**Deriving wildlife densities from Unmanned Aerial Vehicles counts, using a random encounter models**

Unmanned Areal Vehicle (UAV) use is becoming increasingly widespread for the mapping and study of marine wildlife. Currently, estimates of marine wildlife density or abundance has been primarily derived from photo ID, and mark recapture. These approaches either require individual recognition of animals, or handling, which is not possible from UAV surveys. Random Encounter Models (REM), modified from idealised gas laws, enables animal densities to be estimated from unrecognized individuals, with a known travel speed, and sensor detection parameters. The student will develop a random encounter model, in order to derive densities from UAV animal counts. Rate of contact of marine wildlife (dolphins, crocodiles, manatees, seabirds, sharks) will be derived from georeferenced images, stemming from fixed-wing UAV surveys in the Turneffe Marine Reserve (Belize), and in the British Indian Ocean Territory. The student will test the accuracy and precision of this generalised REM using simulations of different combination of camera width, UAV altitude, flight speed, and proportion of time spent at the surface by the animal, as reported in previous studies.

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