The Rufford Foundation
Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. 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. Please note that the information may be edited for clarity. 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	Javier Sanguinetti
Project title	Climate change, wildfires and non-native granivores interactions: a potential threat to conserve Araucaria forest in Argentina and Chile.
RSG reference	14945-1
Reporting period	03-27-2014 to 04-01-2015
Amount of grant	£5991
Your email address	sanguinetti.javier@gmail.com
Date of this report	10-09-2015

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
Estimating seeding tree survivorship in relation to fire severity at different fires			X	Data about tree survivorship were obtained at six areas burnt 2-29 years ago and within 16 patches. More than 700 araucaria trees were surveyed.
Estimating cone production recovery on trees with different fire severity at places 2-29 years after fire occurred			X	More than 200 seeding trees were marked and surveyed for cone production recovery at six burnt areas and compared with more than 300 seeding trees sampled at unburnt control areas.
Estimating non-native granivores relative abundance at burned and unburned sites		X	X	Non-native relative abundance was estimated counting signs at six burnt areas: more than 5 km of transects were stablished in burnt and unburnt sites. Complementary, fauna activity was surveyed using six camera-traps during 21 days on each site. During autumn a Calbuco volcano eruption interrupted the field work and therefore partial information was gathered at two from six burnt areas.
Field training to government agents, students and local inhabitants			X	In 10 months we trained 60 people in the field, including national and provincial park rangers, technicians from different government agencies, NGO members, students and mapuche indigenous settlers that lives on araucaria forest.
Preparing education material			X	A poster was developed to disseminate the conservation issues related to fires and non-native invasions in araucaria forest. The project also helped with the development of educational games related with the conservation of araucaria. We will develop material for teachers during 2016.
Preparing a Guidelines for the conservation of Araucaria forest		X		We are developing a handbook with guidelines for the conservation and management of araucaria forest based on scientific information obtained during the last 15 years from several researches. Next

				year will be finished
Seed predation by non-native mammals estimations at burnt sites		X	X	We monitored seed predation during 2 months at two burnt areas, with different seed predator's assemblage. During autumn a Calbuco volcano eruption interrupted the field work and therefore partial information was gathered at two from six burnt areas.
Educational activities for Teachers	X			We couldn't make this activity because of a shortcut in funds and in the availability of time. The next year we will carry out

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Initially was planned to have access to an official vehicle and fuel largely funded by the park. This was not possible and for that reason I had to use my personal truck which caused an increase in fuel costs supported by the grant. Moreover, accidentally loaded dirty fuel caused the rupture of the vehicle which must be repaired. Additionally, during autumn a Chilean volcano (Calbuco) erupted and the cloud ash and its accumulation in the ground avoid the possibility to continue working on the field and modified the environmental conditions for the research.

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

After 18 months of the project the three most important outcomes are:

i) We determine the araucaria tree survivorship and the cone production recovery in relation to fire severity on six sites burnt 2-29 years ago with a total area sampled greater than 500 km^2. This new key scientific information helps us to understand the degree of forest recovery in the context of climate change. Fire killed on average 50 (±11 SE) % of the araucaria trees but varied between 14 to 89 % according to fire severity. Within patches tree mortality varied between 7 to 96 %, reflecting the spatial variability of tree survivorship. After 2-29 years, cone production recovery in survived seeding trees varied between 0 to 35 % but trees that suffered higher fire severity only recovered 4 to 5 % of the reproduction capacity compared to unburnt trees. Therefore, if wildfires increase in extension and intensity promoted by climate change, we expect that Araucaria will seriously diminish their survivorship rates and reproduction recovery despite having adaptations against fire.

ii) We start to understand the relationship between non-native granivores mammals and araucaria forest fires. Apparently this fauna (European hare, Spain rabbit, red deer, wild boar, livestock) increases in araucaria burned sites, especially after 2-7 years after the fire and according to the non-native species assemblage at the watershed spatial scale. We detected

increases up to six times in the abundance of introduced mammals in burnt sites compared with unburnt forests. However, this depends on the regional context of the distribution of this introduced fauna. Also, apparently the increase in abundance is stronger in the valleys and lower parts of the mountain compared to the high mountain areas. Besides, we gathered for the first time, information about seed predation by non-native species at burnt araucaria forest. The response of non-native species distribution and relative abundance at burnt araucaria forest and the related seed predation rate increase is important if we want to predict where the non-native granivores species will produce more impact against araucaria regeneration after fire. Besides, will be useful to develop a map that highlights the priority vulnerable areas against this threat. More information about this relationship will be necessary to complete the next years considering the seed production variability among years and the long term effect of this threat.

iii) We trained technicians and professionals from government institutions, students, NGO members and mapuche settlers. Now these different stakeholders know how to estimate cone production, evaluate fire severity and survey non-native wildlife. During the 2-day workshop, where scientist, government functionaries, mapuches leaders and araucaria forest settlers share knowledge about forest ecology, environmental problems and threats, was possible to define the main political and socioeconomic changes that could promote forest conservation together with funding, management and monitoring needs or solutions (see the attached file with the workshop memory). Besides, we advanced with the writing of the first manual (handbook) that describes the main conservation practices for the protection and conservation of the araucaria forest and its biodiversity relate it with their seeds. This handbook will summarise the information gathered during the last 15 years by our research group and other scientist from Argentina and Chile.

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

Different stakeholders from the local communities from national and province institutions relate it with forest and fire management, students from universities and some mapuche indigenous settlers actively participate during the fieldwork. The project was widely disseminated among state institutions and this caused that the province and the federal governments are planning to prepare proposals to estimate araucaria cone production outside the national park to establish quote to seed gathering by people and to increase the funds to protect burnt areas against livestock grazing. As a result of the project there is now a better communication between professionals from several governmental institutions and there is a way of exchange of information and consultation. One of the results of this better communication is the idea proposed by functionaries from the National Environment & Sustainable Development Secretary to financially support the printing of the handbook (manual) with guidelines for conservation, management and protection of araucaria forest generated by the project. However, much more work is needed to increase and improve the inter-institutional communication and to organise the community-based conservation work with stakeholders.

5. Are there any plans to continue this work?

We plan to continue monitoring cone production, seedling establishment and seed predation on sites affected by fire. It will be very important to get a long term record of cone production from individual trees to compare it with the data gathered between 2000 to 2015 years from individuals at unburnt forests. We also consider important to monitoring araucaria seedling establishment during the next years and evaluate seed predation by non-native mammals on burnt sites during high productive years when satiation effects were observed at large araucaria unburnt stands but we do not know if this is the same for burnt areas.

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

I will publish the work at regional scientific journals and at scientific meetings, in fact I sent the work to the Rufford Foundation Conference Sudámerica 2015. Besides, I will continue with notes in newspapers to divulgate the information within the general public. Also, we will prepare educational material for teachers to allow that the araucaria ecological knowledge gets to the school students. Finally, I will send technical reports and papers to government institutions with management proposals and conservation guidelines. In fact, I sent two reports the last year to the provincial and federal authorities in order to exemplify what is need, in terms of management, outside Lanín National Park.

During the last months we published notes about the Project at the regional newspaper and within the blog of Lanin National Park. See links below.

http://www.rionegro.com.ar/diario/los-incendios-han-diezmado-las-araucarias-6684575-9574-nota.aspx.

http://www.lmneuquen.com.ar/noticias/2015/3/21/controlan-la-recoleccion-de-pinones-en-zonas-afectadas-por-incendios_250248

https://plus.google.com/u/0/115073864074619120601

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

The grants was used from March 2014 and as indicated in schedule presented in the proposal (see "Activities and Methodology"), the project has an 18 month length and finished in August - September 2015.

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
Bank money cost	0	56	(+56)	This was the cost of the Bank transfer from England to Argentina
Equipment	2309	1738	(-571)	I got six cheaper camera-traps than the ones that were originally in the budget. I did not buy the two-way radios.
Vehicle maintenance	528	1171	(+643)	I use my personal truck because we did not have access to an official vehicle. During the field work my truck was broken and must be repaired. Also inflation in the country increased the total amount of this item.
Vehicle fuel	128	832	(+704)	The grant finally provided the total cost of fuel because we did have access to an official vehicle. Besides, more sample sites that expected and inflation in the country increased this item.
Food	598	655	(+57)	During April and May we are going to use more funds for this item. Inflation in the country increased the total amount.
Voluntaries subsistence payment	1320	501	(-819)	I decided to contact a lower number of voluntaries because of budgets constrains in the rest of the items
Workshop cost	369	829	(+460)	This workshop will be carry out in July as was planned in the proposal
Educational material cost	528	120	(-408)	We print 300 educational posters but because of budget constraints we do not reserve money for the printing of the handbook. However, this handbook was not concluded get.
Educational campaign cost	211	89	(-122)	I decided to suspended the train school teachers activities because of budget constraints
Total	5991	5991		**Exchange rate 1 £ = 12,98 Total**

The devaluation of Argentine money and the high inflation during 2013-2015 periods mainly explains the differences on budget amount and actual amount for each item. An accumulated inflation of more than 65% since the budget was prepared significantly change the money that finally were used on each item and increased the field work costs and the ones relate to educational issues (workshop). These variations on the financial money costs of some items constraint the possibility to develop the rest of the items and explains our decisions relate to activities and products that were reduced.

On the other hand after the proposal was sent to RSG and approved, during December 2013 two new wildfires occurred in the araucaria region and when we start the project we decided to include them within the sampling sites. This decision caused that a greater portion of the money was used to finance the field work.

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

Considering the conservation, management and socioeconomic implications that the results of this project has, it is important to consolidate and confirm the actual results with more research, extending the sampling period for at least 3 more years. In this way, the scientific information will be more solid in order to be more confidence about which management, conservation, mitigation and protection actions are more important and priority.

Another important step will be the transfer of the information to the decision makers and stakeholders that depends on araucaria forests. During 2015 we had huge wildfires in Patagonia, outside araucaria range, some of them with more than 300 km^2 in size. In this context, the fire issue is installed in public opinion, not only in Patagonia but throughout the country. This scenario represents an opportunity for conservation biologist to influence on politicians and decision makers.

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

Yes, I included on a poster (is attached) and in oral presentations during the training activities to stakeholders. Also the document memory of the workshop included the Rufford logo. I will use it soon at scientific meetings and in note at newspapers. Finally, the logo will be including in the handbook (Manual) with guidelines for conservation and protection of araucaria forests.

11. Any other comments?

Several photos, a poster and notes in newspapers generated by the project, and a two pdf files with the Workshop Memory file and with and a final technical report for the stakeholders are attached to this report.