The impact of extreme weather events on tropical island biodiversity

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Tropical islands are hotspots of global biodiversity. Their extreme isolation has resulted in the evolution of many unique species and ecosystems. Tropical island biodiversity is also amongst the most threatened in the World because of its vulnerability to the habitat loss and alien predatory species that accompanied human colonization. Today, extensive efforts are being made to restore threatened species and ecosystems. The island of Mauritius in the Indian Ocean is iconic in biodiversity conservation. The Dodo has become a global symbol of extinction and biodiversity loss. Mauritius is also one of a very small number of countries to have made significant net biodiversity gains over the last 20-30 years due to its conservation efforts.

Environmental change potentially threatens these biodiversity gains. In particular, terrestrial and marine ecosystems are experiencing changes in the frequency and intensity of extreme weather events (e.g. tropical storms and droughts). Almost nothing is known about the potential biodiversity impacts of these changes in Mauritius or in any other tropical island system. Typically, these changes are viewed as potentially damaging because evidence from elsewhere shows that extreme weather events can increase mortality in animal and plant populations. However, positive impacts are also possible. For example, many tropical forest trees produce fruit after storm events to exploit canopy gaps caused by the storm. This potentially provides food resources for associated animal communities, and may therefore actually reduce mortality. As a result, both the sign and magnitude of any biodiversity impacts remain uncertain. The aim of this studentship project is to use several long-term (20-30 year) population datasets from a range of terrestrial and marine animal species in Mauritius to investigate the impacts of extreme weather events on their population dynamics and viability. All of the species involved are of high conservation value. Specifically, we plan to (1) describe the direct and delayed life history effects of extreme weather events; (2) model the impact of life history effects on population growth and viability; and (3) assess the potential impacts of climate change and adaptation scenarios on population growth and viability. This work will require the integration of long-term ecological datasets, observational data on extreme weather events, and the output of high resolution Global Climate Models that will provide the process-capability and large sample sizes required for this project. Most of the required ecological and weather data have been assimilated and are ready for analysis. The outputs from the project will have a direct benefit to biodiversity conservation in Mauritius, but will also provide insights of global importance on the potential risks posed by extreme weather events to tropical island biodiversity.

Training opportunities:
The project will include a period of fieldwork training in Mauritius through a 6-7 month placement with the Mauritius Wildlife Foundation, the lead conservation NGO on the island and partner in this project.

Student profile:
The project would be suitable for a student with a BSc in Biological Sciences with an emphasis on whole organism biology and ideally an MSc in ecology or conservation.

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