Distinguishing Between Tracks and Clutches for Nesting Turtles: How Survey Techniques and Uncertainty Impact Abundance Estimates and Trend Detection

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Abundance surveys of nesting sea turtles often use counts of clutches or tracks to represent the number of turtles coming ashore. In lieu of substantial long-term capture-mark-recapture studies, a count survey is often used to present an estimate of population size which can then be used to compare between populations or look at trends within the one population. A major source of uncertainty (including error in track species identification and nesting success estimates) in nesting sea turtle abundance surveys can arise when tracks are counted instead of clutches or turtles. How much inherent uncertainty there is will have an impact on the confidence of abundance estimates and the ability to detect real trends in populations. We investigated differences in the proportion of tracks resulting in successful egg deposition, arising from different methods of detection – comparing indirect detection using day surveys looking at track characteristics and direct detection using night surveys watching for the presence of eggs. Uncertainty from sample sizes were investigated using simulation modelling based on binomial distributions, nesting success data published in the literature and case studies from loggerhead turtles nesting at Ningaloo Marine Park and flatback turtles nesting at Cape Domett. Impacts from sample size and spatial and temporal differences were investigated, and their impact on trend detection and abundance estimates were explained in relation to the different nesting behaviours of the different species of sea turtles. At Ningaloo Marine Park, nesting success for loggerhead turtles using the indirect and direct detection methods was within expected limits (8.2%) based on binomial sampling (n= 74). In contrast, there was a much larger than expected difference in nesting success between indirect and direct detection methods for flatback turtles at Cape Domett (17.9% difference, n= 44) with the direct detection method producing a higher estimate. Further research is needed to ascertain why differences in estimates between methods occurred at Cape Domett and not at Ningaloo Reef. This may be attributed to spatial or temporal variability between the samples, species or density specific differences, or error in identification methods.

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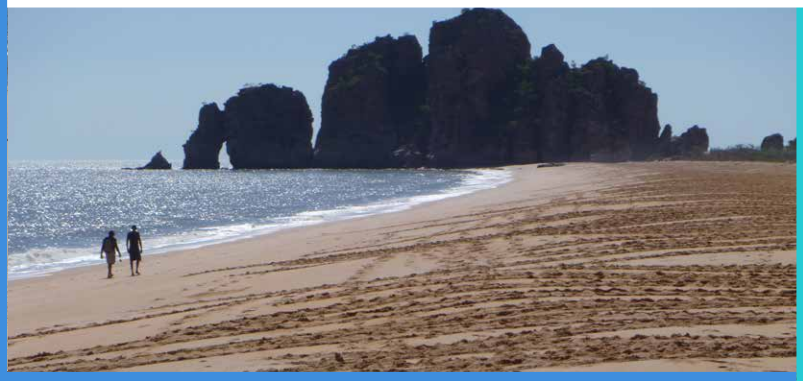
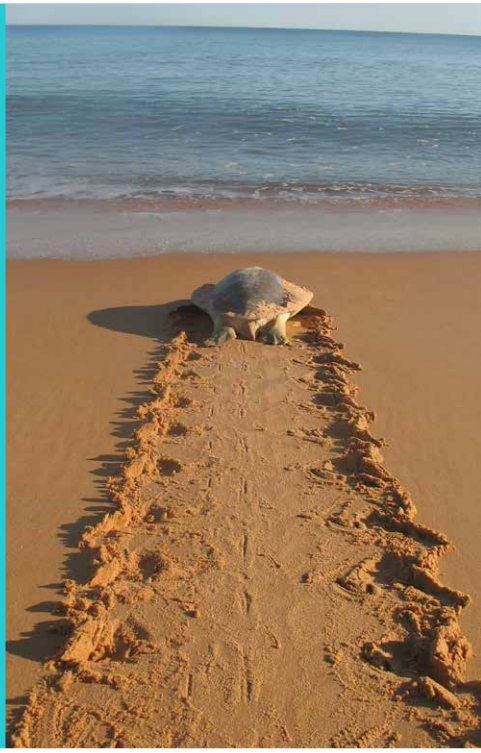


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