

IN-SITU SEA TURTLE NEST PROTECTION PROGRAM IN PANAMA - OKANDA COASTAL STRETCH IN THE EAST COAST OF SRI LANKA: A SUCCESSFUL CONSERVATION ACTIVITY WITH COMMUNITY PARTICIPATION

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ABSTRACT

Although, sea turtles are protected under government legislation since 1972 (Fauna and flora Protection Ordinance of Sri Lanka 1972 and amendment 1993), they are still being exploited in Sri Lanka for their eggs and meat. Turtle rookeries are being disturbed by the tourist industry development and many turtles are accidentally caught and drowned in fishing gear each year. A recent survey in the east coast at the end of 30 years long civil war revealed that the stretch of beach from Panama to Okanda is a significant turtle nesting site where five species of turtles namely, Olive ridley turtle, green turtle, leatherback turtle, logger head turtle and hawksbill turtle, come to nest. However, after the war several development programs have been introduced to this area and human settlements are also coming up in the area. Wild boars (*Sus scrofa*) inhabiting the nearby natural forests are the major threat to turtle eggs in the area. Survey records showed that 90.4% of the nests have been dug out by wild boars during 2009 and 2010. Among the five species nesting, 68% are Olive ridley turtles. After the conservation program was initiated mortality rates have declined significantly. Nesting density is higher in the region and hatching success is 78%. Beach erosion causes loss of nests substantially. This study shows that Panama-Okanda beach provides a significant nesting site for sea turtles and highlights the need to declare it as a sanctuary.

INTRODUCTION

Declines in sea turtle populations are major concerns for conservation biologists all over the world (Rajakaruna *et al.*, 2009). Therefore, today all sea turtle species are globally protected and many attempts are taken worldwide to conserve these threatened species. In Sri Lanka, under the Fauna and Flora Protection Ordinance (FFPO 1938, amended in 1972) protection of sea turtles is ensured. Further, Sri Lanka has been a member of CITES (Convention on International Trade in Endangered Species) since 1979, which prohibits the import or export of sea turtles and their products. However, turtles are still being exploited in Sri Lanka for their eggs, meat and shells (Kapurusinghe and Saman, 2001).

It is a known fact that five of the world's seven sea turtle species including green turtles, leatherbacks, olive ridleys, hawksbills and loggerheads come to nest on Sri Lankan beaches (Deraniyagala, 1953). South and southeast coastlines provide important nesting and foraging grounds to sea turtles (Deraniyagala, 1939). In comparison to that, very little data is available on the sea turtle rookeries in the east coast of Sri Lanka. The Turtle Conservation Project conducted by the Wildlife Research and Conservation Trust (WRCT) revealed that Panama-Okanda stretch of beach in eastern Sri Lanka (Figure 1) is an important nesting beach for the

marine turtles (Ellepola, 2012). Therefore, this study was aimed to highlight the importance of turtle nesting beaches in the east coast and evaluate the success of the current sea turtle conservation program in the area.

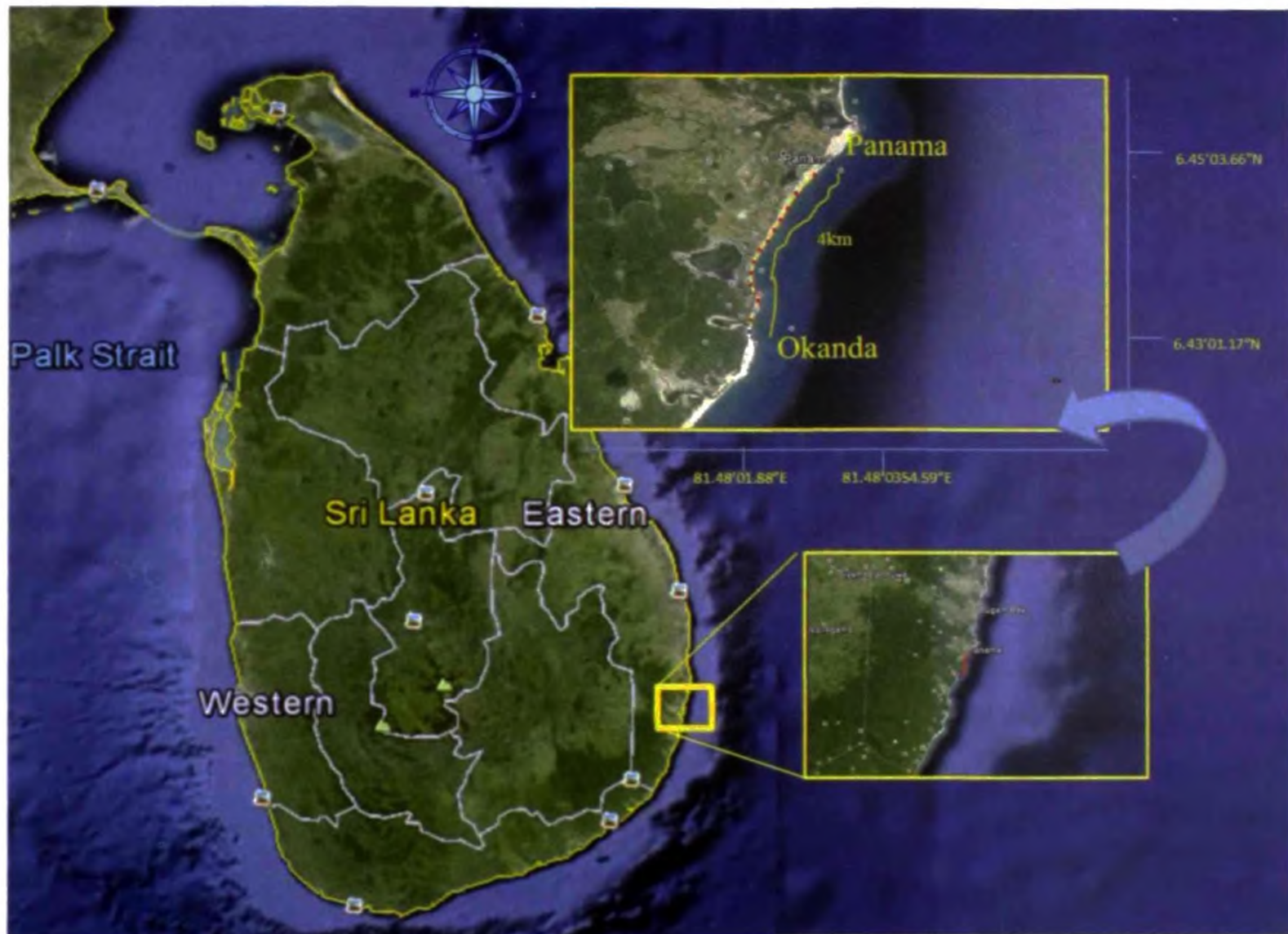


Figure 01. Panama-Okanda sea turtle rookery in the east coast of Sri Lanka

Until 2009, East coast turtle rookeries were unexplored due to the civil war conditions in the region. The status of the rookery was critical when it was first identified where the populations were drastically declining due to wild boar attacks, Ghost crab attacks, exploitation for meat, eggs and other products of turtles by humans and turtle by catch during fishing (WRCT, 2009). WRCT east coast ecological survey revealed that Panama area (Figure 01) is the location of one of the most important Olive ridley rookeries in Sri Lanka. Other four species of turtles namely, Green turtle, Leatherback, Loggerhead and Hawksbill, also nest at Panama beach. Only four to five villagers were involved in egg collection or killing turtles at Panama beach. Panama is adjacent to world famous Yala East (Kumana) National Park which is also a part of a recently declared Ramsar site. Beach line in the area is bordered by forest patches and chena cultivations. Villagers in Panama mainly depend on fishing; about 300 fishermen live in the area. High level of turtle by-catch is evident in the area where about 100-200 turtles get killed annually due to by-catch (WCRT, 2011).

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After extensive surveys and research from 2009, conservation efforts were taken on a 4km stretch of beach from Panama to Okanda in the East coast of Sri Lanka by the WRCT. The conservation project is based according to the Action Plan for Sri Lanka prepared in 2005 which involves local community in sea turtle conservation, providing alternatives to the coastal communities through developing their talents and increasing awareness in the sustainable use of natural resources (de Silva, 2005).

MATERIALS AND METHODS

The study was carried out in the Panama- Okanda turtle rookery in the east coast of Sri Lanka bordering the Yala East (Kumana) National Park (Figure 01). This stretch of beach is 4km in length and a portion of it is protected under the Department of Wildlife Conservation. The pilot survey was carried out in 2009 in order to identify key nesting areas. During the pilot studies turtles coming ashore to lay eggs were marked using a waterproof paint to estimate the population size. Data on threats to marine turtles, species composition, seasonality, nesting density, number of nests and number of eggs laid were obtained. The nests were excavated after four days post-hatch and the remaining eggs were counted to measure the hatching success and mortality rates.

After completing the pilot study WRCT initiated the turtle conservation program and up to date data is being recorded. In addition to that, the success of the in-situ conservation efforts is measured through evaluation of hatching success, comparative mortality rates, number of volunteers joining the project, level of awareness raised among local people and their contribution towards the success of the project.

RESULTS AND DISCUSSION

The pilot study revealed that five species of marine turtles, Olive Ridley (*Lepidochelys olivaceae*), Green turtle (*Chelonia mydas*), Loggerhead turtle (*Caretta caretta*), Hawksbill turtle (*Eretmochelys imbricata*) and Leatherback turtle (*Dermochelys Coriacea*), come ashore to nest in the rookery. Among the five species nesting, 68% are Olive ridley turtles while 15% are Green turtles, 14% are Hawksbill turtles, 1% is Loggerhead turtles and 2% are Leatherback turtles (Figure 02). An average of 188 (± 14) sea turtles come to nest in this beach annually, out of which an average of 128 (± 17) are Olive ridley turtles. Nesting occurs throughout the year with a peak nesting period around the months of December, January and February (Figure 03). Annual average nest density is around 69 nests/km and is considerably a higher amount for a stretch of beach as small as 4km.

Turtles come ashore to lay eggs during early hours and late hours in the nesting period (Figure 04). Two distinct time periods in which turtles come ashore to lay eggs were identified. The first being 7.00 pm – 11.00 pm in the night where the nesting frequency is highest (12.8 nests/hour), second being 12.00 pm- 06.00 am in the morning with an average nesting frequency of 8.1 nests/hour. However, there is evidence that turtles nest even during day light within this stretch of beach.

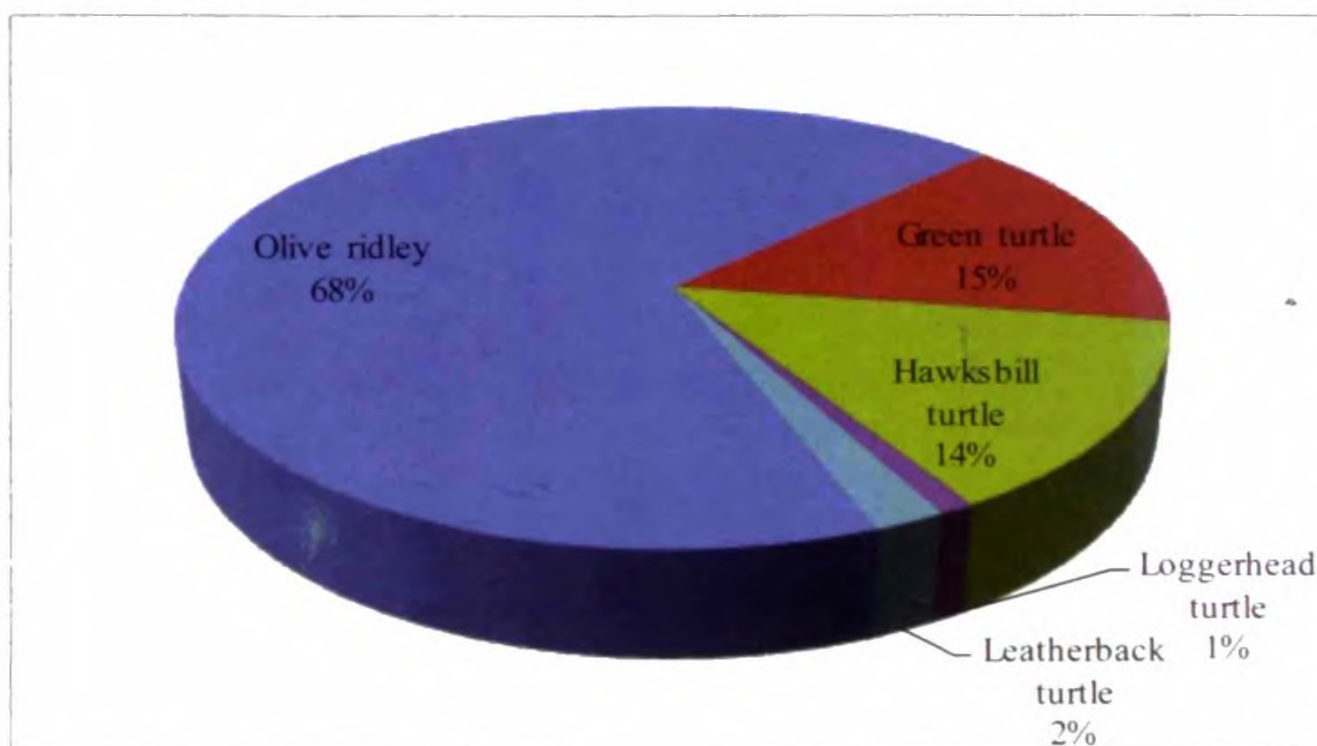


Figure 02. Percentage composition of turtles nesting Panama-Okanda turtle rookery

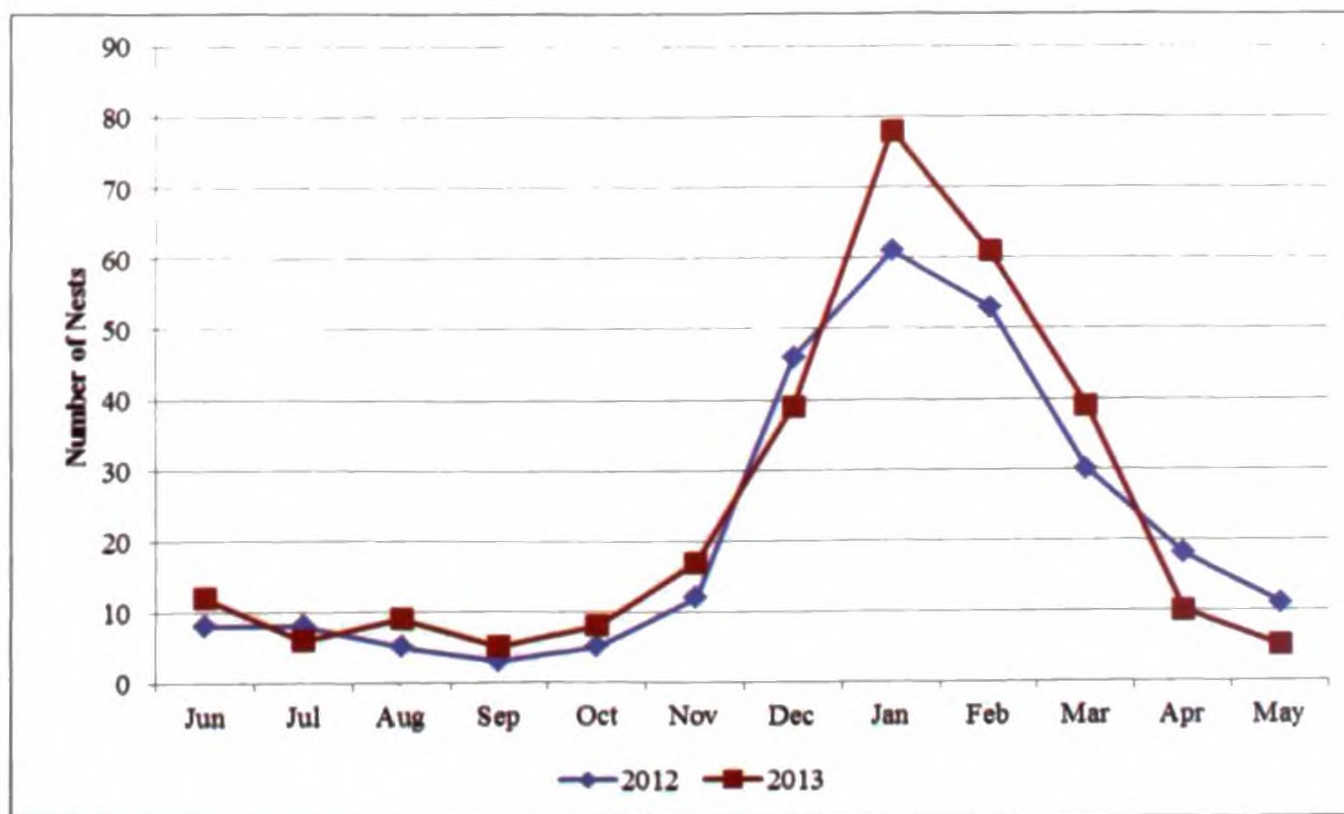


Figure 03. Annual average number of nests in the monitoring beach

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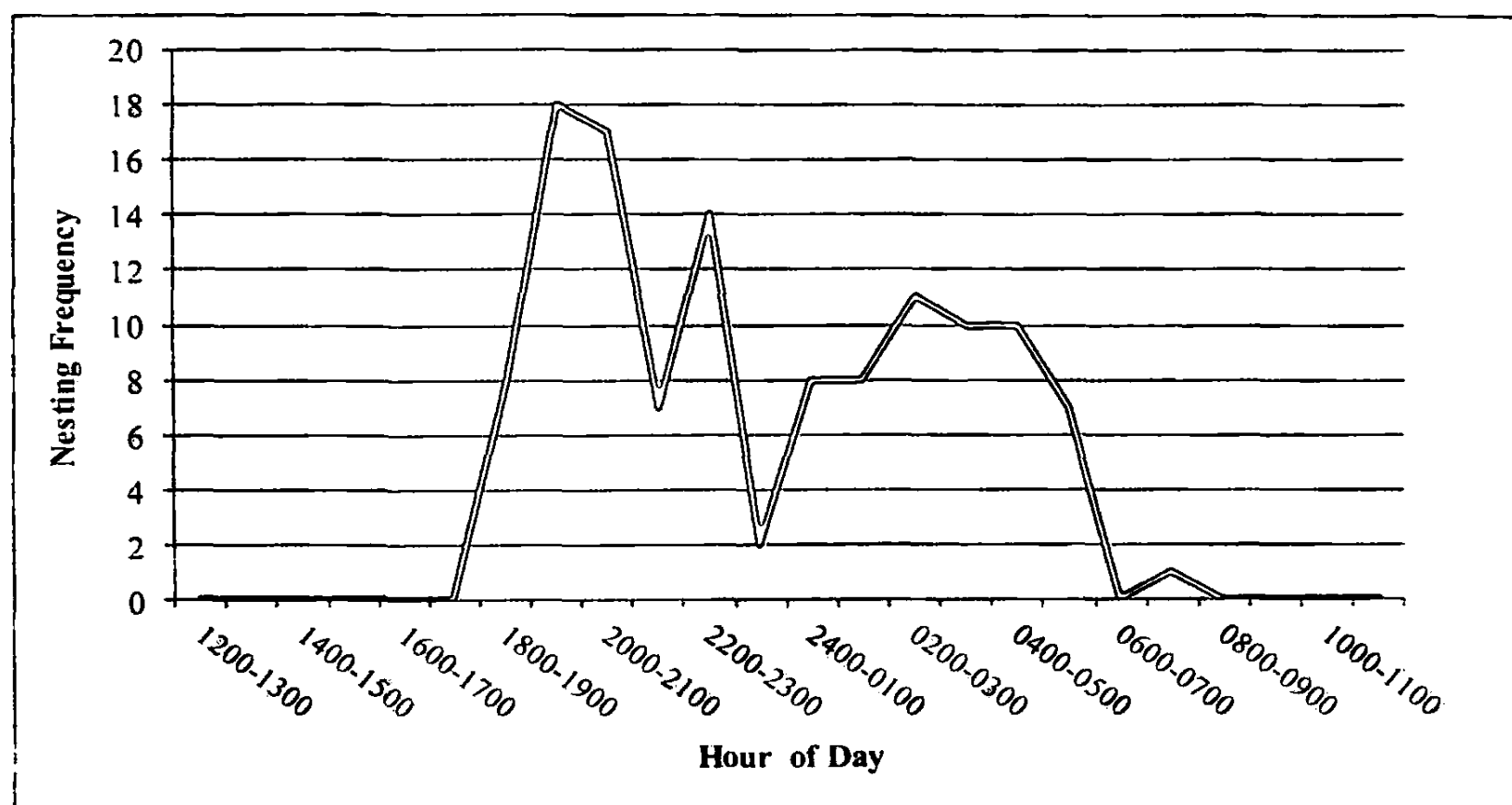


Figure 04. Nesting frequency at various time intervals of the day

An average of 12,040 eggs are laid per year and an average of 10,089 hatchlings are released every year. (Table 01). Average hatching success for all turtle species was about 78.49% while the mortality rate was about 21.42%. Comparison of hatching success over the past few years suggests that hatching success was slightly increasing and mortality rates were slightly decreasing due to the conservation efforts by the WRCT (Figure 05). However, the beach erosion caused by the strong waves in the area has become a significant factor in increasing the mortalities.

Table 01: Number of Eggs laid, number of hatchlings, hatching success and mortality rate in Panama turtle rookeries

Species	Number of Eggs laid	Number of Hatchling	Hatching success	Mortality rate
Olive ridley turtle	10346	8882	85.46%	14%
Green Turtle	842	551	65.43%	34.56%
Hawksbill turtle	616	459	74.51%	25.48%
Loggerhead turtle	124	102	82.25%	17.74%
Leatherback turtle	112	95	84.82%	15.17%

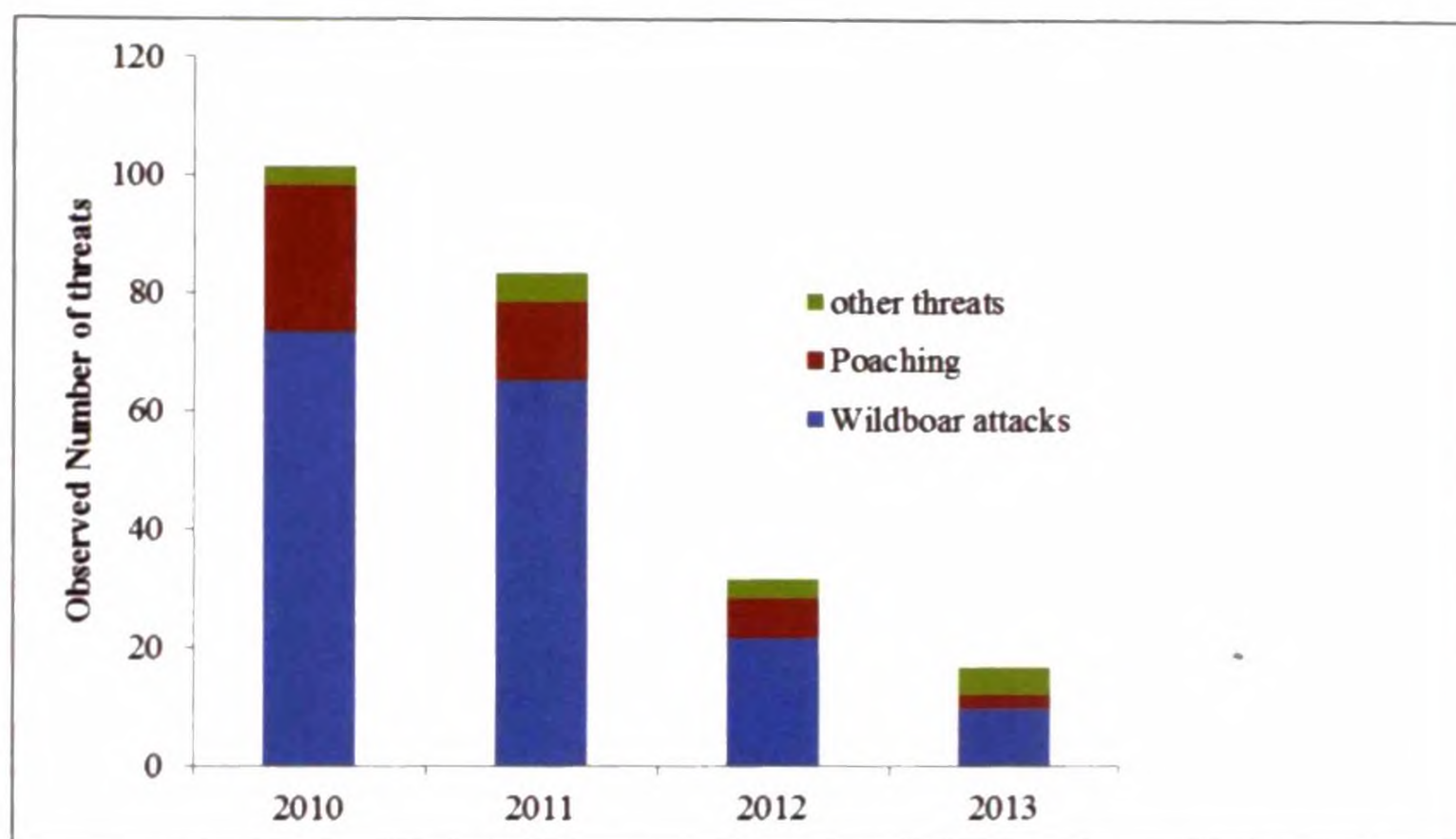


Figure 05. Threats to sea turtles nests during 2010 to 2013. (Note: other threats include turtle by-catch, threats by dogs, crab attacks and beach erosion)

Surveys on turtle nesting beaches are the most widely used monitoring tools used by turtle conservationists around the world. This is an important component of a comprehensive program to assess and monitor the status of sea turtle populations. These assessments are necessary to evaluate the effects of recovery and conservation activities which are being implemented at all life history stages (Schroeder and Murphy, 1999).

The average annual nesting at Panama rookery was 69 nests per kilometre. This is quite low in comparison to the Rekawa rookery, the major turtle nesting site in Sri Lanka which has a much higher average annual nesting of 416 per kilometre ((Ekanayake *et al.*, 2002). Even though Panama rookery has fewer nesting than Rekawa and other nesting beaches around the world, it could be considered as an important nesting beach since all five species including the Critically endangered Leatherback turtle come to nest. It is a significant rookery for Olive ridley turtles as well. Further, nesting takes place all around the year and also during the day light which is not reported in many turtle rookeries in the world.

Nesting time suggests that turtles prefer dark hours to lay eggs while predation is low. However, it seems that peak nesting time is from 7.00 pm to 11.00 pm at night. Further, it has been noted that the frequency of nesting increases with the intensity of the moon and it should be studied further.

The hatching success seems to be remarkably high in this stretch of beach and conservation efforts taken have directly influenced the results. The method of in-situ conservation used in the Panama turtle rookery is proven to be successful. Here, a wire mesh cage is planted

around the nest and kept until the hatchlings emerge. Daily monitoring of the protected areas and up to date records of the nests has made conservation efforts very effective. Involvement of the local community in patrolling and protecting the beach has given a huge boost to the project implementation organization.

Beach erosion causes a significant impact in losing turtle nests. During such critical conditions the nests are drawn back manually and this causes the hatching success to decrease. Further experiments should be designed and tested on these facts in order to increase the effectiveness of the conservation project.

Earlier, there was no literature about the nesting population of turtles on this beach. The WRCT survey identified this beach as an important nesting place for turtles. Hence, this is the first proper survey done about turtles nesting on this beach and further studies should be carried out. And also, the present study shows that Panama-Okanda rookery is an important nesting beach for the marine turtles and highlights the significance of declaring it as a sanctuary.

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