The influence of foraging success on marine turtle migration and breeding and the ecological impact of a changing climate

Supervisors

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Project description

Understanding how migratory species may respond to changing climatic conditions is critical for their conservation and management. For species that are capital breeders, such as marine turtles, that do not typically breed annually, environmental conditions at the foraging ground are likely to affect the timing, frequency and magnitude of migration and breeding. The extent to which historical or carry over effects (Harrison et al 2011; J.Anim Ecol), may influence future breeding, has not been explored for marine turtles. In addition, although site fidelity to breeding and foraging grounds has been shown in some marine turtle species, we do not know how oceanographic conditions may influence migration between these sites.

This project will focus on the foraging ecology of the loggerhead turtle (Caretta caretta), utilising 25 years of reproductive histories of nesting females at a long-term study site in Cyprus. This student will spend 3-4 months in Cyprus during years 1 and 2 of the project.

The aims of the project are:

1. How do reproductive traits correlate to trophic status? Reproductive histories of nesting females will be analysed in combination with stable isotope analysis (SIA) of tissue samples for these females, to determine the relationship between trophic status and reproductive fitness.

2. What are the foraging sites for loggerhead turtles in this region? Satellite tracking and SIA data will be used to produce an isoscape of foraging sites, allowing individuals to be assigned to likely foraging sites and prey (e.g. Yeruham, et al. 2015; Sci Rep). The levels of threat in these areas, in particular fisheries activity will also be examined to assess potential impact.

3. How do conditions at the foraging site influence reproductive fitness? Environmental data (e.g. satellite remote sensing, model and meteorological data) will be used to investigate the conditions at the foraging grounds and relate these to reproductive fitness, how sites may change under future climate scenarios and how this may influence population dynamics.

4. How do oceanographic conditions influence migration and phenology? Environmental data will be used to investigate how variations in oceanic processes can influence migratory routes and phenology.

The Council of Europe has listed the loggerhead turtle as an indicator species for marine health in the Mediterranean. A recent report to the Council of Europe has highlighted the lack of understanding of the demographics of this species and the top ten research priorities, two of which this project directly addresses.

Loggerhead turtle ©Rees_Archelon