RESPONSE OF FLATBACK TURTLE HATCHLINGS TO LIGHT EMITTING DIODES AT SEA*

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It is well known that light pollution disrupts the early dispersal of marine turtles. But now that light emitting diodes (LEDs) are rapidly replacing traditional lights, it is evident we know little about how they influence hatchling dispersal, or how modifying the intensity of the light affects their in-water behaviour. Here we used acoustic telemetry to assess the early in-water dispersal and predation rates of flatback turtle hatchlings (*Natator depressus*) in response to different intensities of white LEDs located on a boat 150 m offshore of a nesting beach on Thevenard Island in Western Australia. These lights were enriched in short light wavelengths which are known to disrupt the sea-finding ability of hatchlings. Hatchlings (n=68) were obtained from a total of seven nests and were released in experimental trials within 48 hrs of capture. Prior to release, an acoustic tag was glued to their undersides, and they were released at the waters' edge to swim through the nearshore zone where acoustic receivers had been deployed in an array totalling 21600 m^2. This experimental setup allowed us to document the turtle movement paths as they dispersed through the nearshore zone in the presence and absence of LEDs of five different intensities (10, 30, 50, 70 and 120 watt). The experiment occurred over two nights, with the lights on the boat located either on the eastern or the western side of the array. We found no effect of LEDs on the bearing hatchlings took as they swam through the tracking array when lights were in the direction they dispersed under ambient conditions. When LEDs were not in their usual direction of travel observed under ambient conditions, variability in their mean bearing increased, and a change in bearing occurred with the highest light intensity. We found weak evidence that predation was also higher at this light intensity compared to ambient, and also in two of the lower light intensities (10 and 30 watts), but only on one of the experimental nights. We were unable to find a relationship between hatchling speed and time spent in the tracking area with light intensity. However reduced sample sizes (due to predation), and the fact that there was little difference in the measured intensity

between light treatments might have affected our ability to detect effects. Although more effort is required to increase the confidence in our findings, the use of white LED floodlights in coastal areas, even at low intensity, appears to pose a threat to hatchlings. We suggest light avoidance or other light management measures such as task lighting, shielding, and avoiding shining light directly on the water, might be more appropriate mitigation measures than simply reducing intensity.

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