estimate this. The data is very important as we can establish whether a turtle is juvenile or adult based on the SCL. In order to properly estimate the SCL, you need to be close (1 to 2 meters) to the turtle. You can approach the turtle gently from behind or from one side. **Remember: Never touch a turtle and never try to move it.**

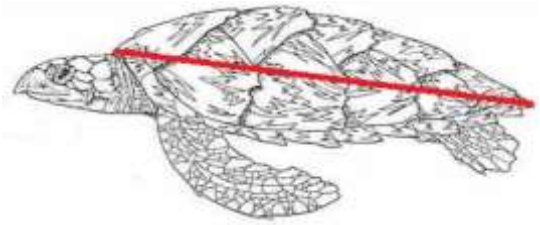


Fig.2 – Straight carapace length (SCL) from the profile

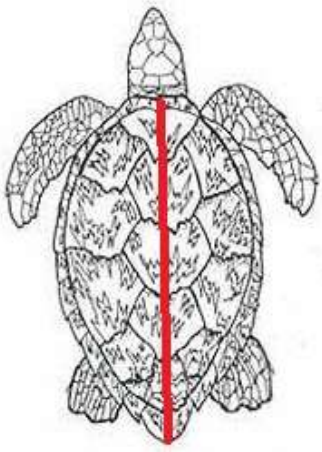


Fig. 3 – Straight carapace length (SCL) from the top

- *Picture*:* if you can take a picture of the turtle it would be helpful for our catalogue. The best way to photo-identify turtles is by taking pictures of one or both facial sides. However, any picture of the entire turtle carapace and/or special features would be very useful (check Appendix IV for more details).
- *Activity*:* usually turtles can be observed resting (not moving, either hidden in cracks or on the ground), swimming, feeding, or mating (interaction with another turtle).
- *Tag:* If you see any metal or plastic tags, please add this information here. Metal or plastic tags are usually applied in the nesting beaches and are used to track turtles and monitor their movements. If you see a turtle with tags, please try to record the number on it but only if you can do it without stressing the turtle. **Remember: Never remove a tag from a living or dead turtle! Please report the stranding to HEPCA and our staff will deal with the situation with the relevant Red Sea Authority.**

12. Comments: in the comments section, please record any particular features you found on the turtle (shark bite, presence of barnacles and their position, carapace deformity, irregular number of scutes, etc.) and add any other information that you think could be useful.

How to report your data

Step 1. Fill in the database

Once you have completed a survey, please update the database (in excel format) that comes with the TurtleWatch package. The database has two sheets:

1) In the first sheet entitled *"Observer":* please enter your personal information here (as reporter) and the dive center you belong to;

2) In the second sheet named *"TurtleWatch survey":* please enter/input all the information you gathered during the survey. If you have seen more than one turtle during the same dive, please number them from 1 (the first one you saw) to *n* (the last one you saw) and report the required information for each. If you are not sure about the species, the sex or any other data just put "unknown" (UN) or "not available" (n/a) if you couldn't collect a specific data item.

Save your database and rename it adding the latest date you up-dated it.

Step 2. Rename your pictures

Rename each picture with the species code (e.g. EI,CM,etc…), the date of the survey, the number of the turtle and the site name according to this format: **sp-ddmmyyyy-xx-site**. Add (1), (2) and so on if you have more pictures from the same turtle.

Example: CM-31032010-2-Fanous (1). This is the code for the second green turtle spotted on the 31st of March 2010 in Fanous, (1) indicate that this is the first picture of the turtle but more are available.

Save the pictures into a folder that is named after the photographer. If there are more photographers, create as many folders as there are photographers. Once you have completed this part of the survey, please zip the folders to ensure the smallest file size and send them as attachments.

Step 3. Send us your data

Once you have saved the database and renamed all your pictures and folders, please send them to us at: agnese@hepca.com. Please Note: **we cannot accept pictures bigger than 500Kb**. If you have many more pictures, send them as separate e-mails. If

you were not able to zip the folders with the pictures, please specify in your e-mail the name of the photographer for each picture or set of pictures. By sending us your pictures, you are automatically agreeing that we can use them for our turtle awareness material. The photographer will be credited each time a picture is used. If you do not wish for your pictures to be used outside of the database, please state this clearly in your e-mail.

When and where?

Diving Centers that decide to participate with the TurtleWatch project are asked to complete **a survey form on a regular basis (ideally once per week)**, even if turtles have not been spotted/seen/encountered. Remember that **the presence of turtles is as important as their absence.** This will enable us to understand the distribution of these animals based not only on the season but also on the species.

As our aim is to cover the entire Egyptian Red Sea coast, TurtleWatch surveys can be carried out at every dive/snorkeling site, there is **no spatial limitation**. Please remember that it is important that **only one form is completed per dive/snorkeling site/per observer.** The guide will supervise the recreational divers when they are filling the form. When there are no recreational divers willing to fill the form, the dive guide is asked to do it once back on-board.

What happens to the collected data?

The collated data will be reviewed by our staff, inserted into our Red Sea Turtles database and will be used to generate spatial and temporal distribution maps. In the long term, this data will also help us to estimate population trends and abundance. Reports will be published on a regular basis on our web-site and your contribution will be acknowledged. If you are interested in receiving follow-ups of the project, you can subscribe to our newsletter on our website (www.hepca.com).

Contact us

Do you have any questions or suggestions? If so, please contact us at: agnese@hepca.com

Appendix I – TurtleWatch Datasheet

HEPCA
CARING FOR THE RED SEA

TurtleWatch

Data-sheet ref. number (office use only):

1.Dive center:_____
2.Dive guide:_____
3.Reporter:_____
4.E-mail:_____

5.You are: O Scientist O Professional diver O Visitor O Other

6.Date:___/___/_____ 7.Dive site: _____

8.Depth: _____meters 9.Water temperature:_____°Celsius

10.Have you seen any turtles? O YES O NO 11. If yes, please feel the following table:

Species (code*)	Sure of ID? (Y/N)	Gender (F/M/U)	Approx. length (cm)	Picture: (Y/N)	Activity**	Tag**

**Species code:* CM=Green; EI=Hawksbill; DC=Leatherback; LO=Olive-ridley; CC=Loggerhead; U=unknown

***Activity:* sleeping; feeding; swimming; breathing; mating; other (specify)

****Tag:* if you see a tag, try to read the number carefully. **Never take a tag from a live turtle**

12.Comments:

Appendix II – Sea turtle Identification Key

In order to distinguish between species, it is fundamental to know the external morphological features of sea turtles:

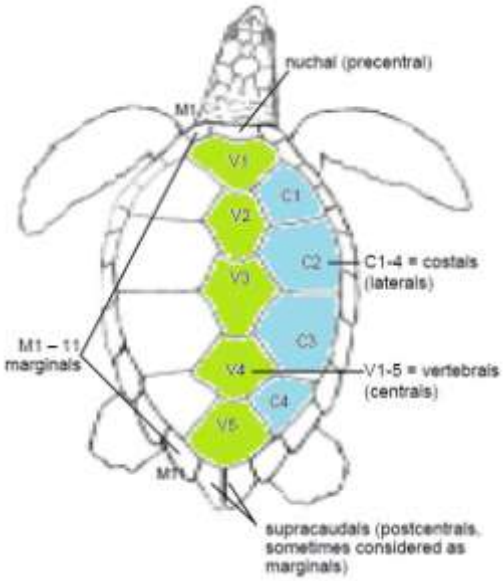


Figure 1. External morphological features of a sea turtle carapace. Every scute (plate) has a specific name according to its location. We highlighted in green the vertebral or central scutes and in blue the costal or lateral scutes. These two categories are the most important to distinguish between species present in the Red Sea. In the example we used the image of a hawksbill turtle. Image from Pritchard and Mortimer, 1999.

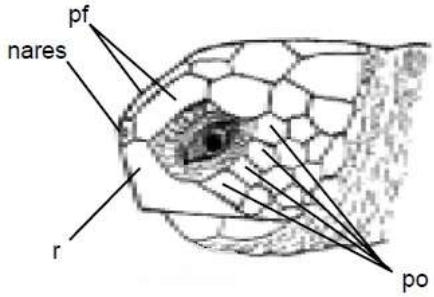


Figure 2. Anatomical features of sea turtle head, with PF: pre-frontal scales; PO: post-orbital (or post-ocular) scales; R: ramphoteca. When two turtle species have the same number or scutes on the carapace, counting the prefrontal and preorbital scales can help distinguish them. In the example we used the image of a green turtle. Image from Pritchard and Mortimer, 1999.

Flexible carapace with:
- no scutes (plates)
- 5 to 7 ridges
- black with white spots

Bony carapace with:
- scutes (plates)
- no ridges

Leathery, flexible carapace
Dark with white spots
Jaw deeply notched

Leatherback turtle
(Dermochelys coriacea)

4 pairs of lateral scutes

5 pairs of lateral scutes

6 or more pairs of lateral scutes (sometimes asymmetrical)

Ridge at the end of the carapace

Loggerhead turtle
(Caretta caretta)

2 pairs of prefrontal scales
Overlapping scutes
Bird-like beak

Hawksbill turtle
(Eretmochelys imbricata)

1 pair of prefrontal scales
Non overlapping scutes
Rounded head

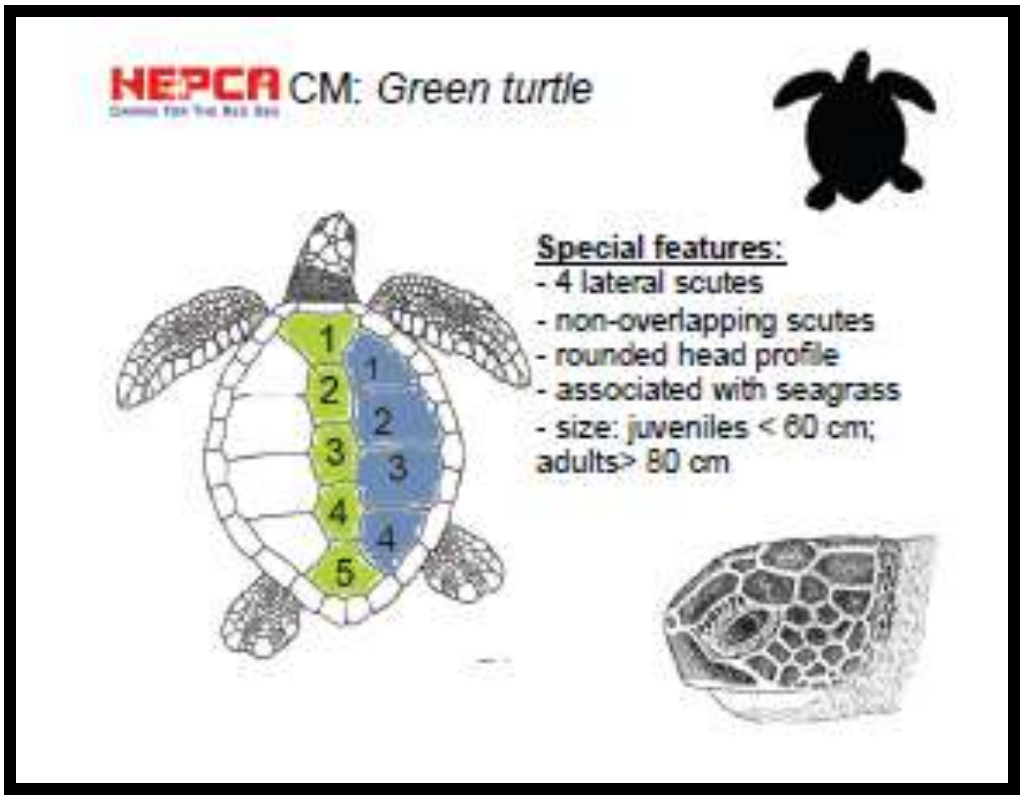
Green turtle
(Chelonia mydas)

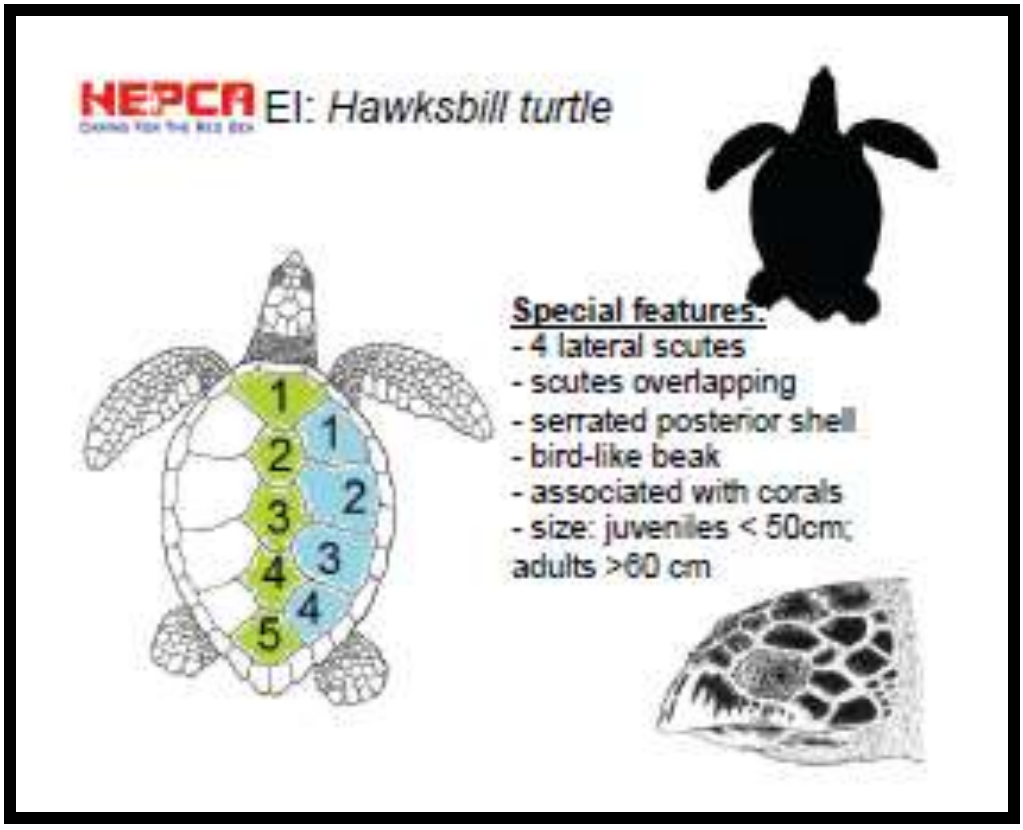
Almost circular carapace
Dark grey to dark green
Usually small size

Olive-ridley turtle
(Lepidochelys olivacea)

HEPCA
CARING FOR THE RED SEA

Appendix III – Red Sea Turtle ID sheet

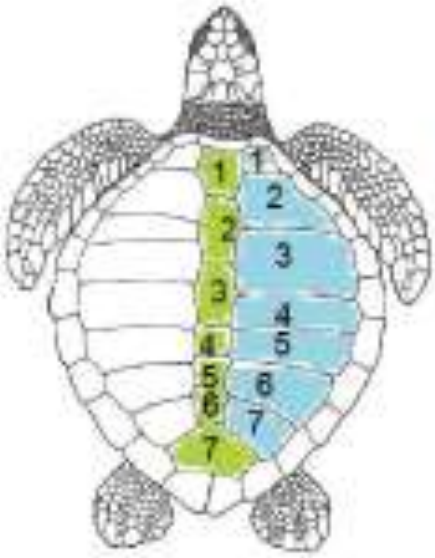




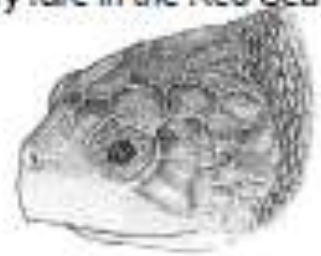
DC: *Leatherback turtle*

Special features:
- large (up to 2m)
- felxible carapace
- longitudinal ridges
- black with white spots

LO: *Olive-ridley turtle*

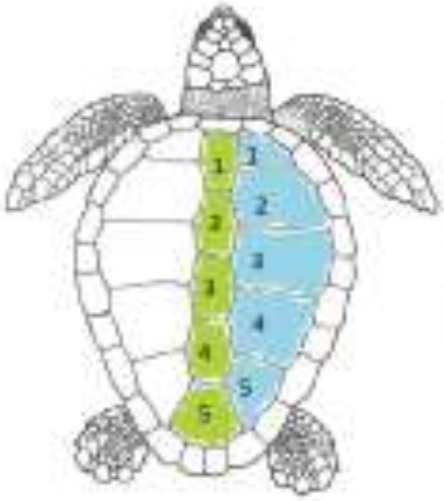


Special features:
- almost circular
- usually small (<70cm)
- 5 to 9 lateral scutes
- triangular head
- very rare in the Red Sea



HEPCA

CC: *Loggerhead turtle*



Special features:

- ridge on the carapace at the 5th central scute
- usually big triangular head
- 5 lateral scutes
- very rare in the Red Sea

Appendix IV – Photo Identification

The easiest way to identify a sea turtle species is by looking at the scutes (plates) on the carapace and on the head. In order to individually distinguish each turtle, both right and left facial sides are needed with sufficient focus and high enough resolution. Examples of useful identification pictures are shown below.

Figure 1. Right facial side of a green turtle. The quality of the image is good enough to zoom in and count the scutes.

Figure 2. Close up of the left facial side of a green turtle.

Figure 3. Picture of the full carapace of a green turtle, this is useful to list any special features that may characterize the turtle (number of barnacles, deformations, irregular number of plates, etc.).

Appendix 2.2. The TurtleWatch Datasheet

HEPCA
CARING FOR THE RED SEA

TurtleWatch

Data-sheet ref. number (office use only):

1.Dive center:_____ 3.Reporter:_____

2.Dive guide:_____ 4.E-mail:_____

5.You are: O Scientist O Professional diver O Visitor O Other

6.Date:___/___/_____ 7.Dive site: _____

8.Depth: _____meters 9.Water temperature:_____°Celsius

10.Have you seen any turtles? O YES O NO 11. If yes, please feel the following table:

Species (code*)	Sure of ID? (Y/N)	Gender (F/M/U)	Approx. length (cm)	Picture: (Y/N)	Activity**	Tag**

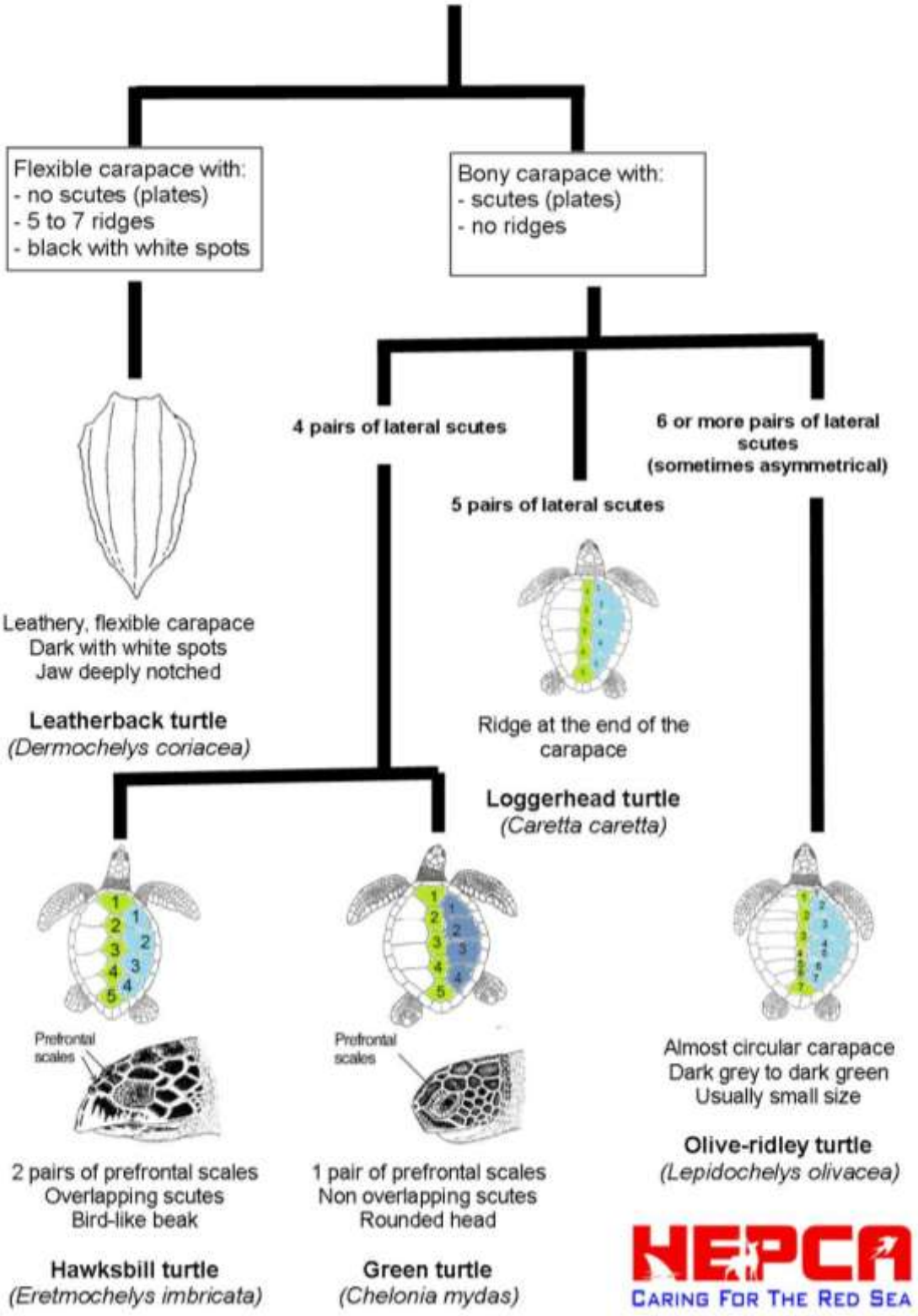
**Species code:* CM=Green; EI=Hawksbill; DC=Leatherback; LO=Olive-ridley; CC=Loggerhead; U=unknown

***Activity:* sleeping; feeding; swimming; breathing; mating; other (specify)

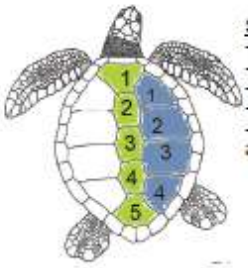
****Tag:* if you see a tag, try to read the number carefully. **Never take a tag from a live turtle**

12.Comments:

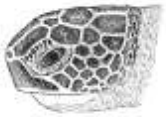
Appendix 2.3. Red Sea Turtles Identification sheets



NEPCA CM: *Green turtle*



Special features:
- 4 lateral scutes
- non-overlapping scutes
- rounded head profile
- associated with seagrass
- size: juveniles < 60 cm; adults> 80 cm



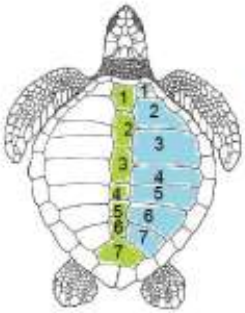
NEPCA EI: *Hawksbill turtle*

Special features:
- 4 lateral scutes
- scutes overlapping
- serrated posterior shell
- bird-like beak
- associated with corals
- size: juveniles < 50cm; adults >60 cm

NEPCA DC: *Leatherback turtle*

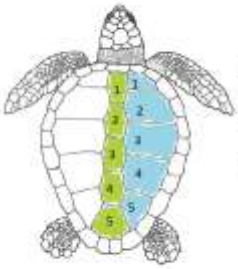
Special features:
- large (up to 2m)
- felxible carapace
- longitudinal ridges
- black with white spots

NEPCA LO: *Olive-ridley turtle*



Special features:
- almost circular
- usually small (<70cm)
- 5 to 9 lateral scutes
- triangular head
- very rare in the Red Sea

NEPCA CC: *Loggerhead turtle*



Special features:
- ridge on the carapace at the 5th central scute
- usually big triangular head
- 5 lateral scutes
- very rare in the Red Sea

HEPCA
CARING FOR THE RED SEA

Catalogue of Marine Turtles of the Egyptian Red Sea

January - December 2011

In collaboration with

BOOMERANG

HEPCA
CARING FOR THE RED SEA

What's HEPCA?

HEPCA's mandate is the protection and conservation of the terrestrial and marine ecology of the Red Sea. This includes the underwater bio-network of coral reefs and the sensitive land ecosystems of the Red Sea coastline. At HEPCA's core is a no compromise attitude for the future. Our primary objective has remained essentially unchanged from day one: working towards the protecting and preservation of Egypt's natural resources.

In 1995 HEPCA was registered with the Red Sea Governorate and the Ministry of Social Affairs as a Non-Governmental and Non-Profit Making Organization. Our initial objective of protection and conservation has evolved and includes many other projects and initiatives such as resource monitoring & management, public awareness campaigns, solid waste management strategies, scientific research, and community development.

We have instigated research, grass-roots mobilization and ambitious waste management plants projects that are handling the vast accumulation of human waste & debris plaguing the Red Sea. Furthermore, HEPCA is involved in raising public awareness with activities targeting the local community, schools, tourism sector and service providers. Community development has always been at HEPCA's core. A number projects encouraging sustainability amongst local Bedouins have been some of our most important achievements.

HEPCA is most active in lobbying for legislation to protect our environment. Over the last five years we have been at the forefront of campaigns, which have resulted in the amendment of over 32 laws, articles and decrees. We work very closely with the Egyptian Environmental Affairs Agency (EEAA) and Natural Protectorates Department. Our collaborative efforts have ensured that laws protecting off-shore islands and coral reefs are enforced, and we have also assisted them in developing management and monitoring strategies.

Supported by its members and affiliated to both governmental and non-governmental agencies, HEPCA achieves its purpose and objectives through pro-active engagement and involvement with all arising environmental concerns.

We are continually searching for new ways to improve both HEPCA's efficiency and effectiveness as a means to maximize our contribution to society.

Visionary thinking and progressive action underpins HEPCA's continued role as a vehicle for change. With every passing day we are witnessing the transformative capabilities of HEPCA's philosophy, as members within our community take on a pro-active role in conservation. Empowering HEPCA's momentous calling will always be that sense of ownership we invoke whitin the community and our members. It's this individual empowerment that has allowed HEPCA to serve as a platform for mobilizing community reform.

By supporting the work of HEPCA, you too can help ensure the preservation and sustainability of the Red Sea environment for future generations!

Sea turtles of the Red Sea

Five of the seven sea turtle species existing in the world, can be found in the Egyptian Red Sea: the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*), the leatherback turtle (*Dermochelys coriacea*), the loggerhead turtle (*Caretta caretta*) and the olive-ridley turtle (*Lepidochelys olivacea*). Sea turtles are long-living reptiles characterized by slow growth, late sexual maturity and high mortality rates during their first developmental stages (eggs, hatchlings, juveniles). For this reason, they are considered extremely vulnerable to all kinds of over-exploitation and population recovery can take decades. All five species are enlisted in the IUCN Red List either as critically endangered (leatherback and hawksbill turtles), endangered (loggerhead and green turtles) or vulnerable (olive-ridley turtles). Furthermore they are all enlisted in Appendix I of the Convention on International trade of Endangered Species (CITES), meaning that trade in sea turtles and derived products is forbidden in signatory countries. While green and hawksbill turtles are known to nest along the Egyptian coastline, olive-ridley, loggerhead and leatherback turtles are seen more sporadically only in the feeding areas.

Green turtles are widely distributed in tropical and subtropical waters, near the continental coast and/or around islands. They are known to forage on shallow seagrass beds and undertake long migrations from rookeries to feeding areas. Usually these migrations are performed along the coastline although there are some exceptions (i.e. Ascension Island population).

Hawksbill turtles have a circumglobal distribution, inhabiting tropical and to a lesser extent sub-tropical waters of the central Atlantic and Indo-Pacific regions. Hawksbill turtles are known to live in clear waters and feed on a number of invertebrates including corals and sponges.

Sea turtles play an essential role in keeping the Red Sea healthy and full of life. Green turtles, also known as “sea cows”, maintain ***healthy seagrass beds*** which host spawning fish, their juveniles and a great number of other invertebrates like mollusks and crustaceans that are at the bottom of the entire food chain. Hawksbill turtles feed on corals and sponges and therefore keep the balance between these two populations. This balance has proven to be critical for a ***healthy coral reef***. Both leatherback and olive-ridley turtles feed on jellyfish, small size fish and other animals living in the water column. As jellyfish and small fish usually feed on fish eggs and larvae, these two turtle species reduce the pressure on many different fish species inhabiting the Red Sea.

So, ***sea turtle conservation is not just about turtles***, but also concerns the habitats they use and that we also enjoy, like the coral reefs. A healthy sea turtle population depends on us and how we use the resources we share with these animals.

Why create a catalogue of marine turtles of the Red Sea?

In ecology, it is very important to be able to identify individuals within a population as this provides realistic estimates of the population size, growth rates and also migration patterns. This information is central to the development of wildlife management plans and thus it is fundamental for the conservation of the species.

The most frequent techniques used for marine turtles identification is the use of flipper tags but this method usually requires the capture and handling of the animal. Furthermore, the tags can get lost because of incorrect application or because they have been bitten off. An alternative to attaching markers to wildlife, is to use visual identification of individuals. This is commonly done for example with dolphins where the shape of the dorsal fin and/or the presence of marks and scars allow researchers to identify each individual. This technique has some obvious advantages: animals are not physically captured (so they are not stressed) and their behavior is not affected by the identification system. Photographic identification, in which researchers photographically capture these natural markings to identify and re-identify individuals, has proven to be a useful tool in long-term monitoring of wild animal populations.

In sea turtle research, this method is quite recent but has already proven to be effective when marine turtle populations are easily accessible to snorkelers and divers. To identify individual marine turtles ideally three pictures per animal are needed: one for left profile of the head, one for the right profile of the head and one for the full carapace. In particular the head profiles have patterns that are unique to each individual. Furthermore, some turtles have specific natural marks on their carapace (extra scutes, barnacles, scratches) that make them unique.

In its effort to increase the scientific knowledge of marine turtles of the Egyptian Red Sea and to improve their conservation, HEPCA started the first catalogue of these animals. The catalogue is a joint effort between HEPCA researchers, dive centers and visitors. Pictures are being collected from different sources. This catalogue has many aims: 1) provide a long-term photographic database that is updated once per month; 2) involvement of different sectors in sea turtle conservation and 3) it can be used as a tool to spread awareness among different users.

How is the catalogue organized

When suitable photo-identification pictures of an individual are available, they are compared with the classified individuals. If there is no match, the animal is given a unique name and is added

to the catalogue. The turtles are classified in alphabetical order and the standard set of information is provided for each animal. In the following figure, an explanation of the information can be seen.

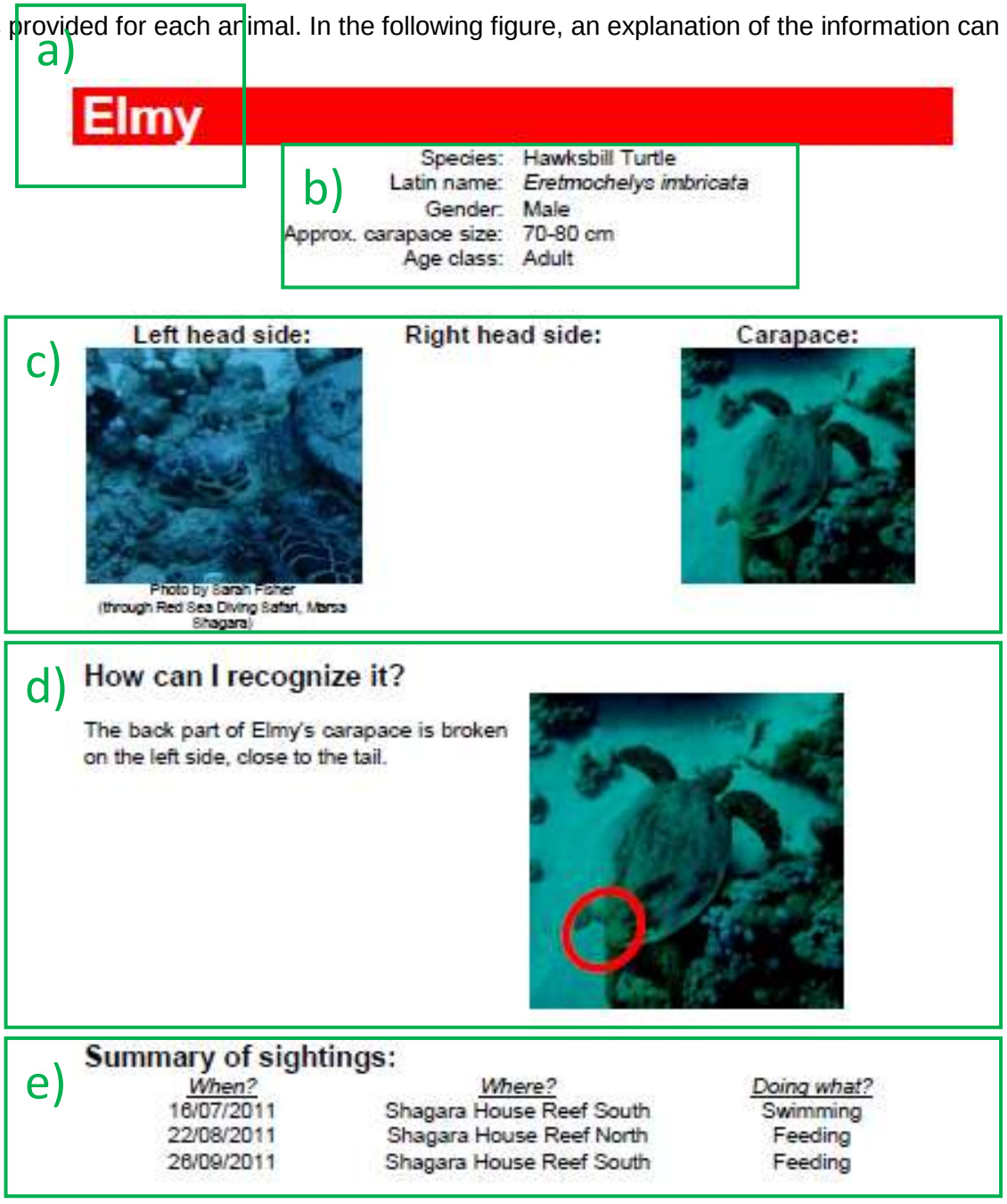


Figure 1. Sections and information about each animal: a) unique name; b) generic details (e.g. size, gender, etc.); c) photo-identification pictures (when pictures are not taken by HEPCA staff, you will find below each photo the name of the author and the dive center that sent us the picture); d) identification tricks; e) sightings information.
The glossary in the end explains any technical words.

Ahmed

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Ahmed has an extra small central scute between the 4th and 5th scutes.

Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
22/08/2011	Marsa Abu Dabbab	Feeding
24/09/2011	Marsa Abu Dabbab	Feeding
28/10/2011	Marsa Abu Dabbab	Feeding
29/10/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Feeding

Ali

Species:	**Green Turtle**
Latin name:	***Chelonia mydas***
Gender:	**Male**
Approx. carapace size:	**90-100 cm**
Age class:	**Adult**

Left head side:

Right head side:

Carapace:

How can I recognize it?

Ali has a small triangle on the back left side of its head.

Summary of sightings:

When?	***Where?***	***Doing what?***
27/10/2011	**Marsa Abu Dabbab**	**Feeding**
29/10/2011	**Marsa Abu Dabbab**	**Breathing**
28/11/2011	**Marsa Abu Dabbab**	**Feeding**

Amina

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60- 70 cm
Age class: Juvenile

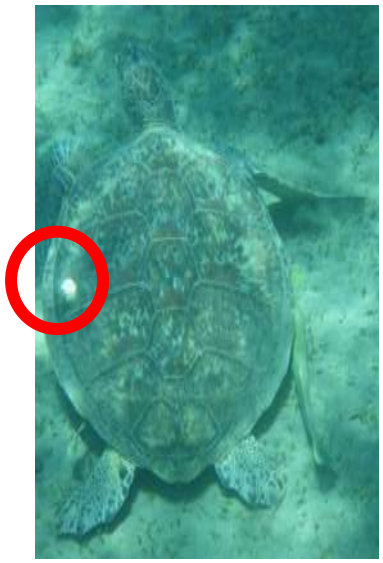
Left head side:

Right head side:

Carapace:

How can I recognize it?

Amina has a white barnacle on the 2nd left lateral scute.



Summary of sightings:

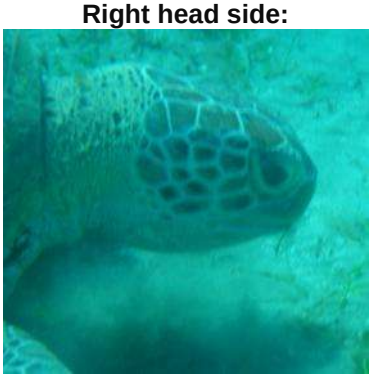
When?	***Where?***	***Doing what?***
16/07/2011	Marsa Abu Dabbab	Feeding
20/07/2011	Marsa Abu Dabbab	Feeding
26/09/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Swimming
04/11/2011	Marsa Abu Dabbab	Swimming

Aziz

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Right head side:



Carapace:

How can I recognize it?

Aziz has a special pattern on the left side of its head. Four scutes form a sort of triangle.

Summary of sightings:

When?	***Where?***	***Doing what?***
23/08/2011	Marsa Abu Dabbab	Breathing
24/08/2011	Marsa Abu Dabbab	Feeding

Beans

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Photo by Anne Conlan (through Red Sea Diving Safari, Marsa Shagara)

Right head side:

Carapace:

How can I recognize it?

Beans has 5 scales on the left side of its head.

Summary of sightings:

When?	***Where?***	***Doing what?***
31/08/2011	Marsa Fukera	Resting
28/09/2011	Marsa Fukera	Resting
30/11/2011	Marsa Fukera	Resting

Belin

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Belin has a special pattern on the left side of its head. Four scutes form a sort of bow tie.

Summary of sightings:

When?	***Where?***	***Doing what?***
16/07/2011	Marsa Abu Dabbab	Feeding
19/07/2011	Marsa Abu Dabbab	Feeding
19/07/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Feeding

Burrito

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

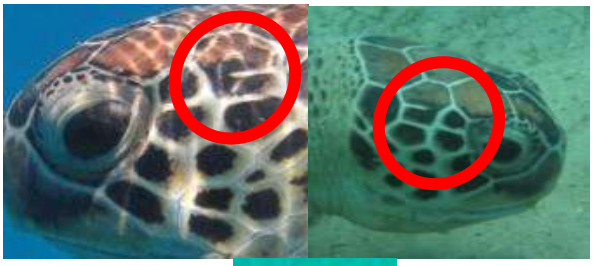
Left head side:

Right head side:

Carapace:

How can I recognize it?
Burrito is very easy to recognize:

- **It has the same mark on both sides of the head (an incomplete line);**



- **It has an extra central scute between the 3rd and the 4th ones. The extra scute has an irregular shape.**

Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
19/07/2011	Marsa Abu Dabbab	Breathing
22/08/2011	Marsa Abu Dabbab	Feeding
24/08/2011	Marsa Abu Dabbab	Feeding
26/09/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Feeding
26/11/2011	Marsa Abu Dabbab	Feeding
27/11/2011	Marsa Abu Dabbab	Feeding

Cleo

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Female
Approx. carapace size: 90-100 cm
Age class: Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?
Cleo has two distinctive traits:

- **On the left side of its head, she has three scales that (with a little bit of imagination!) form a pyramid (or a triangle).**

- **On the carapace, the 2nd central scute is mushroom-shaped.**

Summary of sightings:

When?	***Where?***	***Doing what?***
24/08/2011	Marsa Abu Dabbab	Feeding
26/11/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Feeding

Dabbab

Species: Hawksbill Turtle
Latin name: *Eretmochelys imbricata*
Gender: Male
Approx. carapace size: 70-80 cm
Age class: Adult

Left head side:

Photo by Wil Van Wynen (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Right head side:

Carapace:

Photo by David Haines (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

How can I recognize it?

Dabbab is easily recognizable because its carapace is badly broken in the rear left part.

Photo by David Haines (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Summary of sightings:

When?	***Where?***	***Doing what?***
23/09/2011	Jackson Reef	Swimming
28/09/2011	Jackson Reef	Swimming

Emma (aka Flower)

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Female
Approx. carapace size: 90 - 100 cm
Age class: Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

On the left side of its head, a group of scales form a flower-shaped pattern.

Summary of sightings:

When?	***Where?***	***Doing what?***
29/10/2011	Marsa Abu Dabbab	Feeding
04/11/2011	Marsa Abu Dabbab	Feeding
26/11/2011	Marsa Abu Dabbab	Feeding
27/11/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Feeding

Hammer

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Female
Approx. carapace size: 90 - 100 cm
Age class: Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

On the right side of its head, Hammer has 5 scales that together form a hammer.

Summary of sightings:

When?	***Where?***	***Doing what?***
23/08/2011	Marsa Abu Dabbab	Breathing
28/11/2011	Marsa Abu Dabbab	Feeding

Heba

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Right head side:

Carapace:

How can I recognize it?

Heba has a scale on the right side of its head that is shaped like a hand with a finger indicating something in the back.

Summary of sightings:

When?	***Where?***	***Doing what?***
16/07/2011	Marsa Abu Dabbab	Feeding
23/08/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Feeding
27/11/2011	Marsa Abu Dabbab	Feeding

Helmy

Species: Hawksbill Turtle
Latin name: *Eretmochelys imbricata*
Gender: Male
Approx. carapace size: 70-80 cm
Age class: Adult

Left head side:

Photo by Sarah Fisher (through Red Sea Diving Safari, Marsa Shagara)

Right head side:

Carapace:

How can I recognize it?

The back part of Helmy's carapace is broken on the left side, close to the tail.

Summary of sightings:

When?	***Where?***	***Doing what?***
16/07/2011	Shagara House Reef South	Swimming
22/08/2011	Shagara House Reef North	Feeding
29/08/2011	Shagara House Reef South	Feeding
26/09/2011	Shagara House Reef South	Feeding
03/11/2011	Shagara House Reef South	Swimming

Hope (aka Tartina)

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 20-30 cm
Age class: Juvenile

Left head side:

Right head side:

Carapace:

How can I recognize it?

Hope is a very small turtle that was observed for the first time in Marsa Abu Dabbab in August 2011. Its main distinguish trait is its size! Hope is not used to be around divers and can be scared very easily. If you have the chance to see Hope, please keep distance between you and the animal and do not try to catch it.

Summary of sightings:

When?	***Where?***	***Doing what?***
24/08/2011	Marsa Abu Dabbab	Swimming
28/10/2011	Marsa Abu Dabbab	Resting
29/10/2011	Marsa Abu Dabbab	Resting
27/11/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Swimming

Ibrahim

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Male
Approx. carapace size: 80-90 cm
Age class: Sub-Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?
Ibrahim can be recognized for its size first of all. It is one of the biggest turtles in Marsa Abu Dabbab. Furthermore it has an unusually high concentration of algae on its neck.

Summary of sightings:

When?	***Where?***	***Doing what?***
26/09/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Feeding
28/10/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Feeding

Imen

Species: Hawksbill Turtle
Latin name: *Eretmochelys imbricata*
Gender: Female
Approx. carapace size: 60-70 cm
Age class: Adult

Left head side:

Photo by Anneke & Leslie (through Red Sea Diving Safari, Marsa Shagara)

Right head side:

Carapace:

How can I recognize it?

Imen has many barnacles in the central scutes (especially on the 2nd and 3rd). furthermore, it is missing the two caudal scutes.

Photo by Sarah Fisher (through Red Sea Diving Safari, Marsa Shagara)

Summary of sightings:

When?	***Where?***	***Doing what?***
29/08/2011	Shagara House Reef North	Feeding
29/08/2011	Shagara House Reef South	Feeding

Islam

Species: Green turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Right head side:

Photo by Ann Conlan (through Red Sea Diving Safari, Marsa Shagara)

Carapace:

How can I recognize it?

The two scales on the top of Islam's head are not completely separated.

Photo by Ann Conlan (through Red Sea Diving Safari, Marsa Shagara)

Summary of sightings:

When?	***Where?***	***Doing what?***
31/08/2011	Marsa Fukera	Resting
31/10/2011	Marsa Fukera	Resting
30/11/2011	Marsa Fukera	Swimming
01/12/2011	Marsa Fukera	Breathing

Jackson

Species: Hawksbill Turtle
Latin name: *Eretmochelys imbricata*
Gender: Female
Approx. carapace size: 70-80 cm
Age class: Adult

Left head side:

hoto by Sander Hiesselar (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Right head side:

Photo by German Soria (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Carapace:

Photo by Sander Hiesselar (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

How can I recognize it?

Jackson has many leeches on the rear part of its carapace and on the 2nd central scute.

Photo by Sander Hiesselar (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Summary of sightings:

When?	***Where?***	***Doing what?***
07/09/2011	Jackson Reef	Feeding
01/10/2011	Jackson Reef	Resting
18/10/2011	Jackson Reef	Feeding
12/11/2011	Jackson Reef	Swimming

Jam

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Jam has two distinguishing traits:

- **It has two small post-orbital scales (3rd and 4th) on the left side of its head;**

- **It has only 3 post-orbital scales on the right side of its head.**

Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
24/07/2011	Marsa Abu Dabbab	Feeding
28/10/2011	Marsa Abu Dabbab	Breathing
27/11/2011	Marsa Abu Dabbab	Feeding

Kiki

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Male
Approx. carapace size: 90-100 cm
Age class: Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Kiki has the mark of a bite on the left rear flipper. The bite was done recently.

Summary of sightings:

When?	***Where?***	***Doing what?***
24/08/2011	Marsa Abu Dabbab	Feeding
26/09/2011	Marsa Abu Dabbab	Feeding
29/10/2011	Marsa Abu Dabbab	Feeding
04/11/2011	Marsa Abu Dabbab	Feeding

Leila

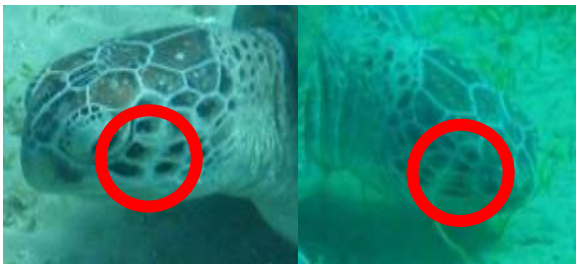
Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Female
Approx. carapace size: 70-80 cm
Age class: Sub-Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?
Leila has 5 post-orbital scales both on the left and right sides of its head.



Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
23/08/2011	Marsa Abu Dabbab	Feeding
25/09/2011	Marsa Abu Dabbab	Feeding
27/10/2011	Marsa Abu Dabbab	Feeding
04/11/2011	Marsa Abu Dabbab	Feeding
26/11/2011	Marsa Abu Dabbab	Feeding
27/11/2011	Marsa Abu Dabbab	Feeding
28/11/2011	Marsa Abu Dabbab	Feeding

Maddalina

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Maddalina has 5 post-orbital scales on the right side of its head. Furthermore the 4th scale has a special sign.

Summary of sightings:

When?	***Where?***	***Doing what?***
22/08/2011	Marsa Abu Dabbab	Feeding
25/09/2011	Marsa Abu Dabbab	Feeding

Negm

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

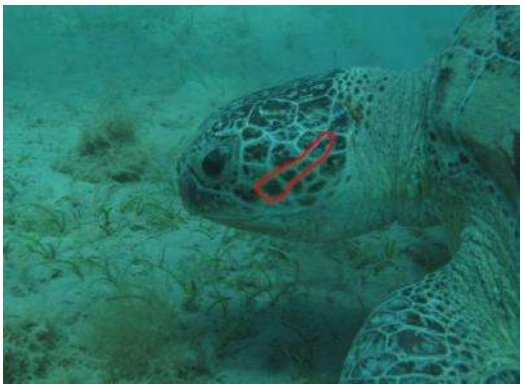
Left head side:

Right head side:

Carapace:

How can I recognize it?

Negm has 4 scales on the left side of its head that form a diagonal line.



Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
27/11/2011	Marsa Abu Dabbab	Feeding

Nour

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Nour has many scratches on the carapace.

Summary of sightings:

When?	***Where?***	***Doing what?***
16/07/2011	Marsa Abu Dabbab	Feeding
24/08/2011	Marsa Abu Dabbab	Feeding
24/09/2011	Marsa Abu Dabbab	Feeding
29/10/2011	Marsa Abu Dabbab	Feeding
04/11/2011	Marsa Abu Dabbab	Feeding

Paola

Species: Hawksbill turtle
Latin name: *Eretmochelys imbricatas*
Gender: Female
Approx. carapace size: 60-70 cm
Age class: Adult

Left head side:

Right head side:

Carapace:

How can I recognize it?
Paola has 2 distinctive signs:

- **A long scale on the left side of its head;**

- **A hole on the back side of the carapace on one of the right marginal scutes:**

Summary of sightings:

When?	***Where?***	***Doing what?***
29/11/2011	**Sharm El Lulli**	**Resting**
29/11/2011	**Sharm El Lulli**	**Resting**

Ray

Species: Green turtle
Latin name: *Chelona mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Right head side:

Carapace:

How can I recognize it?
Ray has two incomplete lines crossing diagonally the two scales on the back part of its head (similar to sun rays).

Summary of sightings:

When?	***Where?***	***Doing what?***
27/11/2011	Marsa Shagara South Reef	Swimming
28/11/2011	Marsa Shagara South Reef	Swimming

Spotty

Species: Hawksbill turtle
Latin name: *Eretmochelys imbricatas*
Gender: Female
Approx. carapace size: 80-90 cm
Age class: Adult

Left head side:

Photo by Martina Balzarova (through Red Sea Diving Safari, Marsa Shagara Village)

Right head side:

Photo by Martina Balzarova (through Red Sea Diving Safari, Marsa Shagara Village)

Carapace:

Photo by Martina Balzarova (through Red Sea Diving Safari, Marsa Shagara Village)

How can I recognize it?
Spotty has three whitish spots on its carapace (two on the left and right side close to the head, one close to the tail). Only two spots are visible on this picture.

Photo by Martina Balzarova (through Red Sea Diving Safari, Marsa Shagara Village)

Summary of sightings:

When?	***Where?***	***Doing what?***
28/10/2011	Elphinstone	Feeding

Yemen

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Right head side:

Carapace:

How can I recognize it?

On the left side of its head, Yemen has a sign similar to a "y" in a circle.

Summary of sightings:

When?	***Where?***	***Doing what?***
19/07/2011	Marsa Abu Dabbab	Feeding
23/08/2011	Marsa Abu Dabbab	Feeding

Yolanda

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 60-70 cm
Age class: Juvenile

Left head side:

Photo by Wil Van Wynen (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Right head side:

Photo by Erich Reboucas (through Camel Diving Safari, Sharm El-Sheikh)

Carapace:

Photo by Wil Van Wynen (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

How can I recognize it?

Yolanda has a special pattern on the carapace. It seems it has many scratches but in reality it is only the colors of the carapace.

Photo by Timo Hanninen (through Shark Bay Umbi Diving Village, Sharm El-Sheikh)

Summary of sightings:

When?	***Where?***	***Doing what?***
24/05/2011	Shark and Yolanda	Resting
20/06/2011	Shark and Yolanda	Swimming
30/09/2011	Shark and Yolanda	Swimming
21/10/2011	Shark and Yolanda	Breathing

Zizo

Species: Green Turtle
Latin name: *Chelonia mydas*
Gender: Unknown
Approx. carapace size: 70-80 cm
Age class: Sub-adult

Left head side:

Right head side:

Carapace:

How can I recognize it?

Zizo has a special pattern on the right side of its head.

Summary of sightings:

When?	***Where?***	***Doing what?***
24/08/2011	Marsa Abu Dabbab	Feeding
25/09/2011	Marsa Abu Dabbab	Feeding
04/11/2011	Marsa Abu Dabbab	Feeding
26/11/2011	Marsa Abu Dabbab	Feeding

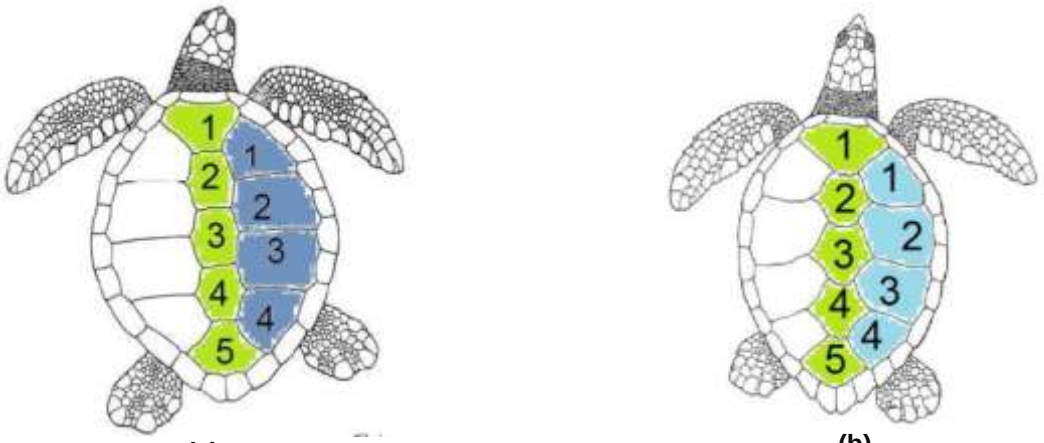
Glossary

Carapace: sea turtle shell.

Central scute: scute (or plates) located in the middle of the carapace (where the dorsal spine is). The number of central scutes can be species-specific (see figure 1a-b).

Barnacle: little animal belonging to the group of crustaceans with an external shell. It usually attaches itself to the turtle carapace. There are different species of barnacles that can be found on turtle carapaces, some of them are harmless while others pierce the turtle skin. *NEVER REMOVE A BARNACLE FROM A LIVE TURTLE.*

Lateral scute: scutes (or plates) located left and right of the central scutes (the dorsal spine).



(a) **(b)**

Figure 1a-b. Location of central (green) and lateral (blue) scutes in green (a) and hawksbill (b) turtles. Images modified from FAO World Sea Turtle Catalogue (Marquez, 1990).

Pre-frontal scale: scale on the top of a turtle snout (nose). The number of pre-frontal scales is typical of each sea turtle species (see figure 2a-b).

Post-orbital (or post-ocular) scale: scale that surround the eye of the turtle. Their number can be variable but usually the green turtle has 4 post-orbital scales while the hawksbill has 3 (see figure 2a-b).

Scale: Each of the small overlapping plates protecting the skin of fish and reptiles, including turtles.

Scute: horny or keratinized plate that is part of the turtle carapace. According to their position we distinguish between central, lateral and marginal scutes. The number of scutes and their distribution is typical of each turtle species.

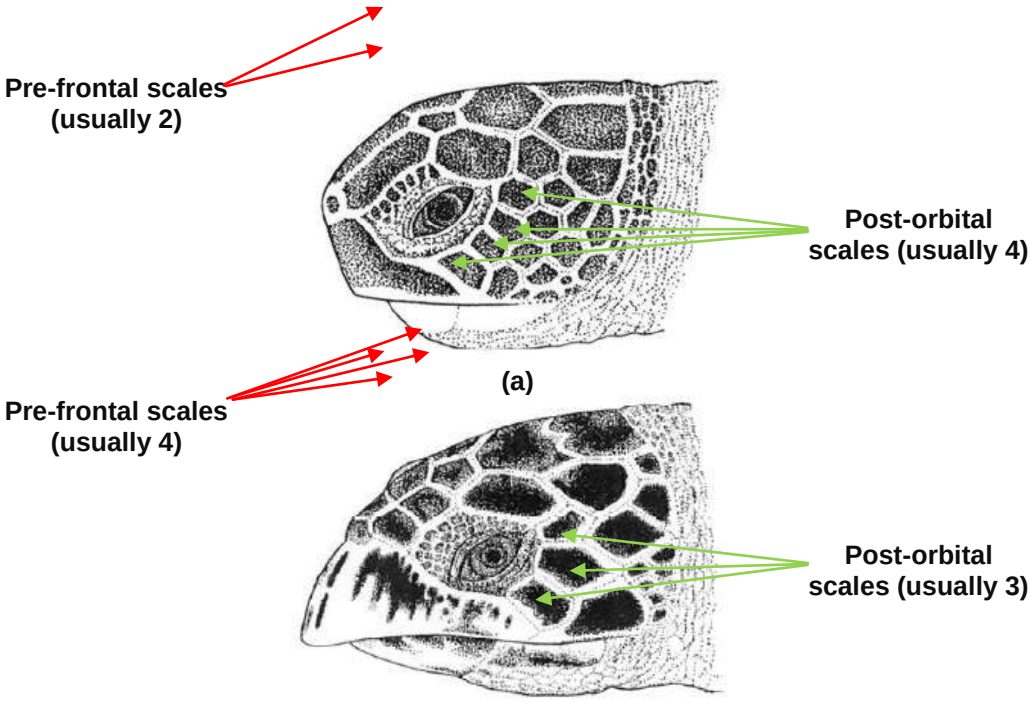


Figure 2 a-b. Location of pre-frontal and post-orbital scales for green (a) and hawkbill (b) turtles. Images modified from FAO World Sea Turtle Catalogue (Marquez, 1990).

Approximate carapace length: Length of the turtles carapace generally measured using a marked stick (see the figure 3).

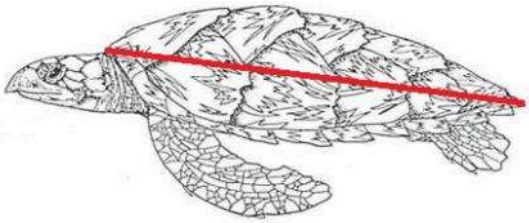
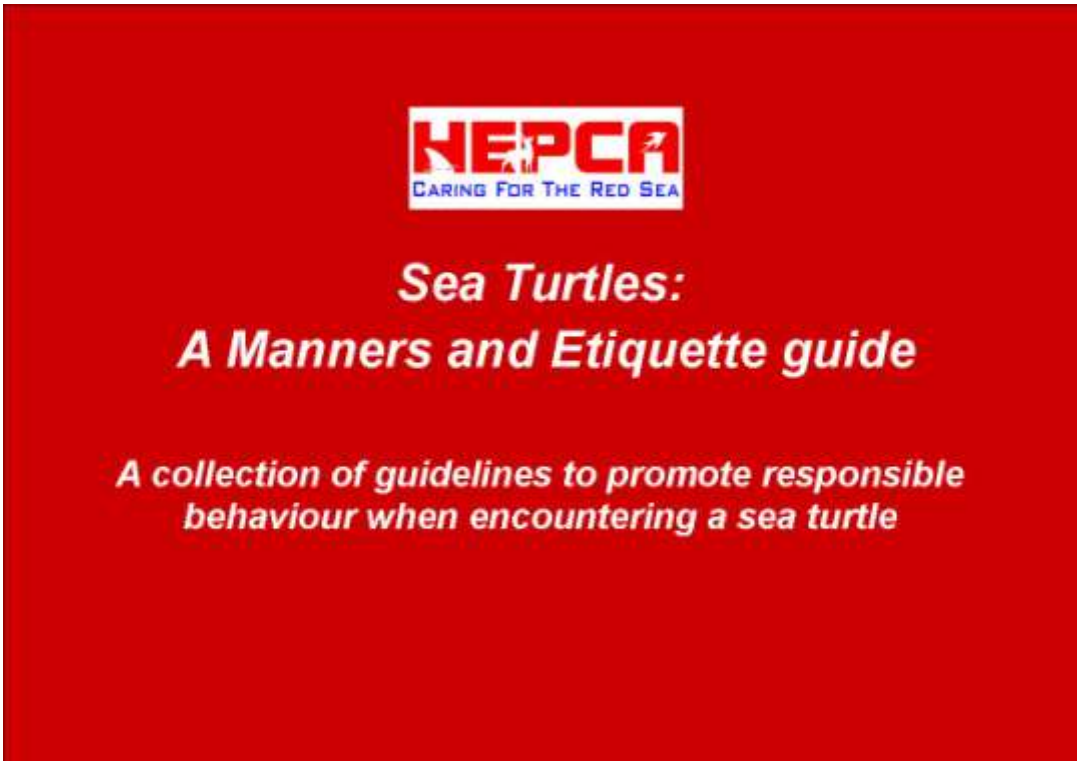
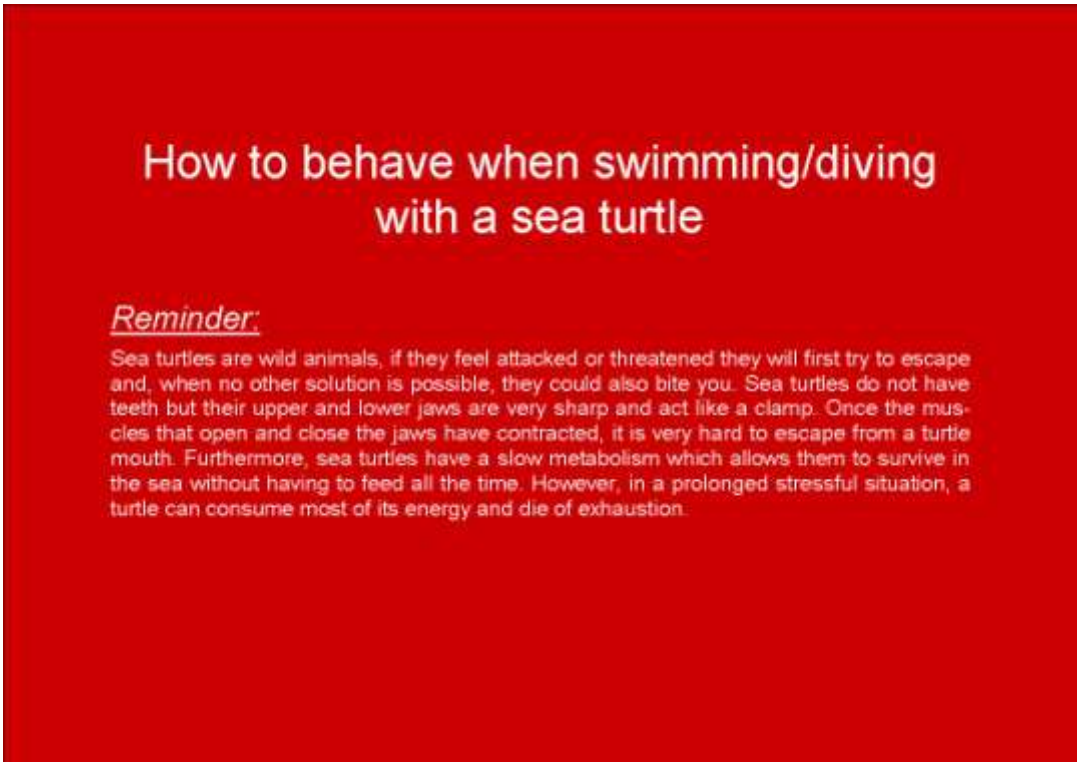


Figure 3. The approximate carapace length refers to the length of the carapace only (we do not include the head and/or the tail) and it doesn't take into account the carapace curve.

Appendix 5.1. Booklet: Responsible behavior when encountering a marine turtle





- Do not drive speed boats or jet skies in areas where sea turtles are known to bask at the surface. If you do so, please pay attention to turtle presence, **reduce the boat speed and keep a safe distance**.
- **Never feed a turtle!** Remember, sea turtles are wild animals and their ability to find food is fundamental to their survival. If you see people feeding turtles, please tell them that this is wrong!
- When swimming with a turtle, always **keep a safety distance** especially from the head as turtles can bite very hardly.
- **Never ride a turtle!** This is a very stressful situation for them and could provoke their exhaustion and death.
- **Never move a turtle from where it is resting.** Do not encourage your dive guide to handle turtles and if you see him/her doing so, please let him/her know that this is a wrong behavior.
- If your are diving/snorkeling/swimming, the best way to enjoy the presence of turtles in the water is to follow them without making fast movements (especially with your arms). You can get closer to a turtle by gently approaching it from behind or one side but remember to keep a 2-3m distance. **Stay away from their head!**
- Sea turtles are known to carry **bacteria and parasites**, so never touch a turtle for your health but also for their well-being.

How to behave when encountering a nesting sea turtle

Reminder:

Nesting sea turtles are very sensitive to all lights, movements and noisy. If they do not feel safe, they will probably go back to the sea and try to lay eggs later. If repeatedly disturbed, a turtle could discard eggs at sea, consequently bringing to their total loss. The following guidelines have been written in order to inform you on the correct behavior you should have while watching a sea turtle nesting. Remember that this process can take up to two hours and it is very important for it to go smoothly as this step is fundamental for maintaining sea turtles populations.

- When a nesting turtle is spotted, you should move to a distance of **at least 15 meters**. If you are with a guide, you can approach the animal from behind slowly and without making noisy to assess what the turtle is doing.
- It is important to keep **all the lights off**, only infrared lights should be allowed on a nesting beach.
- When the turtle starts laying eggs, she enters in a trance. At this moment, and only at this moment, you can get closer to the animal. Remember, no more than 10 people at the same time. Do a semi-circle behind the turtle. **Always stay behind the turtle!**
- If you are visiting a project where measurements are taken, follow the instructions of your guide.
- As soon as the turtle starts to cover the nest, you and your group should step back to your original position and allow the turtle to finish the process and go back to the sea.
- **No photographs with flash!** It is not allowed to take pictures with flash of nesting turtles. The flash-light could disturb or disorient the turtle and can endanger all the nesting process. Only infra-red cameras are allowed, however pictures and videos should be taken from behind the turtle.

How to behave in case of hatchlings emergence/releasing

Reminder:

Hatchlings are the baby turtles coming out of the nest. As adult turtles, they are very sensitive to the light and can easily get disoriented and lose their way. Whether you are assisting to a natural emergence or you are releasing turtles from a hatchery, it is important to keep all the lights off and try to do as less noisy as possible.

If hatchlings are emerging from their nest, remember:

- **Watch your steps!** Hatchlings are small and dark, therefore difficult to see at night. At the same time they are very fragile and could be easily crushed.
- Do not try to "help" hatchlings reaching their home by moving them forward. The contact with the sand is very important for the baby turtles as they receive an imprint that will allow them to go back to their natal beach once they will become adults. **Never place a hatchling directly into the sea!**

You can help baby turtles reaching the sea by:

- Removing all the obstacles on their road (rubbish, pieces of wood, sandcastles, holes in the sand);
- Controlling some predators (like dogs) and/or discouraging others (like birds, crabs, etc.) from eating the baby turtles;
- Keeping all your lights off and protecting the hatchlings from all sources of artificial lights on the beach.

Reducing light pollution on nesting beaches

Reminder:

Both nesting turtles and hatchlings are very sensitive to the light. In nesting females, artificial light has been proven to deter them from laying eggs. Furthermore, the presence of artificial lights can make a turtle abandon or abbreviate the nesting process thus reducing the chances of eggs survival. It is not clear why artificial lighting affects nesting turtles, but some researchers suggest that turtles (that usually nest at night to protect themselves from predators and dehydration) associate artificial light with daylight. Artificial lighting has also been associated with both adult and baby turtle's disorientation. Hatchlings seem to use predominantly visual cues to find the sea and move towards the brightest point which is meant to be the sea. Artificial lights can easily confuse and disorient baby turtles that will surely die of exhaustion and dehydration while looking for the sea.

- Turn off all unnecessary or non-essential beach-front lights. As the nesting and hatching season last from May to September approximately, you can think about eliminating or reducing any artificial lighting during this period.
- When it is not possible to turn off all the lights, think about limiting light duration for example by using movement detectors.
- Use light screens to block the glow of light or re-direct lights so that they do not point on the nesting beach.
- **Reduce the wattage** of the lights, this way you will reduce the amount of light emitted.
- Short-wave length blue, white or yellow light sources are known to have a significant lesser impact on sea turtle orientation. Think about substituting long-wave light sources (for example bulb neon and white LED), with shorter-wave lights.
- Remember that **an artificial light will probably cause problems for sea turtles if it can be seen by an observer standing anywhere on the nesting beach**.