

## 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Nicolas Ferreyra
<b>Project title</b>	Impact of the Red Deer ( <i>Cervus elaphus</i> ) on High Priority Conservation Native Forest in Patagonia, Argentina
<b>RSG reference</b>	11502-2
<b>Reporting period</b>	May 2012 – May 2013
<b>Amount of grant</b>	£5997
<b>Your email address</b>	nferreyra@apn.gov.ar
<b>Date of this report</b>	23/07/2013

**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
Measure the impact on native vegetation		x		We sampled 52% of the planned sample plots. We need to finish 27 plots (50 x 50 m) mainly in Lolog watershed. We will do this during the spring of 2013. We achieved some results about the impact to indicator species by the processing and analysing data about browsing indexes and vegetation cover. We discovered that indicator species like <i>Austrocedrus chilensis</i> , <i>Aristotelia chilensis</i> , <i>Nothofagus nervosa</i> , <i>Nothofagus pumilio</i> and <i>Embothrium coccineum</i> are affected by red deer
Deer population monitoring			x	During 2012-2013, we finished counting deer pellets by re-sampling 14 transects 400 m long that were first measured in 2008 and 2009 in Tromen area. We continued surveying with six active cameras trap. Until October 2012, there were 607 active days of continuous surveying. We obtained 116 deer photos, an average of 20 photos per camera. In order to improve the quality of this data, with this second RSG we bought six more cameras. We had a delay in the installation of this equipment at the field due to bamboo blooming. Ninety more days of active camera trapping were incorporating to the monitoring, until February 2013, but photos were not analysed yet.

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

At the study area during the last working season occurred a regional bamboo (*Chusquea culeou*) blooming and as consequent rodent population growth. One of the rodent species, *Oligoryzomys longicaudatus*, responded to the appearance of bamboo seeds and is the reservoir of the Hantavirus pulmonary syndrome disease (HPS). Due to the human health risk associated to a rodent outbreak after the bamboo blooming, field work activities were reduced and therefore some objectives were impossible to be achieved on time. Despite of this unusual and rare ecological event, we could partially fulfill some of the original objectives for this season.

Here's is some digital news about this event (spanish):

[http://www.lmneuquen.com.ar/noticias/2013/5/19/afirman-que-habra-una-gran-ratada-que-se-extendera-hasta-el-2014\\_187737](http://www.lmneuquen.com.ar/noticias/2013/5/19/afirman-que-habra-una-gran-ratada-que-se-extendera-hasta-el-2014_187737)

<http://weblavoz.com.ar/sociedad/sociedad-provincial/ratada-estudian-situacion-en-moquehue/>

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

Since 2010, with the first RSG we achieved three important outcomes: 1. Description of Deer population; 2. Confirmation of deer population changes related to the alien species management; and 3. Preliminary evaluation of deer impact to native flora used as indicator species.

#### Description of Deer population

In these years we characterised the deer population and we evaluated the spatial and temporal changes associated with habitat demands. Deer abundance estimations varied between 1 and 7 deer per km<sup>2</sup> depending on sites and habitat conditions. Deer use this area during spring, summer and autumn. We know that population composition change along the year, e.g. during spring-summer period the population is largely represented by females, constituting 60% of the observed animals and the female-male ratio is close to 2:1, while in the fall, this ratio is close to 1:1. To the east, outside the protected area, we observed that the abundance of females in relation to males is greater than values obtained inside national park with a female: male ratio close to 6:1. We also know that an altitudinal migration of red deer exist during the year. In spring, the deer use the forests in the foothills of the mountains while during the summer and fall use forests and grasslands in the valleys. All this information is very valuable to manage the population of this invasive alien species.

According to historical sightings and photos obtained per unit effort, we could assess the existence of changes throughout the year in the relative abundance and composition of deer. In the management area, higher relative abundance of deer and larger proportion of animals forming groups, with both sexes separated where detected during the spring. Conversely, the lowest deer abundance with separated sexes was observed during winter. Intermediate relative abundance of deer values, with more presence of lonely animals, was observed between summer and autumn. According to the record of 116 photos, the deer would have a peak of activity between the 9:00 to 12:00 am and between 18:00-24:00 (Figure 1). This information confirms the custom of deer to be active during the night, fact that hunters often do not recognise or admit. This explains the erroneous hunter's conclusion that often say that there are few deer at the region and mainly because they search for them only during the day. Photo data confirms the domination of females within deer population and their composition changes during the year.

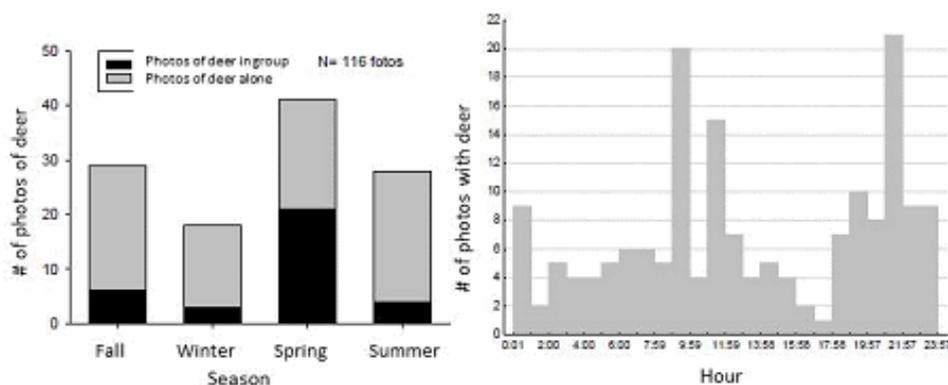


Figure 1. Number of photos with lonely or group deer along the year.



Figure 2. Examples of photos obtained with the camera traps.

#### Confirmation of deer population changes related to the alien species management

Deer population was reduced significantly between 2009 and 2012 years due to the management applied for 5 years. Three clear evidence obtained through the population monitoring support this conclusion. Firstly, the observation of deer per unit effort decreased 2.5-fold between 2012 and 2009 with a reduction of 60% on the period. Secondly, the same was observed with the changes on group size. In the period, we estimated a reduction of 55% on deer group size, when the hunting management begins the mean group size was 4.8 animals while on 2012 were only 2.3 per group. Finally, the deer capture per unit effort significantly decreased at a mean rate of 46% during the evaluation period.

#### Preliminary evaluation of deer impact to native flora used as indicator species

From the vegetation surveys we can preliminary obtained the first results and conclusions about the deer impact on the indicator species. We recorded 32 species of shrubs and trees at the study site. More than 72% of these species were browsed by red deer, with a mean value of 35% of the individuals from each species been affected. The decreasing ranking of damaging to the indicator species is: *Pseudopanax laetevirens*, *Ribes magellanicum*, *Ribes valdivianus*, *Nothofagus pumilio*, *Nothofagus nervosa*, *Nothofagus oblique*, *Araucaria araucana*, *Schinus patagonicus* and *Aristolelia chilensis*.

We observed a direct relationship between the relative abundance of the vegetation species and the frequency of deer browsing. Also, we found the same relationship between the plants abundances

and the severity of browsing. On the other hand, the 25% of the sampled forests concentrated the 50% of the browsing. All these results seem to indicate that red deer select particular sites for feeding, those with higher vegetation cover and higher shrubs and tree species diversity. This type of site may have more red deer, or they are using it during more time and therefore, deer produce more browsing severity. In the long term, on these heavily used sites a reduction on plant diversity and structural complexity within the understory should be expected. These changes on vegetation ultimately could affect insect, birds and mammals' abundances and diversity due to habitat modifications produced by the alien invasive deer.



**Figure 2. Vegetation impact surveys visit and replacement trap cameras memories and deer sampling surveys during winter season.**

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

We achieved the collaboration of six scientists allowing us to link deer research with management. Technical agreements were achieved with this scientific group working towards the future, embodied in projects. In Tromen, neighbor's landowners agreed with the management being implemented on deer population within the protected area. Political and technical conditions are growing to allow the regional deer management population by the inter-institutional coordination between public and private land inside and outside the National Park.

This project also provided the conditions to discuss deer management with hunters and guide hunters, the experience shows that is difficult to get a total agreement among the different stakeholders that are involved (biologist, managers, politicians, hunters, guide hunters) and that is necessary more organisation and political support to achieve a greater advance on this outcome.

**5. Are there any plans to continue this work?**

The Red Deer Management Plan in Lanin National Park is approved and will be implemented until 2018. This year will be evaluated and modified for continuity. The next year, we planned to advance deer management in coordination with ranchers inside and outside the protected area and try to integrate the deer policy with provincial authorities to reduce deer populations outside the National Park. This will necessary require a common diagnosis and the analysis and evaluation of changes to

management regulations. We want to formalise agreements among the National Park, stakeholders and Neuquén province.

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

The following documents were disseminated to key stakeholders:

- ✓ Lanin National Park (2010). Red Deer population status and management effectiveness. Period 2009 to 2010. Red Deer Management Plan in Lanin National Park, 32pp.
- ✓ Lanin National Park (2011). Protocol monitoring of the impact of red deer (*Cervus elaphus*) on native vegetation. Lanin National Park, 26pp.
- ✓ Lanin National Park (2011). Monitoring Protocol Red Deer (*Cervus elaphus*) in the Park Lanin National 49pp.
- ✓ Lanin National Park (2011). Monitoring the presence and distribution of red deer using camera traps, 10pp. May, 2011
- ✓ Lanin National Park (2011). Monitoring the presence and distribution of red deer using camera traps, 6pp. November, 2011
- ✓ Lanin National Park (2012). Synthesis of Red Deer Management Plan in Lanin National Park, 6pp.
- ✓ Ferreyra, N. & J. Sanguinetti (2011). Deer population status (*Cervus elaphus*) and its effect on browsing from *Nothofagus* spp. in the PN Lanin Argentina. Oral Exposure, 2nd Conference on Natural Sciences in Patagonia, Esquel, 2011.
- ✓ Ferreyra, N. & J. Sanguinetti (2012). Population characteristics on *Cervus elaphus* and driving experience of this invasive species in the PN Lanin (Neuquén, Argentina). Oral Exposure, Second Latin American Congress of Mammalogy and XXV Conference. Argentina of Mammalogy, November 2012, CABA.

We are planning and preparing manuscripts to be published in Spanish and English languages on common and scientific regional journals and writing shortly notes for hunting magazines.

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

This second RSG was used during the dry season (November 2012 until February 2013). The Red Deer Management Plan will continue for at least 5 more years, according to the National Park Administration Resolution N<sup>o</sup>HD 250/2007.

**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
Expendable equipment	240	240		We bought the material and we already have all the jaws classified, but we did not have time to analyse this material.
Capture IR™ Digital Game Cameras (with solar panel + battery & SD)	1600	1300	300	We finally bought another Game Camera model because there was no availability of the budgeted model. We use the £ 300 to buy other items.
Library	100	200	+ 100	We print a lot of material for distribution among hunting guides, NGO, Regional Technical Delegation and Rangers.
Gerber Multi-Plier® 400 Compact Sport	30	30		
Photodegradable Flagging tapes	7	12	+ 5	We need more flagging tapes than budgeted (10 units instead of 5).
Bushnell® Elite® 150 Laser Rangefinder	290	290		Already bought and used on field.
Pro-Line Nylon Clad Steel Tapes (50m)	60	50	10	Exchange rate difference (among pounds, dollar and ARG pesos)
Diameter tape (3 m)	40	36	4	Exchange rate difference
Vehicle maintenance and fuel	690	690		Although some field work was not totally accomplished, we use all the money because of fuel and vehicle maintenance inflation during this period.
Volunteer food and subsistence	2440	2000	440	The difference was used to participate as a speaker at a Congress in Chile where I present this project
Workshop costs (food)	500		500	The workshop was not performed because there is not enough time due to the completion of other activities.
<b>TOTAL</b>	<b>5997</b>	<b>4848</b>	<b>1149</b>	

Exchange rate: 1 £ = 8,38 AR\$

The difference between the budget and the actual amount will be used to finish 27 plots (50 x 50 m) of vegetation monitoring during the next summer season without rodent outbreak.

Besides we will use part of this difference to present this project at the International Ecology Congress in Chile and to buy some extra field equipment such as Nikon 10 x 50 ATB Binocular.

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

1. Increase information about red deer home range in our area and about regional migration beyond the limits of the park.
2. Finish the evaluation of deer impact to flora indicator species
3. Implement deer management in agreement with provincial authorities and landowners inside and outside the National Park.
4. Continue the deer management plan until 2018 and do an effective management evaluation

**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, we use the logo on technical reports that were sent to stakeholders and politicians, also when we participated with oral presentations at regional and national congress and during training workshops