Using Palaeolimnology to Inform Freshwater Restoration in Madagascar

Fully Funded NERC- CASE PhD studentship with the Wildfowl and Wetlands Trust (WWT)

We are seeking suitably qualified Environmental Science/Biology graduates for a fully funded project, in which neo- and palaeolimnology will inform wetland restoration and guide the reintroduction of a critically endangered endemic species; the Madagascar Pochard. The project will involve field work in Madagascar and an industrial work placement at WWT Slimbridge. The collaborative training with WWT will provide outstanding students with access to training, facilities and expertise not available in an academic setting alone and the student will benefit from a diversity of approaches to freshwater restoration.

Madagascar is a biodiversity hotspot, but degradation is almost ubiquitous in its wetlands. Extensive deforestation and burning over the last 1000 years has resulted in extremely high rates of soil erosion and siltation. There has also been extensive introduction of invasive alien fish species since the 1950s and uncontrolled pesticide application to agricultural wetlands since the 1990s.

Rather than a simple focus on the conservation of the remaining high quality wetlands, the pervasive nature of extreme degradation means that active restoration is needed to bring back biodiversity and ecosystem services. There needs to be a better understanding of pre-disturbance conditions, which can serve as targets for restoration measures. However, the scarcity of undisturbed sites means that it is difficult to use contemporary ecology alone to set targets for restoration of degraded sites. Although there is a paucity of long-term monitoring data, it is possible to extend the timescale of freshwater datasets by complementing contemporary data with that derived from lake sediment cores (palaeolimnology), an approach used in Europe to contextualise a wide range of environmental issues and to define reference conditions.

This research will use a combination of ecological and limnological surveys together with palaeolimnological techniques to assess environmental change in Malagasy lakes over the last c. 1000 years. Reference conditions for wetlands in the central plateau region of Madagascar will be established along with targets for restoration at Lake Sofia, where reintroduction of a critically endangered bird (Madagascar Pochard) is underway.

The candidate will be part of the Environmental Change Research Centre which has world-class laboratory facilities (XRF, sediment size, microscopes, image capture and analysis) and will be trained in palaeolimnological methods including field work (coring, survey) and the laboratory analysis of diatoms and macrofossils. The student will access facilities for stable isotope analysis (C and N), Atomic Absorption Spectroscopy (water chemistry) and $^{210}$Pb dating. An external supervisor, Maarten van Hardenbroek (Newcastle) will advise on small sample stable isotope analysis and ancientDNA from lake sediments.

The project will be undertaken over 4 years; the first year will be mainly training and project design, fieldwork will probably occur in years 2 and 3, we anticipate two field trips followed by data analysis and writing. The candidate will also form part of the London DTP cohort. There will be ample networking and cohort-building activities and events throughout the first term of the first year. The student will have the opportunity to work within a diverse and experienced research group at WWT,
and alongside an international team of conservation practitioners delivering community-based wetland management projects and conservation breeding programmes.

The successful candidate should:

- Be a UK Resident eligible for RCUK funding.
- Have a minimum of a UK Honours degree at 2:1 level or equivalent in Geography, Environmental Science or Biology.
- Be self-motivated and curious with good teamwork and communication skills.
- Be enthusiastic about fieldwork in Madagascar and work experience at WWT
- Have experience with some of the following; limnology, tropical ecology, palaeolimnology, species recovery or wetland conservation.

The application should include:

- 2 Page CV (including statement of eligibility)
- 1 page Cover Letter explaining your interest in the project and rationale for the project
- Contact information for two academic references

Financial Information

- The successful candidate will receive up to 4 years funding consisting of an annual stipend (currently £14,999) and Fees. The student will also access a Research Training and Support Grant for research costs plus WWT will make financial contributions e.g. to cover accommodation for work experience.

Closing date is Friday 16th February and candidates should be available for interview on Friday 2nd March. The position is available from September 2018.

Please submit your application (and also any informal enquiries) by e-mail to Professor Vivienne Jones vivienne.jones@ucl.ac.uk