Factors in Historical Hatchling Production and Implications for Nesting Hawksbill Sea Turtles (Eretmochelys imbricata) on Maui

Luke Sundquist and Hannah Bernard
Hawai‘i Wildlife Fund

Purpose

Hawksbill sea turtles have been protected and researched as they nest on Maui for decades. This small population has not experienced any significant recovery. We examined 22 years of data from 91 nests for trends and effects of natural variables and human impacts on clutch size, incubation time, hatchling success, hatchling production, and nesting population.

Background

Hawksbill sea turtles have been listed as critically endangered across the globe by the IUCN since 1996. The nesting population on Maui represents a portion of the small, isolated population of hawksbills in the Hawaiian Archipelago. Hawai‘i Wildlife Fund partnered with state and federal agencies in 1996 to research and protect this population. Since then, this community volunteer-based project has identified and patrolled six nesting beaches along the south coast of Maui, tagged 10 nesting females, and monitored 91 nests. Observations vary each year, without any activity some years but a mean of 1.3 females and 4.2 nests per year over the 22 year period. These nests have led to 9000 live hatchlings, but numbers of females, nests, and hatchlings per year have not increased significantly over this period.

Staff and volunteers conduct dawn patrols and night patrols to hout each nesting covered, and to NOAA/Pacific Islands Regional Office and Lush Charity Pot for funding.

Results

- Mean clutch size decreases for each clutch laid during a nesting season. For females that laid a 5th clutch of eggs, it was significantly smaller than their previous clutches.
- Five is the maximum clutches seen in one season in this population, with one female laying 24 nests in 5 seasons over 16 years, for a total of 4112 eggs.
- Clutch size was positively correlated with female size and age since first nesting observation and negatively correlated with date of nesting, but these effects were not significant (p>0.05).

Incubation Time to First Emergence

- Incubation time varies drastically between the three most common nesting beaches on Maui. Oneleoa has significantly longer incubation, including the longest observed incubation of over 70 days, while incubation on Kealia and Kawiliipoa has been as short as 53 days.
- No significant correlation was found between incubation time and date or year, but changing beach temperatures could have long-term effects on incubation time and sex bias.
- Nesting females have high site fidelity, so the incubation time and ultimate hatchling success of their clutches are closely tied to the conditions of the nesting beach.

Conclusion

Data from the Hawksbill Sea Turtle Recovery Project revealed several trends from the last 22 years of research. Female age and size does not have a significant effect on clutch size or hatching survival. However, we have seen females lay up to 5 viable clutches over multiple nesting seasons, for thousands of total eggs from one individual. The incubation time and success of these clutches depends largely on the nesting beach, its associated threats, and volunteer protection. As this project continues, we encounter and resolve new obstacles, finding solutions through partnerships and community awareness. Hawksbill sea turtles are faced with invasive predators, pollution, habitat loss, beach development, and global warming, but have shown resilience and longevity. Although there has not been a significant increase in this population yet on Maui, continued dedication and conservation can prevent their loss and enable their recovery.

Acknowledgements

This poster was made possible through the support of the ISTS38 sponsors highlighted in the printed program. Thanks to NOAA/Pacific Islands Regional Office and Lush Charity Pot for funding this project, to our partners with U.S. Fish and Wildlife Service and Hawai‘i Department of Land and Natural Resources Division of Aquatic Resources, and to all of our dedicated team and volunteers with Hawai‘i Wildlife Fund.

References:


Author Contact: Luke Sundquist, Hawai‘i Wildlife Fund, lukes.hwf@gmail.com