

Final Evaluation Report

Your Details			
Full Name	Josephine Owusuwaa Nyarko		
Project Title	Investigating the Impacts of Temperatures on Sea Turtle Nesting and Hatching at the Muni Pomadze Ramsar Site, Ghana		
Application ID	28540-1		
Date of this Report	14/5/2021		



1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieve	Partially achieve	Fully achieve	Comments
Determining Incubation temperatures in nests	ieved	ially ieved	ieved	During the study, nests were monitored through the incubation period till the nest hatched. Nest incubated between 43 to 53 days with an average incubation period of 47.78± 3.1. Temperatures in all nests increased as incubation progressed and were significantly higher (p=0.01) than temperature of the sand metabolic heating. The average incubation temperature was between 31.1°C±0.8°C and 33.4°C±0.9°C and this was within the tolerable range of temperatures (25-35°C) for sea turtle hatchling survival as observed by Ackerman (1997), Valverde <i>et al.</i> (2010); Hill <i>et al.</i> (2015) and Binhammer <i>et al.</i> (2019). The wide disparities between adjacent sand temperatures and nest temperatures in the present study indicate that metabolic heating occurred during the incubation periods for nests laid within the study period, October, November and December. Nests from October however recorded the lowest temperatures as compared to those laid in November and December. In view of this, Hawkes <i>et al.</i> (2007) suggested that with climate warming and its consequent increase in beach temperatures, sea turtles may shift their nesting period to earlier or later dates
				with more suitable atmospheric conditions. In the case of this study, sea turtle nesting may shift to earlier months to avoid increasing temperatures during nesting and incubation.
Estimating their sex ratios, hatching rate/ success and assessing				Our findings indicated that hatchlings from all nests during the season were strongly female biased ranging



their morphologies for abnormalities	averagely between 90-100%. The hatching success varied between 0 and 93.4% (mean = 59.1%) and there were no observed abnormalities in their morphologies. Skewed sex ratios found from hatchlings in this study threatens the future population dynamics of these sea turtles. Also nests which recorded longer hour of temperature beyond the tolerable range (>34°C) showed recorded lower hatching success and vice versa. A particular nest with 0% hatching success also saw sudden rise in temperature to almost 35°C (threshold temperature) on during the thermo- sensitive period where even a 1°C difference in temperature has critical effects on the species providing rather hard and dried up unhatched eggs contrary to the usual rotten looking unhatched eggs. Our findings indicate the impact of heat-related mortalities on eggs and hatchlings and hence the need for conservation measures to mitigate these issues.
Fishing communities actively protecting sea turtles	Members of the community were involved in night patrols and educated on the work been done and its essence through jingles played daily at the community information centre. Also volunteer groups were equipped with monitoring and patrol skills to undertake monitoring activities which will further protect sea turtles against poachers and egg collectors.

2. Describe the three most important outcomes of your project.

The most important outcomes of the project were:

a). The dominant nesting sea turtle species at the MPRS was the olive Ridley turtle.

b). Nest temperatures were higher than associating sand temperatures due to metabolic activity in the nest. The impact of metabolic activity was significant during the middle and final third periods of incubation, and hence influence the sex ratios of hatchlings.



c). Further, the incubation temperatures influenced the length of incubation period and hence, the size of hatchlings as well. The rates of hatching and emergence success of hatchlings were also impacted by nest incubation temperatures.

d). Finally, the study also indicated that the primary sex ratio of hatchlings produced during the nesting season were strongly female-biased.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

The start of COVID-19 pandemic in the country and its consequent lockdown placed on movement and gatherings made education of the communities difficult. However, at later times when the lockdown was partially lifted on movement, we employed the use of playing jingles in the community through their community information centre to educate community members on the essence of sea turtle conservation and the project that was taking place.

4. Describe the involvement of local communities and how they have benefitted from the project.

Members of the community were involved in night patrols and educated on the work been done and its essence through jingles played at the community information centre during the period. Also volunteer groups from the community were equipped with monitoring and patrols skills to undertake monitoring activities which will further protect sea turtles against poachers and egg collectors. For example, during the study period, there was a case of a failed turtle nesting during the day and when community members noticed its struggle to get back to sea, the research team was quickly informed to help the sea turtle back to sea.

5. Are there any plans to continue this work?

Plans are underway to continue the work at other sea turtle nesting sites in the country for comparison of results and also involvement of the other sea turtle species that nest on Ghanaian shores as well. However, lack of funding to do so now is our current hindrance.

6. How do you plan to share the results of your work with others?

The project was coordinated from the Wildlife Division office of the project area and hence our findings is shared with their office for implementation purposes. However, plans are underway for publication in a peer-reviewed paper. The abstract of this work has also been sent around to pave way for presentation of the findings from the research at an international conference.

7. Looking ahead, what do you feel are the important next steps?

There is the need to extend this research to other nesting sites in the country to provide a better understanding on the effects of changing temperatures on these species.



Also, similar research should be conducted on the other two species that nest on our beaches.

Future research should be done over a long-term period, to sample nests from different seasons with a variety of thermal and climatic conditions.

Finally, authorities in charge of sea turtle conservation in Ghana should incorporate findings from this work to afford conservation decisions that considers the changing climates.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used in a PowerPoint presentation of the findings from the work at Department of Marine and Fisheries Sciences (University of Ghana). Also, the acknowledgement section of the written thesis accorded the foundation its due acknowledgement for supporting the work.

9. Provide a full list of all the members of your team and their role in the project.

Mr. Prince Yankson- Field Assistant

Miss. Grace Ofori – Field Assistant

Mr. Stephen Mensah - Driver

10. Any other comments?

I am very grateful to the entire team at this organisation for the opportunity given me. Thank you.