

Final Evaluation Report

Your Details	
Full Name	Agustin Vitali
Project Title	Cascading effects to the introduction of non-native ungulates and the loss of a keystone interaction in Patagonia temperate forest
Application ID	26510-1
Grant Amount	£4956
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Date of this Report	October 29, 2019

1. 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 the consequences of non-native ungulates on plant community	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Evaluate the consequences of non-native ungulates on pollination web	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Evaluate the consequences of non-native ungulates on seed dispersal web	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

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

I did not encounter any difficulties during the project. I had only a small setback during the project when I tried to buy the cameras traps. The cameras traps cost almost three times more in Argentina than in the US or Europe. When I tried to buy the cameras in the US, the Argentinean Government began to retain all imported goods. So, I was able to buy only three cameras. However, I solved the problem by borrowing camera traps of other labs.

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

1) In presence of the keystone mutualism both pollination and seed dispersal networks were more complex, containing more species and more interactions. In addition, I found greater plants richness supporting the networks, which provide a diversity of resources (flowers and fruits) used by pollinator and seed dispersal animals.

2) Non-native ungulates producing negative cascading impacts on both pollination and seed dispersal networks by disrupting the keystone mutualism. In presence of non-native ungulates, the networks were integrated by fewer species and fewer interactions than in intact forests. Moreover, plants community presented fewer species with dominance of thorny plants. These results highlight the impacts of non-native species in local communities and the critical need to develop management plans to control and eradicate them.

3) In absence of the keystone mutualism, the pollinator and seed dispersal networks were less resistant to disturbance. Thus, the presence of this keystone interaction should be used to develop priority areas for conservation because of its high capacity of supporting more biodiversity.

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

I worked with several sectors of the local community. During fieldwork, I counted with the help of park rangers, who learned about fieldwork protocols, endemic species and non-native species. In addition, I involved undergraduate and graduate students from different careers in fieldwork activities. Field assistants learned about several ecological concepts applied to conservation, and also the field techniques necessary to answer ecological questions. Moreover, I participated in two workshops for children, teaching them about native species and the importance of their conservation using hands on techniques. I also have been giving classes to students in an elementary school in a project called "Inibioma va a tu escuela".

5. Are there any plans to continue this work?

I would like to continue studying the impacts of global change on the conservation of the temperate forests of Patagonia. I showed the impacts of non-native ungulates in pollination and seed dispersal networks by indirect effects; however, this opens up new research opportunities and conservation related questions. It is possible to restore the pollination and seed dispersal networks after the non-native ungulate's eradication? Would be the re-sow mistletoe seed a useful management plan to restore the keystone mutualism lost?

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

I am sharing the results of my project with different stakeholders. I already have shared results with other researchers through talks at the university and with local community in workshops and classes at elementary and high school levels. Moreover, I plan to share my results with other member of the scientific community through scientific publication in national and international journals, and conferences. Finally, I plan to meet with the administration of National Parks to share the results obtained in the project and advise them about future management plans.

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

The grant was used from November 2018 to August 2019. The project took a little bit more time that I anticipated because I decided to keep more time the camera traps on the field to obtain more records of animal eating fruits and dispersing the seeds.

8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Tools and materials: eppendorf tubes, headlamps, flagging, rechargeable batteries, memory cards, multi-tool, etc.	50	496	+446	I exceeded the budgeted amount because of the battery and memory cards purchase for every camera trap used in the field. I also bought a multi-tool to uses in the field in order to secure the camera traps and the tomahawk traps
Tent	217	150	-67	The available tent was cheaper than the budgeted tent
Fuel (field truck)	144	289	+145	I exceeded the budgeted amount because I decided to keep the project running more time the camera traps on the field to obtain more frugivory records.
Field assistant	1800	1913	+113	I exceeded the budgeted amount because I decided to keep the project running more time the camera traps on the field to obtain more frugivory records.
Food for field assistant	135	203	68	I exceeded the budgeted amount because I decided to keep the project running more time the camera traps on the field to obtain more frugivory records
Binoculars ^[1] _{SEP}	150	187	+37	The available binoculars were more expensive than the budgeted binoculars
Camera traps	2460	449	-2011	I could only buy three cameras traps because the government began to retain imported goods
Overhead Fundación Jose Balseiro	-	334	+334	This amount was not contemplated in the previous budget
Equipment: sleeping bag, backpack and GPS	-	810	+810	Sleeping bag and backpack were bought to use in the nocturnal marsupial fieldwork. During nocturnal fieldwork we rested in a tent. GPS was used to mark the trees where we recorded the pollinators and frugivory visits.
TOTAL	4956	4831	-125	I indicate the average rate of exchange because of the economic instability of Argentina.

				Average rate of exchange: 1£~58.18 \$ pesos Argentinos Actual rate of exchange: 1£~ 75.31 \$ pesos Argentinos
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9. Looking ahead, what do you feel are the important next steps?

For me, continue the research line and start to apply the knowledge generated during my project into management plans are the most important next steps. First, maintaining the research line would generate and improve knowledge about non-native ungulates and allow us to better understand their impacts and possible solutions. Second, applying management plans could stop the spread of non-native ungulates avoiding new areas to be affected. In addition, management plans could try to recover the impacted ecosystems and ecosystems function provided for them.

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

Yes, I used The Rufford Foundation logo in my oratory presentation, school classes and workshops.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Agustin Vitali: leader of the project

Mariano Rodriguez-Cabal: adviser of the project leader

Yamila Sasal: adviser of the project leader

Kandela Butteler, Berenice Lovazano, Juan Gabriel Calzada, Antonella Fernandez, Mauro Lucci, Julián Baetti, Enrico Valfoska, María Eugenia Valfoska, Irene Villa & Genevive Conley: field assistants. Their work consisted in record pollinator and seed dispersal events. Also, some of them helped me with censuses of plants and nocturnal marsupial monitoring.

Celeste Prieto: park ranger. She assists with censuses of plants and seed dispersal records.