The Rufford Small Grants Foundation

Final Report

Grant Recipient Details	
Your name	Sebastián Augusto Ballari
Project title	Wetland Conservation and the Impact of Invasive Alien Mammals in Northwest Patagonia
RSG reference	41149-B
Reporting period	Final report - April 2025
Amount of grant	[Intentionally deleted]
Your email address	[Intentionally deleted]
Date of this report	25/04/2025

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
Select study sites in wetlands with presence of invasive species			Yes	Six wetlands with presence of fallow deer, red deer, wild boar and livestock selected and georeferenced in Fortin Chacabuco Ranch
Set up multi-species exclusion experiment			Yes	24 experimental plots established with four treatments in each site.
Monitor habitat use by invasive mammals via camera traps		X		The cameras were installed and monitored nearly a full season of habitat use. The data are currently being analyzed to identify correlations with vegetation and soil variables.
Quantify plant and soil responses to invasive species			Yes	Vegetation and soil parameters measured; lab analysis underway.
Statistical analysis		X		Most progress to date has been made in the analysis of vegetation, along with partial advances in soil parameter assessment.
Use UAV to estimate rooting area by wild boar	X			The technique was calibrated; however, data collection was postponed due to weather conditions, setup delays, and the lack of adequate UAV equipment.
Engage students and collaborators in field activities			Yes	Researchers' students from CONICET, and international and national universities involved in fieldwork and training.

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

A significant amount of time was invested at the beginning of the project to select the study sites and construct the exclusion experiment in the wetlands of Estancia Fortín Chacabuco. This delayed the start of other project activities.

Rainfall at certain times of the year (i.e., fall and winter) complicated access to some areas of the ranch. Furthermore, the level and seasonality of this rainfall sometimes made it difficult to access

some wetlands for surveying. Relatedly, the diversion of irrigation canals on the ranch has also complicated some survey tasks due to soil flooding (e.g., Potrero).

Due to recent job opportunities, two of the researchers collaborating on this project have travelled abroad. Therefore, a doctoral fellow will be sought in the next CONICET doctoral scholarship call to join the team. This has undoubtedly been one of the most significant limitations due to the amount of information available to process. In this regard, for example, processing of samples such as camera trap data and micro- and macro-arthropod samples have been delayed.

Changes in the global economy, and specifically in Argentina, including inflation and the devaluation of the Argentine peso, have led to changes and limitations in the budget. Beyond this, we have worked hard to ensure that the budget provided by Rufford and the contributions from counterparts are strategically used to ensure the project is completed and progress is made within the established timeframe. This situation is evident, for example, in the delay in soil sample analysis, where an agreement was reached with the INTA, which resulted in a reduction in the budget.

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

1. Experimental Design and Field Implementation

We successfully implemented a complex exclusion experiment with four treatments across six wetlands. This allowed for the first time in the region to disentangle the individual and combined impacts of introduced wild boar, red deer and fallow deer under real-use conditions.

II. Structural changes in ecosystems

This project established a comprehensive experimental baseline and monitoring system, offering critical insights into the ecological impacts of invasive mammals on high-value Patagonian wetlands and guiding future conservation actions. Also represent the first data in the region to assess this problem in northern Patagonia (overgrazing of grasslands and wetlands by introduced ungulates and livestock) from a comprehensive and holistic perspective:

I. Experimental Design and Field Implementation

Herbivore exclusion experiments showed that reducing the presence of introduced mammals, particularly red deer, fallow deer, and wild boar, resulted in significant increases in plant biomass and grass height across Patagonian wetlands. These findings confirm that herbivory suppression positively influences vegetation structure and productivity.

II. Structural changes in ecosystems

This project revealed early signs of structural ecosystem changes through the emergence of woody vegetation in exclusion areas. Although still at an early stage, this trend suggests that the exclusion of large herbivores could promote long-term shifts in plant community composition, reinforcing the importance of wetland conservation.

III. Institutional Collaboration and Training

The project successfully fostered institutional collaboration among key stakeholders, including Nahuel Huapi National Park, CONICET, Estancia Fortín Chacabuco, The Nature Conservancy, Asociación

Civil Conservación Patagónica and INTA. This cooperation has strengthened the scientific and operational framework for wetland monitoring, invasive species management, and long-term conservation initiatives in northwestern Patagonia. This has occurred at different levels, as within the framework of this project, internships have been carried out for students from Argentina and the USA (e.g. Northern Arizona University -NAU-).

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

The project took place at Fortín Chacabuco Ranch, managed by The Nature Conservancy, with direct collaboration from ranch personnel. We also worked with Nahuel Huapi National Park rangers and the environmental education team. Local knowledge and logistical support were essential. Additionally, undergraduate and PhD students from CONICET and NAU were trained in field techniques and ecosystem monitoring.

The project is immersed in a very interesting context, as it is a private ranch, managed by an NGO, within a protected area. In this sense, we have engaged the interest and participation of the staff of Estancia Fortín Chacabuco and its administrator, The Nature Conservancy. The sustainable use and management of wetlands represents a permanent and necessary objective for the ranch, and the approach of this project, supported by The Rufford Foundation, has made it possible to shed light not only on some of the negative damage caused by introduced ungulates, but also on the resilience and flexibility that wetlands in this region have for their recovery in the face of overgrazing and degradation.

The scope of the project, as described above, addresses a common problem in the Patagonian region, replicating the scenario observed at Estancia Fortin Chacabuco (degraded wetlands + native herbivores + introduced ungulates + livestock). In this regard, the National Parks Administration, through Nahuel Huapi National Park, has demonstrated a deep interest in the continuity of the project, with expectations that the results can be extrapolated to other Patagonian protected areas.

This is related to the regional problems facing these species. In this regard, those responsible for the ranches neighboring Estancia Fortin Chacabuco are very interested in the project and its approach to studying and managing the dama deer, red deer, and wild boar. For this reason, a discussion workshop is being organized for June 2025.

5. Are there any plans to continue this work?

Yes. In projects that evaluate the response of biological parameters to the suppression of disturbances such as herbivory and trampling by large animals, it is necessary to consider that certain biological processes may show significant changes over time. Some parameters, such as plant biomass, may respond quickly to the suppression of intense herbivory; however, other parameters, such as soil nutrient cycles, should be expected to experience slower and more gradual changes. For this reason, we firmly believe that this project will continue in the medium and long term, reinforcing the proposed objectives and hypotheses and expanding the possibility of further research on the dynamics of wetlands and introduced ungulates in northwestern Patagonia.

We plan to continue monitoring all plots seasonally and fully implement the UAV-based damage assessments. We also plan to assess additional components such as invertebrate communities. These elements will form the basis of a future *Completion Grant* application to further assess recovery processes and long-term management solutions.

The project will seek to strengthen the team by adding a doctoral student whose main goal is to deepen the work completed during this period thanks to the support of The Rufford Foundation.

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

The results of this project will be shared through multiple dissemination strategies targeting both scientific audiences and the broader community. Presentations are planned at national and international scientific conferences to communicate key findings and foster discussions within the academic and conservation community (e.g. Argentine Conference on Mammalogy -JAM-, Calafate 2025). Although the preparation of a scientific paper for submission to a peer-reviewed journal is underway, it was decided to wait until a larger dataset is available—based on the preliminary results from the first year of sampling—to strengthen the analysis and ensure a more comprehensive publication.

Reports summarizing major results and conservation implications will be prepared and delivered to park authorities at Nahuel Huapi National Park, as well as to The Nature Conservancy (TNC), to inform management decisions and guide future conservation actions in the region.

To reach a wider audience, project outcomes will also be shared through outreach activities, including posts and updates on social media platforms and conservation-related websites. These efforts will help raise awareness about the importance of wetland conservation and the impacts of invasive species in Patagonia.

Finally, educational materials will be developed for local communities and schools. These materials will focus on the ecological value of wetlands, the threats posed by invasive mammals, and the importance of sustainable land use practices. Through these actions, the project seeks to ensure that knowledge generated through research leads to practical conservation benefits and broader public engagement.

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

The project was implemented from March 2024 to March 2025. The project is planned to assess significant changes in the conservation of wetlands over the medium and long term and is expected to continue making progress by completing missing data from the first year and adding elements for the second year of sampling. The project currently continues with partial support from CONICET and INTA, and a new application is expected to be submitted to The Rufford Foundation to ensure the project's viability and success.

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*. [Intentionally deleted]

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

Looking ahead, one of the most important next steps is to ensure the continuity of long-term ecological monitoring of wetland conservation at Estancia Fortín Chacabuco. Many of the processes we are studying—such as changes in vegetation structure, soil properties, and faunal communities—require extended timeframes to become fully evident. Early results already suggest promising trends, such as increased plant biomass, shifts in vegetation composition, and signs of ecosystem recovery when herbivory pressure from invasive mammals is reduced. However, to confirm these patterns and understand their broader ecological implications, it is essential to maintain systematic monitoring over several years.

Long-term studies are particularly critical in the Patagonian context, where biological invasions by species like red deer, fallow deer, and wild boar represent a widespread and growing threat in a global context. Although invasions have been recognized as a major driver of ecological change across the region, there is still limited experimental data linking species impacts to wetland degradation. Our project offers a unique opportunity to generate robust empirical evidence on the dynamics of invasive species impacts and the potential for wetland restoration under managed exclusion strategies. Expanding this knowledge base is vital not only for our study site (Estancia Fortín Chacabuco) but for informing broader conservation strategies across Patagonia's increasingly threatened wetland ecosystems.

Another key next step is to further strengthen the inter-institutional collaboration that has been fostered through this project. The partnership between Nahuel Huapi National Park, CONICET, Estancia Fortín Chacabuco, The Nature Conservancy, and INTA has created a strong scientific and operational framework for advancing conservation research and management. Expanding this network of collaboration will enhance the sharing of expertise, access to technical resources, and the dissemination of best practices for wetland management and invasive species control. Building capacity through training new students and researchers and promoting knowledge exchange among institutions will be crucial to sustaining and amplifying the project's impact.

Finally, applying for a Completion Grant from The Rufford Foundation represents a fundamental step to guarantee the long-term success and continuity of this work. Additional support will allow us to consolidate and expand monitoring efforts, complete detailed analyses on soil, vegetation, and faunal communities, and strengthen community outreach activities. It will also facilitate the publication of scientific articles, the development of management recommendations for protected areas, and the creation of educational materials to engage local communities.

In short, maintaining long-term monitoring, deepening the study of invasive impacts in Patagonian wetlands, fostering institutional collaboration, and securing continued funding through a Completion Grant are all critical to achieving the full potential of this project and ensuring meaningful contributions to wetland conservation in northwestern Patagonia.

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?

The preliminary results of the project "Wetland Conservation and the Impact of Invasive Alien Mammals in Northwest Patagonia" were shared and discussed during a meeting titled "Wetland Workshop at Estancia Fortín Chacabuco," with specialists from The Nature Conservancy, INTA, and the National University of Comahue. During this event, a brief presentation was delivered introducing the project and highlighting the importance of RSG funding for the development of this initiative.

A second workshop is planned for June 2025 with relevant authorities (National Parks Administration, INTA, SENASA, CONICET) and representatives from neighboring ranches around Estancia Fortín Chacabuco. This event aims to outline an integrated approach to the study and management of invasive alien mammals and will feature a formal presentation of the project, acknowledging the critical support provided by RSG.

Complete project results, including the RSG logo, will also be presented at the I Trinational Ecology Meeting – Argentina, Chile, Uruguay (Mendoza, October 2025) and at the XXXVI Argentine Mastozoology Conference (Santa Cruz, September 2025).

Additionally, a dissemination article highlighting RSG support is being prepared for publication in Macroscopia magazine (https://www.nahuelhuapi.gov.ar/multimedios/macroscopia.html), focusing on the main findings related to wetland management within the protected area. Finally, a scientific article is planned for submission to a high-impact journal (e.g., Biological Conservation, PeerJ, Oecologia) after the second year of data collection, to ensure robust and comprehensive results that support the publication.

11. Any other comments?

I would like to sincerely thank The Rufford Foundation for its outstanding commitment to supporting science and conservation efforts, particularly in countries like Argentina, where sustained challenges in research funding are a major concern. Your support has made a profound difference not only for biodiversity conservation but also for the professional development of researchers like me. I am deeply honoured to have been a beneficiary of The Rufford Foundation's grants, and I recognize that much of my scientific and personal growth has been possible thanks to your invaluable contribution.

This project represents an important step towards improving our understanding and management of the impacts of invasive mammals on the fragile wetlands of Patagonia. The funding provided by The Rufford Foundation was crucial to implementing an ambitious and logistically challenging experimental design, which would not have been feasible otherwise. We are especially grateful for Rufford's continued dedication to supporting conservation initiatives in the Global South, where this type of investment is truly transformative.

Thank you for believing in our work and for helping to build a better future for people and nature.

12. I agree to this report being published on the Rufford Small Grants website

Yes

Sebastián A. Ballari