Do Oceanographic Features Influence Marine Turtle Diving Behavior? Investigations into Hawksbill Sea Turtle (Eretmochelys imbricate) Diving in the West Indies

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DO OCEANOGRAPHIC FEATURES INFLUENCE MARINE TURTLE DIVING BEHAVIOR? INVESTIGATIONS INTO HAWKSBILL SEA TURTLE (ERETMOCHELYS IMBRICATA) DIVING IN THE WEST INDIES

Jacob E. Hill & Frank V. Paladino

BACKGROUND
- Understanding diving behavior is important in quantifying threats faced by sea turtles.
- Diving behavior within a species may vary geographically.
- Features offshore from the nesting beach may influence diving behavior during the internesting interval.
- This study tested the hypothesis that hawksbill sea turtles nesting on a beach surrounded by unique oceanographic features would exhibit different diving behavior during the internesting interval than those nesting at other beaches.

METHODS
- Study Site: Sandy Point National Wildlife Refuge, St. Croix, USVI (Figure 1)
- Unique Features: Deep water close to shore and reef nearby is degraded; suboptimal internesting habitat for hawksbills.
- Patrolled beaches nightly (July-August 2012 and May-September 2013) to encounter nesting turtles.
- Used ultrasonography to determine reproductive status (Figure 2).
- Attached time-depth recorder (TDR) to carapace (Figure 3).
- Recovered TDR when turtle returned to nest again, on average 15.5 days later.
- Obtained 7 sets of internesting diving data from 5 turtles.

RESULTS
- A total of 5403 dives were recorded over the course of 2506 hours.
- Turtles dove more frequently after nesting and before returning to nest, but were relatively inactive throughout most of the internesting interval (Figure 4).
- Overall turtles spent 86% of the internesting interval submerged.
- Average number of dives per hour was 2.1±1.3, with average dive durations of 29.2 minutes and average surface intervals of 3.4 minutes.
- Most of the internesting interval was spent at one depth range, but this depth varied among individuals (Figure 5).
- Less than 1% of time was spent at depths greater than 30m.
- Maximum dive depth increased markedly in the last 15% of the internesting interval (Figure 6).
- 2 turtles dove to extremely deep depths for this species (84m and 95m).

CONCLUSIONS
- These turtles spent the majority of their time in relatively shallow waters, rarely diving deeper than 30m.
- The range of depths at which each turtle spent the majority of time may reflect individual variation in habitat use.
- Long dive durations, short surface intervals, and constant dive depth suggest seafloor nesting.
- With the exception of maximum dive depth, parameters agree with other studies because these turtles were mostly inactive on the seafloor in shallow depths.
- Some of these dives exceed the maximum diving depth published for hawksbills during the internesting interval.
- Turtles attained deepest dives in the last 3 days of the internesting interval, when they were presumably offshore Sandy Point.
- Overall diving behavior and habitat use does not vary greatly between Sandy Point and other sites, but the presence of deep water seems to permit unique cases of extremely deep diving at this location.
- Future investigations should be undertaken at other major nesting grounds to fully understand site-specific differences in diving behavior.

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