

Building sustainable local economics to conserve tropical rainforest

The work of two researchers from Sussex in the tropical rainforests of Ecuador, Papua New Guinea and Fiji has had important implications for strategic conservation planning and identification of priority rainforest areas that require urgent protection. Pioneering the concept of training teams of 'para-biologists', they are able to provide local employment and build sustainable local economies that support conservation and promote scientific endeavour.

Overview

Tropical rainforests are thought to be home to half of the world's animal and plant species, they act as carbon sinks in climate regulation and are the source of over one-quarter of natural medicines known to man. They still contain countless undiscovered species of plants, insects and micro-organisms. Despite being one of the most diverse and valuable ecosystems on the planet, rainforests are also one of the most threatened. Large-scale fragmentation due to logging and agricultural clearance is a major cause of species extinction and a significant contributor to man-made climate change.

Dr Mika Peck (Lecturer in Biology) and Dr Alan Stewart (Senior Lecturer in Ecology) at the University of Sussex are both heavily involved in the study of rainforest habitats and in programmes that are helping to build systems to protect these threatened environments. Their work has important implications for strategic conservation planning, in particular



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the optimal size and geographical distribution of protected areas such as national parks.

Ecuadorian rainforest has both the highest diversity of mammalian species worldwide and suffers from the highest rate of deforestation in South America, with the highest number of species at risk of extinction. Since 2005, Dr Peck has created an international team to generate information needed to preserve Ecuador's threatened wildlife including *Ateles fusciceps*, the brown-headed spider monkey. Using a combination of field work and satellite imaging, Dr Peck and his team have been able to confirm the presence and numbers of this rare and elusive primate, and to identify priority areas of rainforest that require urgent conservation action.

Similarly, Dr Stewart has been part of an international collaboration of ecologists working with teams of para-

biologists on the patterns of insect diversity and their host plant species in the rainforests of Papua New Guinea and Fiji. Their research has revealed that the species composition of insect communities across large areas changes much less than expected, enabling more accurate calculations of insect numbers at regional and ultimately global levels.

Achieving impact

The primary impact of this work is both environmental – improving knowledge and understanding of biological diversity in the tropics – and socioeconomic. By introducing the concept of teams of para-biologists, their work boosts local communities and economies.

Para-biologists are locally recruited staff specially trained to carry out a range of technical tasks including collection of field data, digital

imaging, preliminary identification of specimens, databasing and the initial analysis of results. Not only has this approach proved to be an efficient way to conduct research, it generates significant social and economic benefits to the local community. It is a model that is now being adopted around the world as a means of studying hyperdiverse ecological environments.

As part of this effort, Drs Peck and Stewart have helped establish and develop the Binatang Research Center in Papua New Guinea, one of the top three para-biologist teams in the world, and the Santa Lucia Research Station in Ecuador. These centres provide a sustainable income stream for local conservation programmes by providing training in research and conservation within the local community, encouraging international scientists or volunteer researchers to set up research programmes, attracting ecotourists, and by establishing conservation charities that engage in outreach programmes and attract additional income for conservation and infrastructure.

By increasing knowledge and understanding of biodiversity, their work enables governments and NGOs to plan conservation efforts more strategically. For example, the Darwin Initiative projects in Papua New Guinea were instrumental in assisting one remote village community to set up 100 km² of its lowland rainforest as a legal entity (Wanang Conservation Area), thereby protecting it from logging. Dr Peck's research describing the risks to spider-monkey habitats prompted the Ecuadorian government to declare an 180-km² site as the first municipal protected area in the country.

Future impact

A site in Ecuador that maintains 150 critically endangered brown-headed spider monkeys (global estimates in 2005 for this species were only 250 individuals) has been identified. Work with the local community has begun to develop a conservation strategy for this area that fosters sustainable livelihoods. Establishing these forests as protected areas is key to bringing this species back from the brink of extinction.

In April 2014, a major fundraising campaign supported by Sussex will be launched to buy key areas of



***Ateles fusciceps*, the brown-headed spider monkey – now recognised as one of the top 25 most endangered primates. Photo courtesy of Juan de Dios Morales.**

forest to expand the Itapoa reserve. In parallel, a project is planned with other landowners to link quality chocolate production to spider-monkey conservation. A strategic analysis, conducted in collaboration with environmental law firm Client Earth, identified high-quality cacao (chocolate) production as a potential sustainable income stream. Funds and experts have been made available to train the community and improve the quality of cacao processing, with a view to obtaining a better market price through ethical buyers. In return, each landowner must agree to conserve remaining forest, not hunt primates and help with reforestation. Local para-biologists continue to monitor primates and forest habitat and, along with local farmers, are essential in developing this project. Conserving remaining wild populations is vital but the project also includes work with a high-end ecotourist reserve (Mashpi) to reintroduce captive spider monkeys to a protected area, rewilding these global priority forests with a primate that plays the major role in seed dispersal of distinctive trees and in maintaining diversity.

In Papua New Guinea, a two-year grant from the Waterloo Foundation has been awarded to employ a Business Development Officer to develop and launch a full business model for creating sustainable income for the Wanang village based on its Conservation Area. By attracting revenue from visiting scientists, biodiversity monitoring, environmental impact assessments, ecotourism and carbon credits, the project aims to bring long-term sustainable income

to the community that can match potential income from logging and at the same time improve the country's research infrastructure and skills. The project will test a model for conserving critical forest ecosystems for study in the face of increasing pressure from commercial interests.

Funding and partnership

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www.sussex.ac.uk/lifesci/stewartlab