

# The Rufford Foundation

## Final Report

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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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Kristina Cockle
<b>Project title</b>	Parana Pine Forest Project: Research and outreach to conserve nest sites for globally threatened birds in Argentina
<b>RSG reference</b>	18013-D
<b>Reporting period</b>	Sep 2015 – Dec 2016
<b>Amount of grant</b>	£9944
<b>Your email address</b>	kristinacockle@gmail.com
<b>Date of this report</b>	January 14, 2017

**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
Advance scientific knowledge of how to conserve and restore tree cavities for nesting birds				
Advance knowledge about local people's perceptions of birds and their habitat				We did not visit as many schools as planned, but we visited more farms to work with adult farmers instead.
Encourage and help local farmers to conserve threatened species on their farms				We did not visit as many schools as we hoped, but we visited more farms to work with adult farmers instead.

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

Coring and ageing trees was not straightforward, but it is possible for some species. Annual rings are created in cases where growth varies over the course of a year (for example, in temperate areas with a cold winter). In subtropical forests, the existence of annual rings varies according to tree species and local climate. Our study area is subtropical, with cool winters but no dry season. We found annual rings only in some species of trees. Even in these species, determining age requires laboratory work - it is not as simple as just counting the rings from the increment borer in the field. To complicate matters, many cavity-bearing trees have rotten centers. We were able to make arrangements with a dendrochronology lab in Mendoza province, to use their facilities for processing our samples. Also, we have anecdotal evidence from one farmer, who had a toucan nesting in a cavity in a Paraíso (exotic, fast-growing tree) when the tree was only 15 years old. We will use tree rings to age nest trees for a subset of native and exotic species that are most common and have consistent annual rings. This will be a longer term (3 year) project.

We focused our attention on working with adult farmers, so we did not visit as many schools as initially planned. We needed several months to prepare our research with farmers so we had less time to spend working in schools. We initially tried to select

farms randomly for interviews, but most people were unwilling to talk to us when we arrived “out of nowhere”. We had much better success using the “snowball” approach, whereby each family recommends another family to interview. We initially tried showing the farmers satellite images of their farms, to spark a conversation about farm management. However, we found that interview questions were a much better conversation starter that allowed us to delve into the issues that farmers were most interested in. Rather than trying to figure out satellite images, farmers preferred to show us around their farms so that we could observe first-hand how they used the land. Each interview lasted ~1 h, followed by 1-2 h of open conversation about farm management and conservation issues.

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

**1. We contributed to global understanding of the ecology of cavity-nesting vertebrates and how to conserve them in the Atlantic Forest.** We studied 162 nests/roosts of cavity nesting birds and mammals from September to December 2015 and September 2016 to January 2017. Using these data, combined with data from previous years, we found that endangered vinaceous parrots overlap in nest niche with multiple taxa of cavity-nesting animals including opossums, bees, toucans, and owls (Bonaparte & Cockle 2017). Vinaceous parrots need cavities that are high (>10 m), with large entrances (>7 cm), but other animals also use these cavities. We found that the longest-lasting cavities (>10 years) are in the living trunks of tree species with dense wood (Cockle et al. 2017). However, fast-growing, low wood-density tree species might provide short-term replacement cavities in secondary forests. Importantly, we found 62% of vinaceous parrots nest on farms (vs. ≤ 50% for any other taxon), which highlights the importance of working with local farmers to conserve cavities in human-altered habitats as well as protected areas. We are still studying nests and entering the data from the most recent breeding season so that we can perform further analyses and prepare publications over the coming year.

**2. We gathered data to improve understanding about local people's perceptions of birds and their habitat.** We conducted 23 semi-structured interviews with farmers in Paraje Gentile and Santa Rosa. We discussed threatened species, cavity-nesting birds, farmers' actions and their visions for the future. Many farmers reflected that when they first arrived they thought nothing of clearing forest, it was “what everyone did”, but they now worry about the lack of forest and losing the services that the forest provides. All of the farmers who had native forest (85% of farms) expressed that this forest represented a benefit for the family. The benefits most often mentioned were: source of water, source of firewood and lumber, shade for livestock and people, recreation, temperature control, source of native fruits, protection from wind and erosion, and source of “better oxygen”.

*"If the forest disappears, the problems with water appear." (D.O.)*

*"What's important on a farm is water. Once there's no water, the farm has no value." (N.D.)*

*"The native forest is useful for the air. For how lovely nature is. Because as you see, that hill is a source of water, see how all the streams come out of there (...) That's why we look after it. Imagine if we cut down all that. But in terms of income, no, in terms of helping us economically it doesn't help us at all." (J.A.)*

In 2003 when I arrived in Misiones, farmers often expressed the idea that the forest extended forever, whereas now they remark on the importance of looking after the remaining forest. 92% of farmers indicated that if they found a Parana Pine seedling on their farm they would leave it to grow. These results are preliminary and the bulk of our interviews are scheduled for 2017.

**3. We raised awareness about conservation of threatened species among rural people in the Parana Pine forest.** Farmers manage most of the land with remaining Parana pine forest in Argentina, and are key custodians of this ecosystem, yet they are rarely recognized as having this critical role.

We conducted follow-up conversations with interviewed farmers. After the interviews we gave the families posters or postcards (our outreach materials about endangered species) and transitioned into an open-ended conversation. For many farmers, the interview questions led them to think about a particular topic in a different way and they wondered aloud about these topics in the more open conversation after the interview. For example, in the interview we asked farmers to put a monetary value on a standing dead tree; one husband and wife brought the conversation back to this point, after the interview, discussing with each other how they don't usually consider the monetary value of the resources from the forest. They remarked that if they had to buy firewood and water it would be very expensive for them. Indeed, the wife pointed out that her father is already buying firewood because he has no more forest.

We found these follow-up conversations to be very productive because we had a glimpse of the farmers' thinking process and could exchange ideas about the issues and questions that they themselves brought up. In many cases, as in the example above, the interview sparked a conversation among family members. Many farmers talked about their plans for the future of their farm, asked questions about native species, and talked about the benefits they receive from leaving some forest on their property. In many cases we also discussed the diminishing native forest and the consequences for native animals.

To encourage farmers to participate actively in habitat restoration, we provided 363 native tree seedlings, which were planted by 27 families on their farms. These farmers expressed enthusiasm for continuing to plant native trees in 2017, especially trees that produce edible fruits or beautiful flowers. Many of the farmers enthusiastically showed us the trees they had planted through our programme in 2010 and 2011, trees that are now large enough for children to climb, and that produce flowers and fruits for people and wildlife.

We led 11 workshops about conserving the Atlantic Forest in three rural primary schools that we had not visited previously. The oldest students heard a story, answered questions and participated in class discussion, then used the story to produce a play for the rest of the school. Grades 4-6 talked about threatened animals and then made posters to disseminate their ideas about conserving these animals to the rest of the school. Here are examples of the messages they wrote on their posters:

*"The Helmeted Woodpecker is a bird that makes its nest in trees. So they need trees and forests to live or they will all disappear from the world. What can we do to prevent them from disappearing?"*

*"The Araucaria Tit-Spinetail have very pretty colours and to look after them we need to plant a lot of Araucarias."*

The youngest students listened to and discussed a story about children who discover a nest of vinaceous-breasted parrots and have to decide whether to take the nestling's home. Some also made pictures, and/or played a memory game about which animals are ok to keep as a pet.

Thus, as part of our outreach work, farmers and students have pondered their own conservation philosophy, considered management decisions involving threatened species, contributed to reforestation, and disseminated conservation messages among their peers. They are thinking about the value of remnant trees and forest on their farms, and this sets the stage for them to conserve this critical habitat for Atlantic Forest species.

Indicators suggest that these outreach efforts are working over the long term. Between 2010 and 2015 the number of students who mentioned farmers among people who can help endangered species increased from 25% to 87%. From 2013 to 2015, the average number of ecosystem services (provided by native forest) recognised by students in each class increased from 1.8 to 3.4 (most often mentioned were firewood, lumber, water, fruits, and biodiversity). In 2016 we

counted 262 vinaceous parrots in Argentina, the most we've counted since starting our project in 2003, suggesting that the population is increasing or at least stable since our project began.

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

Local people were involved as volunteers (>20 student volunteers in vinaceous parrot count), paid assistants (4 people x avg. 4 months = 16 person-months), and participants in outreach programmes (~40 families). Local student volunteers were undergraduates from the park ranger technical programme in San Pedro. They gained hands-on experience collecting data, estimating the size of animal populations, using GPS and satellite images, and living/working with local farmers. Several farmer participants helped monitor bird nests on their farms, while others planted native trees to regenerate habitat. Teachers and students benefitted from learning about the ecology of their local ecosystem, Paraná pine Atlantic Forest, which is given only cursory treatment in the national curriculum. The farmers who planted native trees with us (many since 2010) expressed that they are now benefitting from ecosystem services provided by these trees, which give them edible fruits and beautiful flowers, protect their groundwater, and attract desirable wildlife (such as toucans).

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

Yes. This is a long term project. One of our team members (Bianca Bonaparte) received a 5-year PhD scholarship from our national science council (CONICET) to study ecological and social factors influencing the conservation of cavity-nesting birds on farms in the Parana pine forest. Bianca and I will continue our long-term research on cavity-nesting birds, outreach programme in schools, and tree-planting programme. In 2017 we are supported in this work by International Conservation Fund of Canada. Another of my PhD students is conducting comparative research in the Argentine Chaco, and we are participating in an international research network (NETBIOAMERICAS) funded by CONICYT (Chile) to improve conservation of forest vertebrates in Canada, Chile and Argentina.

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

We have two articles published/accepted for publication in international scientific journals, reporting the results of some of the field work funded during this grant period:

1. Bonaparte EB, Cockle KL (2017). Nest niche overlap among endangered

Vinaceous-breasted Parrot (*Amazona vinacea*) and sympatric cavity-using birds, mammals, and social insects in the subtropical Atlantic Forest. *The Condor: Ornithological Applications* 119 (in press).

2. Cockle KL, Martin K, Bodrati A (2017) Persistence and loss of tree cavities used by birds in the subtropical Atlantic Forest. *Forest Ecology and Management* 384: 200–207.

Additional articles will be published in coming years. We also occasionally share updates about the project on our website [www.pinoparana.org](http://www.pinoparana.org), and our Facebook page "SelvaPinoParana". The online magazine "Science News for Students" will soon feature an article about our work on nest survival, and the American Ornithology Publications website will publish a blog post about our work on nest niche overlap. We gave two oral presentations about our research at the Reunion Binacional de Ecología in Puerto Iguazu (September 2016), and will be presenting again at the Association of Field Ornithologists meeting in August 2017, and International Ornithological Congress in August 2018. Locally, we share the results of our research with individual farmers (during farm visits) and through our outreach program in schools, which will continue in 2017. I also presented some of our research at a kindergarten in Barrie, Ontario (Canada) in December 2016.

**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 project is ongoing since 2003. This Rufford Grant was used over the period September 2015 to December 2016, with some funds remaining to be spent to complete field work in January-February 2017. The project was expected to finish in December 2016, so the funds lasted slightly longer than the expected length of the project. This has been wonderful because it means I can keep a local assistant in the field until February 2017, following late nests and entering data from the main field season. She even discovered (today!) a nest of the canebrake groundcreeper, a threatened species whose nest has not been described by scientists, and which we have been searching for since 2003!

**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.** Exchange rate: 1 GBP = 19 ARS

Item	Budgeted Amount	Actual Amount	Difference	Comments
Equipment	325	685	+360	We had to replace some equipment that was stolen during a break-in (e.g. binoculars for volunteers, measuring tapes)
Materials for schools	0	13	+13	Photocopies, paper, costume materials
Materials for field	39	259	+220	Photocopies, tree tags, gas and parts for camp stove, etc. Expenditures pending [£97]
Mileage, fuel, and use of truck	903	1745	+842	Price of gas increased significantly
Bus	780	212	-568	Purchased second vehicle so travelled more by truck than by bus
Field assistant salaries	5460	3770	-1690	Jan-Feb 2017 salaries pending [£1469]
Outreach assistant salaries	0	140	+140	Assistant for delivering tree seedlings to farmers, visiting schools
Food in field and schools	1170	573	-597	Food came mostly from another grant
Accommodation	1079	616	-463	Paid for fewer months than initially proposed
Internet and other communication	188	99	-89	Paid for fewer months of internet than proposed
Other	0	249	+249	Tree seedlings, photos for farmers, transport of equipment [£16 pending]
<b>Total</b>	9944	8362	-1582	Remaining funds will be spent as indicated above, in Jan-Feb 2017

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

There are several important next steps. We need to find more nests on farms so that we can improve our recommendations for conservation of nest trees in rural areas. It is also important to continue studying nests in primary forests, so that we can understand the role of competition for nest sites in driving community dynamics over time. We need to finish collecting data on farmers' use of trees and their perceptions about cavity-nesting birds, to understand how best to collaborate with them toward conservation objectives. Finally, to address local environmental problems throughout their lifetimes, local people need exposure to a conservation ethic and critical thinking from a young age; it is important to continue outreach activities with people of all ages, including young children.

**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?**

We used the logo on presentations at the Reunión Binacional de Ecología in Puerto Iguazú, and we thanked the Rufford Foundation in our scientific publications.

**11. Any other comments?**

Thank you very much for reconsidering (and funding) my proposal. I also appreciated the comments from the trustees/external reviewers, which helped us improve the project and future proposals. I am including some photos with this report.