## Breeding loggerhead marine turtles *Caretta caretta* in Dry Tortugas National Park, USA, show high fidelity to diverse habitats near nesting beaches

KRISTEN M. HART, DAVID G. ZAWADA, AUTUMN R. SARTAIN and IKUKO FUJISAKI

## SUPPLEMENTARY MATERIAL 1 Kernel density estimates

We used the *Home-Range Tools for ArcGIS* extension (Rodgers et al. 2005) and fixed-kernel least-squares cross-validation smoothing factor (*hcv*) for each kernel density estimate (Worton 1995; Seaman & Powell 1996). When we observed unequal variance of the x and y coordinates we rescaled the data to select the best bandwidth (following Seaman & Powell 1996; Laver & Kelly 2008).

To further characterize at-sea inter-nesting areas selected by individual loggerhead turtles *Caretta caretta*, we calculated the centroid of each turtle's 50% kernel density estimate; if a 50% kernel density estimate included multiple activity centres we calculated the centroid of the largest activity centre. We summarized the distance from each centroid to the nearest land.

## SUPPLEMENTARY MATERIAL 2 Site fidelity

We tested location data for, and quantified, site-fidelity using the *Animal Movement Analysis* extension for *ArcView v. 3.2* (Site Fidelity test under *Home Range* options). Using Monte Carlo random walk simulations (100 replicates), during the inter-nesting period we tested tracks against randomly generated walks for spatial randomness (Hooge et al. 2001). We confined random walks to a bathymetric range of 150–0 m to include only the realistic extent of the inwater habitat for the loggerhead turtles during the study period. The random walks were also bounded at the shoreline and c. 150 km north of Dry Tortugas National Park (distant from any received location). Tracks exhibiting site-fidelity indicate movements that are more spatially constrained rather than randomly dispersed (Hooge et al. 2001). In our analyses, coordinates were standardized, given the unequal standard deviation of latitude and longitude for some turtles.