Artificial Light on Water Attracts Turtle Hatchlings During their Offshore Migration

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Investigation of in-water movement of turtle hatchlings has been hampered by the small size of hatchlings relative to the size of available tracking technologies. We used new miniature acoustic transmitters to track turtle hatchlings in order to measure the influence of artificial light. The tracking system consisted of an array of 36 acoustic receivers deployed near the benthos in the surf zone at Ningaloo, Western Australia to detect signals from coded acoustic transmitters attached to 40 green turtle hatchlings released into the array. Ten hatchlings were released into the array in each of two treatments, with artificial light present (on board a boat moored at the edge of the array) and under ambient conditions over two nights. The receiver array was used to obtain high resolution x-y positions of the turtles moving through the array. Positions were calculated if a transmission from an animal transmitter was simultaneously detected on at least three time-synchronised receivers. These detections were converted into positions using differences in arrival times of the same signal at different receivers.

In both ambient light treatments the hatchlings fanned out in in a similar manner, in a largely northerly direction from the release sight and spent 19 ± 5 and 12 ± 3 minutes respectively in the array. In the artificial light treatments, 80% and 100% of turtles travelled to the position of the light (north-west of the release site on night one and north-east of the release site on night two) and remained in the array for significantly longer (22 ± 2 and 18 ± 9 minutes respectively). A current meter deployed in the array showed that the currents were quite low at around 9cm s^{-1} over both nights but the direction was towards the north-east on the first night and towards the north-west on the second night. The turtles did not appear to move with the currents in any of the experimental releases.

We also measured the surfacing rate of turtles with and without dummy transmitters as a proxy of effort, as a test of the effect of the tag on the hatchling's swimming behaviour. We did not discern any difference, with both groups having similar surfacing rates (8.5 ± 4.2 and 8.5 ± 6.2 seconds respectively). We have shown empirically that wild turtle hatchlings are attracted to light and that light causes hatchlings to linger longer in the nearshore zone, thereby increasing predation risk. Our results have important implications for the management of artificial lights on water in the vicinity and adjacent to turtle nesting beaches.

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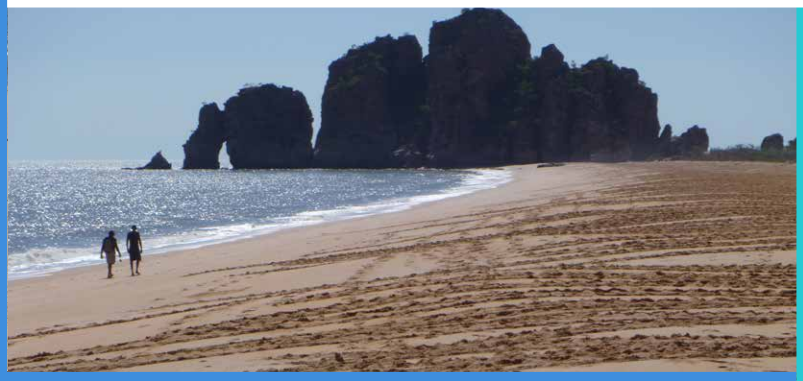

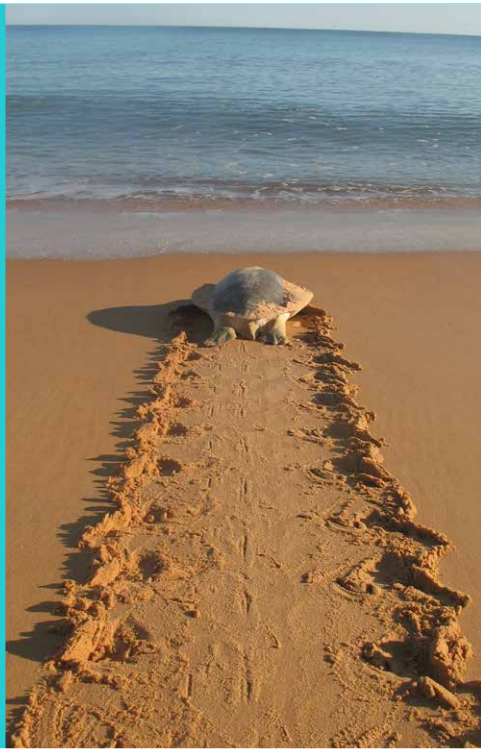

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