

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole

Grants Director

Grant Recipient Details

Your name	Xingli Giam
Project title	Fish species richness and community composition across peat swamp landscapes in Southeast Asia
RSG reference	9627-1
Reporting period	2012/2013
Amount of grant	£6,000
Your email address	xgiam@princeton.edu
Date of this report	1 Feb 2013

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Evaluate if fish species richness and composition differ across intact peat swamp forest and logged peat swamp forest		✓		I have sampled three pools in an intact stage 2-3 (<i>Shorea albida</i> dominated) peat swamp forest in Brunei as well as three stream reaches in an intact stage 1 (mixed peat swamp forest) peat swamp forest in Brunei in August 2012. As the logged stage 2-3 peat swamp forest was completely dry at that time, we were not able to sample the fish communities. With the limited time and the low density of streams in peatlands, we were also not able to find open streams in logged or open sites previously converted from stage 1 forest. This work is continuing, and I will be continuing my field work in the logged stage 2-3 site and open/logged stage 1 site in April-August 2013.
Elucidate the environmental factors that predict species richness and composition patterns in intact peat swamp			✓	I recorded physicochemical parameters at each pool and stream reach as well as physical characteristics of the site. I have also data for fish assemblages in the six sites I have sampled in 2013. Preliminary analyses have identified the environmental factors that predict species richness and composition patterns in intact PSF sites.
Elucidate the environmental factors that predict species richness and composition patterns across intact and altered peat swamp forest		✓		Sampling in intact forest sites has been completed but sampling in altered (logged/cleared) sites will restart in April-August 2013 due to unexpected field conditions (see above). This work is continuing, and I will be continuing my field work in the logged stage 2-3 site and open/logged stage 1 site in April-August 2013.
Evaluating the potential regional-scale impacts of plantation agriculture and forest degradation			✓	RSGF provided me with valuable field experience and hence knowledge at the local scale to allow me to complete this work at the regional scale. I compiled distributions of peat swamp forest fish species in Southeast Asia

on peat swamp forest fish communities				from co-workers, collection records at the Raffles Museum of Biodiversity research in Singapore, and published literature. Using a well-established matrix-calibrated species-area model that accounts for the differences in the habitat value of multiple landscape types, I forecasted fish extinctions in the peat swamp forests of Southeast Asia by the year 2050 under current rates of deforestation and agricultural expansion. This work has been published in <i>Frontiers in Ecology and the Environment</i> .
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Originally, I had planned to work in a pulpwood plantation in Sumatra, Indonesia, to elucidate fish communities in intact peat swamp forests, logged peat swamp forests, and exotic Acacia pulpwood plantations. However, the plantation company rescinded research permissions just before I was scheduled to start and after I have obtained research permits from the Indonesian government. Brunei was an alternative site, which has worked out well so far, due to its pristine peat swamp forests and the available comparison with logged or cleared sites.

3. Briefly describe the three most important outcomes of your project.

1. Elucidating the fish communities and habitats in an intact stage 2-3 peat swamp forest interior, which to my knowledge, has never been done before.
2. Understanding how current rates of deforestation/agriculture expansion could affect endemic peat swamp forest fish species including identifying areas that are likely to suffer from the largest number of extinctions etc.
3. Clarifying how environmental or water physicochemical parameters could structure fish communities in a peat swamp forest (partially completed at this point of time; estimated date of completion: August 2013).

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

N/A

5. Are there any plans to continue this work?

In April-August 2013, I will complete my sampling regime in the logged Stage 2-3 peat swamp forest and logged/cleared Stage 1 peat swamp forest. I am also conducting gut analyses and stable isotope analyses on the fishes to elucidate trophic impacts.

This current project provided me with a platform to further my research on conserving freshwater habitats and biodiversity in Southeast Asia. I have recently started to lead an ongoing project that aims to quantify the conservation value of riparian buffers in plantation landscapes. So far, I have preliminary results from an oil palm plantation converted from degraded/logged forest in Kalimantan, Indonesia and I would like to extend this to plantations established on peatland if suitable sites can be found.

6. How do you plan to share the results of your work with others?

One piece of work inspired from my fieldwork funded by RSGF has already been published. I plan to present the results of my fieldwork research in an international peer-reviewed journal. I will then communicate the results at conferences, the first of which is the ATBC Asia-Pacific Chapter meeting in Bandar Aceh in March 2013. I will also report my findings to Forestry Department and the Ministry of Industry and Primary Resources of Negara Brunei Darussalam. I will also communicate my findings to NGOs active in regional wetland conservation such as Wetlands International. Photos of fishes will be compiled and sent to FishBase.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

The RSG was used from August 2011 to August 2012. This is within the anticipated timeframe. However, I am returning to the field site this coming April to August 2013 to complete my sampling regime for the sites I was not able to sample due to dry weather. The equipment and consumables funded by RSG from the last season will continue to be used for this coming field season.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Equipment and consumables in the field	£4000	+£5366.533	-£1366.533	A few items turned out to be more expensive than what I have expected. The water pH /temperature /conductivity/DO/ORP meter that I originally budgeted for has become obsolete and unavailable, so I had to get one that is more expensive. I also under-budgeted slightly for consumables like ice boxes, plastic bottles, dissection blades and glass bottles for water and fish sampling.
Transportation	£1250	£735.134	+£514.866	As the stage 2-3 logged PSF site was totally dry, we spent fewer days in the field than expected. Diesel costs for powering the boat were funded by my collaborating research team from the Singapore-Massachusetts Institute of Technology Alliance.

Manpower	£750	£0	+£750	I was not able to employ local field assistants from the local university due to conflicts of their schedules. I was able to secure volunteer help from a close friend from the National University of Singapore. The Department of Forestry also provided logistical support in the remote field site.
Note: all exchange rates calculated from oanda.com from Singapore and US dollar values as of 1 Feb 2013.				
TOTAL	£6000	£6101.667	-£101.667	

9. Looking ahead, what do you feel are the important next steps?

Because of the short timeframe available for research, I was not able to engage a plantation company in my research and was unable to elucidate the impact of plantation agriculture on fish communities on peatlands. However, I was able to improve the current state of knowledge on Blackwater fish communities in mature, advanced-stage, intact peat swamp forests and by the end of my next field season in August 2013, I will be able to understand the impacts of logging/clearing peat forests on fish communities.

The next important steps will be to understand how we can mitigate such impacts in a multiple-use agriculture landscape. I have recently started a project in an oil palm plantation on mineral soil but would like to do so on peatlands as well.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

Yes, I have used the RSGF logo in an invited seminar titled "Forecasting global extinctions of freshwater fishes in Sundaland's peat swamp forests" at the Department of Biological Sciences, National University of Singapore, as well as various department and lab seminars in Princeton University. I have also acknowledged RSGF as a supporter for a published paper on likely impacts of peat swamp forest conversion on fishes in Southeast Asia (Giam X. et al. 2012. Global extinctions of freshwater fishes follow peatland conversion in Sundaland. *Frontiers in Ecology and the Environment* 10: 465-470.). I have also been invited to organise a symposium on freshwater ecosystem conservation in Southeast Asia at the Association of Tropical Biology and Conservation (ATBC) Asia-Pacific chapter meeting at Bandar Aceh, Sumatra, Indonesia in March 2013 where I will be presenting results from my work.

11. Any other comments?

I sincerely thank the RSGF for funding this research which constitutes a major part of my PhD dissertation research in Princeton University. RSGF recognizes and understands the difficulty of field research and fully supports us in our endeavours – I truly appreciate that.