

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

Thank you for your help.

**Josh Cole, Grants Director**

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#### Grant Recipient Details

<b>Your name</b>	Nestor Ignacio Gasparri
<b>Project title</b>	Indigenous lands assessment for a regional conservation plan of dry forests in West Formosa
<b>RSG reference</b>	57.11.08
<b>Reporting period</b>	May 2009 - February 2011
<b>Amount of grant</b>	£5560
<b>Your email address</b>	<a href="mailto:ignacio.gasparri@gmail.com">ignacio.gasparri@gmail.com</a>
<b>Date of this report</b>	February 2011

**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
Deforestation maps and modeling			X	
Fauna field surveys and species distribution models			X	The species distribution models were made in combination with a more extensive survey. Twenty samples were surveyed in the RSG project area
Identification of High Conservation Values Areas (HCVA)		X		We identified HCVA based on ecosystem service (forest carbon), cultural values and fragmentation. Identification of HCVA with species under risk or biodiversity concentration is pending waiting the species distribution models.
Integrated analysis of Wichí corridors, HCVA and deforestation projections		X		We identified areas with high probability of deforestation based on deforestation model. In general places identifying for future deforestation are around major towns and will not affect directly areas proposed for Wichí corridors. Integrated analyses are waiting for species distribution models.

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

As part of the learning of the project, we found that the fauna sampling we designed was insufficient to develop a species distribution model. It was necessary to have more sampling effort at each site and a new approach. To avoid this problem, we designed a new sampling unit under the advice of our referee about biodiversity (Pedro Blendinger). The new sampling unit was to make a rapid assessment of one field sampling of 1 km<sup>2</sup>. Each of these cells corresponds for one pixel in the GIS for species distribution models. Each sample include a grid of nine points (separated by 300 m) for bird and tree sampling and 9 transects of 100 by 10 m to survey major mammals tracks (footprints, droppings, etc.). Count points for birds were surveyed for 10 minutes each morning.

Additionally, the geographic coverage of the sampling also was a problem. Even though the RSG project focuses in the West Formosa area, a correct modelling sample outside the area was necessary. To avoid this problem the sampling used for the RSG project was compatible with the sampling of a major project with a broader geographic coverage (PICT 1693). As result of sampling effort coordination a field staff of 8-9 highly qualified people was formed: one post-doctoral student (Ricardo Torres), one MSc student in fauna management (Oriana Onsinaga Acosta), one advanced PhD Student (Ignacio Gasparri), three PhD Students (Sofia Marinaro; Leandro Macchi and Patricia Zelaya) and two or three field collaborators. The conformation of this field staff permitted us to reduce the days of field work for each sampling from 4 to 2 days.

The species distribution models cover all the dry Chaco area (study area of my first RSG project) but with a denser sampling and probably reliable predictions for the west Formosa.

Another limitation for the project was that in satellite images classification was not possible to separate all the forest classes that we expect. We applied some of the most recent methodological methods for images classification (Random Forest) but we were forced to reduce the forest classes. Finally, our vegetation map for west Formosa includes the following classes: water, bare soil, grasslands, forest dominated by deciduous trees, forest dominated by evergreen forest, Vinalar (*Prosopis kuntzei*) forest, riparian forest and palms.

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

1. One of the main results of this project is the formation of a group of professionals with interest to work about the conservation of natural and cultural values in the Wichí territory of west Formosa. In detail, besides the initial project staff (Oriana Osinaga-Acosta; Veronica Piriz Carrillo and myself) one early carrier biologist (Patricia Zelaya) collaborated with the field work and on the basis of this experience prepared a PhD plan and got a grant from CONICET to undertake it. Additionally, two early PhD students (Sofia Marinero and Leandro Macchi) working on interactions between production and conservation in a major project of the Chaco region (PICT) incorporated aspects related with the communal lands' management and the nature conservation in west Formosa into their study.
2. West Formosa will be crucial for the future Chaco conservation in Argentina. Biomass forest maps (results of the first RSG project) and forest species distributions (mammals and trees) of the dry Chaco region (fitted with a collaborative sample of the RSG and PICT project) are congruent and show that west Formosa is an extensive sector with forest not degraded (high biomass) and with the highest regional species richness of major mammals and trees (bird analyses are pending). Additionally, the landscape structure analysis suggests a good situation in relation to fragmentation. We determinate an area of 1.67 million ha of forest with 0.85 million ha dominated by perennial species and 0.82 million ha dominated by deciduous species, with an average patch size above 6000 ha - that is six times the average patch size of others dry Chaco sectors (Salta, Tucumán).
3. On the other hand, a regional deforestation model indicates the west Formosa (specially around towns and national road N°81) as the most probable area for agriculture and pasture expansion in the next decade.
  - a. Analysis based on fauna sampling and forest biomass does not show evidence that communal lands have a better conservation situation than non communal lands. We use statistical approaches to test differences *in* and *out* communal lands of diversity and abundance for different groups (mammals, birds and trees species). Also, biomass (as indications of forest degradation) was tested.

In despite of the probability of limitations of the sample, there are two possible reasons to explain this situation:

- 1) West Formosa has a good conservation situation (as we pointed above) including areas inside and outside communal lands. The general situation of deficient road infrastructure until last year, determinate an incipient degradation process in private and public lands in contrast with others Chaco sectors (e.g. Salta province or Santiago del Estero province).

- 2) Not all communities have the same pressure on resources and there are some communal lands with an exceptional conservation status (e.g. Lote 27) but there are others in the same situation or worse than the non-communal lands. Also, there is not a homogeneous approach in all the communities to administering its resources. Neither community permits deforestation but some permit forest logging by non-indigenous loggers or cattle production (cows and goats). Additionally, communities do not have capacity to control the non-community use of its land.

In a few words, forests in communal lands in general are not in better conservation situation than non-communal lands. But, all forests in west Formosa are in good conservation situation in contrast with other Chaco sectors.

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

In all sampling some members of the local community participated in the field tasks, especially one key person of the Las Lomita area who was involved in much of the fieldwork.

More indirect, but no less important, the communities and local NGOs take in consideration our technical argumentation to the discussion about the landscape forest ordination in Formosa. The provincial government propose a forest zoning based on restrictions to the deforestation at a property scale. The people related with the RSG project elaborated a technical analysis for the local NGOs and communities about the government proposals, with emphasis on territory ordination and biodiversity aspects. Using this report, communities and local NGOs incorporated some of the concepts in a common document presented in a public consultation by indigenous communities and local NGOs (<http://redaf.org.ar/leydebosques/?p=182>). Now, the official zoning includes restrictions for deforestation (zero deforestation) in communal land but not in the adjacent lands (wichi corridors). In despite of the fact that the provincial government forced this approach, the discussions are open and conservation NGOs (such as Greenpeace or Fundación Vida Silvestre WWF-Argentina) are pressing together with local NGOs and communities for modifications.

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

Yes.

As part of the PhD plan of Patricia Zelaya, the forest fragmentation over the bird's assemblages and its conservation will be studied. West Formosa still has large areas of dry forests in good conservation condition, but we expect in the next decades there will be much more deforestation and fragmentation. New samples will incorporate more species (especially rare species that need more time in each sample site) and analyses will be oriented to explore the effects of forest fragmentation and isolation over birds.

As well, also within a PhD project, Oriana Osinaga Acosta will evaluate the communal forests Wichí sustainability in west Formosa, an important task if we take into account two factors: a) that Wichí communities are drastically changed their relationship with nature and hence the resources they use; and b) the fact that the landscape of the province are experiencing profound and rapid changes. As result of the new international policy scenario the carbon credits for natural forest conservation has the potential to impulse conservation process. For Wichí communal lands in west Formosa, co-

benefits of the carbon projects (REDD) in communal lands will be explored. To advance in this direction forest survey oriented to carbon stocks coupled with diversity and traditional non-wood forest products are necessary.

Finally, an intermediate PhD student will use data from this project to compare if communal administration determinates different degradation/conservation of natural resources in contrast with other types of land property (small properties; large properties; public).

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

As part of the PhD plans of a different person related with the project, we expect to follow the interactions with the communities. As happened on other occasions when some member of the RSG project goes to some communities. Previously take time to talk with persons about the project and its findings. If the community are interested in some aspect, we prepare specific information and documents to share with them by internet or post. Additionally, we expect to participate in future communal meetings to share or findings and discuss future plans.

As part of our academic activities we plan to use the data obtained by this project in scientific publications in per review journals and presentation in technical meetings in Argentina (e.g. Reunión Argentina de Ornitología; Reunion Argentina de Ecología)

Oriented to the general audience, we will prepare reports and brochures about the findings of the project. These documents will be posted in a web page with free access.

## **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 06/2009 to 10/2010

As we pointed out in Section 2, the species distribution models combine sampling of the RSG and a major project. Consequently, in despite that RSG project finished the field sampling in west Formosa in winter 2009, additional sampling was necessary outside the area in winter 2010 to develop more robust models. This was one of the reasons why, after we finished the field sampling of the RSG project in west Formosa, the integrated analyses were delayed.

The second reason for a delay was the limitations to separate the forest classes in images classification. We used field data and, we had a workshop in Tucumán with two persons working in west Formosa with extensive field knowledge (Carlos Spagarino and Martin Cano). In this workshop, we worked together with the persons with extensive field knowledge and GIS experts to define forest classes and collect training data for the image's classification. We tested different approaches to image classification including unsupervised and supervised classification with traditional classifiers (ISODATA) and other classifiers as support vector machine and Random Forest. Also, we tested different acquisition dates for images and a combination of two dates (spring and winter). Another approach was to calculate some textural bands. The resulting maps of each approach were judged by people with extensive field sampling (Carlos Spagarino) and with independent data. This evaluation suggests the confusion of some forest classes. Finally, we applied the Random Forest method and got a map described above but, before discarding forest classes, we decided to test an

alternative methodological approach that consumed time and delayed the subsequent analysis specially related with fragmentation.

**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
Subsistence cost for field work team	£1500	£1639	+£139	
Car Rental	£360	£221	-£139	The difference was used to cover field work. Additional funds for the car rental was provided by another project (PICT)
Fuel	£700	0	+£700	Covered with funds from another project (PICT)
GIS Assistant	£1500	£1500		
Field surveys and biodiversity data processing assistant	£1500	£1500		
PC Compaq + office equipment	0	£670		This new item were covered with founds saved from fuel.
Accommodation for two persons and others cost for the workshop in Tucumán	0	£30		This new item were covered with founds saved from fuel.

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

From our point of view, next steps must be oriented to the development of ecosystem services payment that represent an economic alternative for wichi's communities and their traditional natural resources. In that direction the most advanced system is the carbon credits and the new approach based on the reduction of emission by deforestation and forest degradation (REDD+). For this reason, a critical evaluation about the possibilities of implementation of a REDD project for wichi's communal lands in west Formosa could be an important next step. But it is necessary also, identify cost and benefits of this kind of project over nature conservation and cultural values of the communities. Probably an approach like co-benefits of the carbon project could be appropriate to this 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?**

Not now but will be used in congress and publications