

Global warming could help bolster turtle population size

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The sand desert Viana on the island of Boa Vista, Cape Verde, is surrounded by rock desert. Credit: public domain image

(Phys.org) —Scientists studying the sex ratio of sea turtles at one of the world's largest rookeries predict global warming could help bolster population sizes.

Deakin University Chair of Marine Science Professor Graeme Hays says a new study with researchers at Swansea University (UK) and the Cape Verde Islands published this week in *Nature Climate Change*, offers a positive outlook for the endangered group of species.

"Our latest research provides detailed estimates of past, present and future [sex ratios](#) at one of the world's largest sea turtle rookeries, the Cape Verde Islands in the Atlantic, where large numbers of loggerhead turtles breed," Professor Hays says.

"We also recorded sand temperatures on nesting beaches over several years using small data-loggers.

"These recordings were combined with past measurements of environmental conditions on the islands since 1850, and climate predictions for the next 100 years made by the Intergovernmental Panel on Climate Change.

"In this way, a robust 250-year time series of incubation temperatures, hatchling sex ratios, and adult breeding sex ratios is derived."

Professor Hays says sea turtles are unusual in that the sex of hatchlings is determined not by sex chromosomes – as is the case in humans and other mammals – but by the incubation temperature, through a phenomenon known as 'temperature dependent sex determination.'

"Above a certain pivotal incubation temperature, typically near 29°C, the majority of sea turtle eggs produce female hatchlings and vice versa.

"This means that warming temperatures, occurring as part of global [climate change](#), may cause the feminisation of sea turtle populations through the production of only female hatchlings."

Professor Hays says that despite predicted warming and increasingly female skewed sex ratios, entire feminisation of this population is not imminent in the next few decades.

"In fact warm incubation temperatures may have an unexpected conservation benefit of increasing the number of breeding females and hence the total size of the population.

"While this threat of feminisation of [sea turtle populations](#) has been known for many years, there have been few attempts to predict how the sex ratio of populations may change in the future and the resulting extinction risk," he said.

"The conceptual advance made by this study of predicting climate warming impacts across hatchlings, male-female breeding ratios, and nesting numbers provides a more holistic approach to assessing the conservation concerns for [sea turtles](#) in a warming world."

More information: Effects of rising temperature on the viability of an important sea turtle rookery, [DOI: 10.1038/nclimate2236](https://doi.org/10.1038/nclimate2236)

Provided by Deakin University

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