Project: "Implementing Long term Biodiversity Monitoring through RAPELD methodology in Central Argentina. Second step: Monitoring Medium and large sized mammal assemblages"

Ana C. Ochoa- December 2023

I am addressing you to submit the final report of the activities and expenses made during the development of the project **"Implementing Long term Biodiversity Monitoring through RAPELD methodology in Central Argentina. Second step: Monitoring Medium and large sized mammal assemblages",** funded by the Rufford Small Grant 2, of which I am coordinator. Some of them have already been reported in the Update made in August 2023, I present as follows, some details of the total summing up of the Project.

I also share some more selected photographs, so that you have them available for the Rufford page, and some of the didactic and graphic material generated in this last stage of the year. All these files will be shared via Drive, in folder named: "attached files".

In the following pages I inform:

1- A brief description of each of the activities accomplished during the development of the project.

2- Brief explanation of changes and reasons leading to modifications.

3- General Conclusions and Comments.

1-Details of Activities and goals accomplished

We report **the activities accomplished,** which have been ordered by study site and type of activity. We attach files that accompany each section in the following description. Attached archives will be in different folders and will be referring to each section (A to J) in their names, we also present a folder with Photographs of the different activities:

A. Sampling in National Parks and dissemination of Results:

Sierra de las Quijadas National Park:
We accomplished the sampling of medium size mammals twice (dry and wet season) using RAPELD grids (30km^2).

We developed one Virtual Workshop to interchange and disseminate results of our investigations in Mammal ecology in the Park (find Activity's summary/leaflet attached). This was developed in September and October 2022.

We presented two posters about mammal Ecology of Sierra de las Quijadas National Park in scientific reunions; in RAE (Argentinian Ecological Society's Congress, Martinez Retta et al 2023a y b) and one poster regarding these results in SAREM Congress (Argentinian Mammal Study Society, Gatica et al 2023a).

We participated in a workshop (organized by Sierra de las Quijadas National Park staff), which included a "walking class", through one of the trails of the park, narrating the natural wonders of the area. This facilitated a "hands-on" field experience, to learn and teach about the fauna of the Park.

We are preparing two manuscripts, one regarding the updating of the list of mammal species present in the park, to be sent to Checklist Journal (Gatica et al 2023c) and one regarding the Ecology of small mammals of Sierra de las Quijadas National Park (research funded with Rufford Grant I), which includes some of the main results of my doctoral thesis (Ana Ochoa), which was partially funded with Rufford funds and defended in May 2023 (See attached document).

Talampaya National Park:
We sampled three months of the wet season (February to April) and three months of the dry season (from June to August 2023) using a RAPELD grid with 30 Camera traps.

We shared the Mammal diversity fair with students of The School of Pagancillo, in the nearby of Talampaya National Park and also organized a Workshop with National Park's Administration Staff, and with the Superior Education Institute of Villa Union (locality 60km from the park) in August 2023.

We are preparing a manuscript (to be sent in the first half of 2024) about small mammal communities in Talampaya National Park (Results from the Rufford Grant 1). We would like to mention that this work (partially funded by Rufford Grant 1) also enabled the graduation of Lucia Martinez Retta, who graduated in February 2023.

B. Artistic trails for the contemplation of nature:

The grant allowed and facilitated the articulation with many Conservation initiatives in the North of San Luis Province some of which are Private Reserves, and others are Projects or Natural areas projected as Future Reserves. We have designed and projected one interpretation trail in each of 4 Private Reserves in northern San Luis. Trails and themes/focus were adjusted to local owners' requirements and interests:

San Francisco Huarpe Reserve Project:
We have projected and designed one trail of Native Art and Nature. The trail has 6 stops or stations, each of which a flora and fauna element is represented, with special focus on **Cultural values and native stories of fauna.** We have produced: one sculpture, one mosaic piece. We advanced the project up to the design, mapping and planification, including the elaboration of the signs for each station. We plan to set the trail in January 2024.

*El Medio Arte y Cultura Reserve***:**
We have designed a trail that will be the basis for a theatrical bird watching – trail. It has 7 stops, each of which presents a species of the local bird assemblage (spotted and located in previous visits and with aid of local family). We have produced four Sculptures, one Mosaic piece, and one illustration. We also produced the signs. And plan to set up the trail in January 2023.

Los Talas Establishment in La Florida:
We have designed an interpretation trail, that includes 5 stops or stations. We are articulated with local owners, administrators and a local writer, who writes stories about native fauna. This allowed to situate her stories in the different stations of the trail. We have produced one Sculpture, one Mosaic piece, and two illustrations for this trail. We also produced the signs. And set up the trail in December 2024. 4- *La*

Siempre Viva Private Reserve: We designed a Trail that focusses on musical animals of the native fauna, having thought of a trail with different animals (insects, birds, mammals, frogs). We selected species and stations, working with the landowner. We produced one Sculpture, one Mosaic sign, and one illustration. We also produced the signs. And plan to set up the trail in summer 2024.

We present attached some photos with local owners and participative activities, and the general proposal of the Project for Private Reserves.

C. Interviews with community members and locals:
We have developed interviews with neighbours in the North of San Luis (11 in total two in San Francisco, two in Hualtaran, two in El Talita, four in Lujan, one in Reserva Privada La Isla), including the articulated work with collaborators of the Quimilero Project, from Cordoba National University.

We are planning to complete this project in 2024. Interviews are made to locals that generally inhabit areas with limited communication, in rural surroundings and low accessibility, areas were also, limited research and data about biodiversity are available. We also install a camera trap in the area of the interviews. Data collected will be analyzed in the future. This funding allowed for the stretching of bonds and integration of work groups from different National Universities of Central Argentina, being able to interact with colleagues with great experience and knowledge, as are Daniela Tamburini, Enzo Rossi and Ricardo Torres, from Cordoba National University.

D. Collaboration with Biodiversity Samplings made for the creation of Reserva Islas y Canales Verdes del Rio Uruguay, in Entre Rios (RICVRU)

In January 2023 we participated as a team in the Sampling of mammal communities for the recently created Reserva Islas y Canales Verdes del Rio Uruguay, in Entre Rios (RICVRU). This activity was financed and coordinated by WCS staff, but we would like to mention it here, because it was possible due to the equipment acquired with funds of Rufford Grant 1 (and a small portion of equipment obtained with Rufford Grant 2). Sampling was made using RAPELD methodology (modules and parcels) and also participative methods, and interviews, enhancing interaction with local people. These results were presented in 4 different posters in SAREM Congress (Ochoa et al 2023, Maroli et al 2023, Pardo et al 2023, Gatica et al 2023b). And also published a Manuscript (Gatica et al 2023, article accepted in December 2023 to be published in Acta Zoologica Journal).

E. Biodiversity Sampling in Reserves and Natural areas in San Luis

We sampled small mammals and birds in San Francisco, in May 2023, in coordination with San Luis University students (of population Ecology). Articulating with the local Neighbors Assembly.

We sampled birds and habitat characteristics of La Florida RAPELD module, in November 2023, in collaboration with Ecology students of San Luis National University. We organized participative activities with the land administrators, owners and neighbours.

Data is currently being organized and will be used to create a local database of biodiversity for these sites.

F. Scientific Publications (find attached published and accepted manuscripts):

In 2022 our group published the paper: **Taphonomic signature of Puma concolor in bone remains in Sierra de las Quijadas National Park** (Alvarez et al. 2022), which focusses on the study of Puma concolor, the top predator of our ecosystem (in San Luis).

Also, we published an article on the small mammals that are predated by *Bubo virginianus* in Sierra de las Quijadas (**Puegher et al. 2023**), which is related to the results obtained in Rufford 1, continued now, with this second project.

In August 2023 we published in collaboration with PPBio net, the paper:

Long term Monitoring:

Chasing fashions or being prepared for fashion changes?" (Bergallo et al., 2023).

- In December 2023 we received the acceptance of **two manuscripts**, one regarding the new report of the species *Lyncodon patagonicus* in Talampaya National Park (**Castillo Sanchez et al. 2023**, accepted in the Journal: Notas sobre mamiferos Sudamericanos), and one regarding medium size mammals of RICVRU, in Entre Rios (**Gatica et al 2023**, accepted to be published in Acta Zoologica).

- We submitted a manuscript about the distribution of *Dolichotis salinicola*, with new information and reports in the southernmost distribution of the species, and are awaiting response (article

sent to Notas sobre mamiferos sudamericanos, **Pardo et al 2023**).

- At the moment we are preparing several articles about different aspects of native mammal's Ecology, of San Luis and La Rioja provinces, expecting to submit at least two of them in the first half of 2024.

G. Congress presentations (see attached files in folder "Congress presentations")

In November 2022 our group presented **4 posters** related to mammal Ecology in the SAREM Congress developed in Iguazu, Misiones (see attached abstracts).

In October 2023 we presented **2 posters** regarding the ecology of mammals of Sierra de las Quijadas National Park in RAE (Reunion Argentina de Ecologia), that took place in Bariloche, Argentina (see attached abstracts).

In November 2023 we presented **8 posters** in the Jornadas Argentinas de Mastozoologia, JAM, organized by SAREM, in Jujuy, Argentina (see attached abstracts).

H. Didactic course for RAPELD parcels' installation (PPBio course):

We developed the course for the installation of RAPELD Parcels, for the monitoring of Biodiversity, with students from the Biology Career (Lic. En Ciencias Biologicas) of San Luis University, in La Florida (November 2022) and in the SAREM Congress developed in Jujuy, Argentina, in December 2023.

In San Luis the course was included as part of the activities developed in the Conservation initiative: Establecimiento Los Talas (a project of Private Reserve in Northern San Luis). Six students of the career and 3 land owners/administrators participated of the course, learning the method.

In Jujuy, the course took place in the local Municipal Botanical Garden, with around 20 participants, including graduation students, postgraduate students and some members of the park's staff. It also included the articulation with Professor Helena Bergallo, from PPBio Mata Atlantica, Rio de Janeiro Brasil, the participation of 7 members of PPBio San Luis, and one of PPBio Santiago del Estero.

Enabling the strengthening of bonds and international coordination of the program.

I. Didactic Material generation:

Books: We are currently working in two field guides. In different states of advance, for which we present attached these first versions or drafts.

- Guide for San Luis rodent's identification through skull characteristics (70% advanced)

- Guide for the identification of mammals through their footprints and trails (50% advanced)

Posters: We designed 3 posters focusing on native mammals (one of several common species, to show diversity of morphology and general traits), one of Mara (*Dolichotis patagonum*), a vulnerable endemic species of the region, and one of all mammal species with relevant danger category listed by SAREM, that inhabit San Luis Province.

We also produced other two posters (2) focusing on fauna of relevance for human health (poisonous snakes and arachnids). These last posters were designed on demand of the local inhabitants that expressed the need to be able to identify native poisonous animals. Posters were created as a tool to communicate how to prevent accidents and how to encourage co-habitation (human-other animals) in natural ecosystems (find documents attached).

Ilustrated protocols: We have currently illustrated 4 RAPELD protocols, and obtained a final design for the first two, regarding 1- RAPELD Parcels' installation and 2- georeferentiation standards and procedures. We are currently working in the design and compilation of protocol#3 and #4 (small mammal and general vegetation sampling).

We printed posters and books (this included didactic materials designed and developed during Rufford Grant 1) and shared with locals and staff from national parks and private reserves. Find attached some photos of the activities that have been achieved (attached files).

Audiovisual material: We created one audiovisual piece (short story about *Dolichotis patagonum*, mara), and are still working on a second one (short story about *Puma concolor*). Both will be shared online in the first half of 2024.

Products and Games: We designed and elaborated some products with images of native fauna. These products included: puzzles (20 and 30 pieces), Memory game, Calendar and stickers. We then did a try-out, using the games for activities with kids (we incorporated the games to the "Biodiversity Fair and also used them in the activity "Mini-mentes" organized by San Luis National University youth program (in July 2023). In order to assess the games reception by the public, we organized the information in a poster presents to the SAREM meeting in Jujuy (Lemanich et al 2023).

J. Local development of technology for ecological use:

We were able to articulate with colleagues of the Physics Department of San Luis National University (Juan Pablo de Rosas and his Research group) in order to develop two data loggers that will allow the obtaining of adjusted climatic data for ecological analyses at a reasonable price, making it available to local research groups and landowners.

The development and calibration of high standard precision measuring devices is a very desirable possibility for an academic institution, especially in the current economic crisis and Biodiversity and Climatic Monitoring urgence. The team was able to produce two devices, with Temperature and Humidity sensors, that will be tested during activities in the first half of 2024. We attach a file with details and description of the project carried out in this first stage "Open Source Data Logger for Various Sensors" (find document attached).

Note: We would like to add that this Project was protocolized through San Luis National University and that 6 small aids/grants for university students were offered and took place during this year in order to develop part of the activities reported. We attach Formal Resolutions from San Luis University (RD02-974 and Res 1065-22, attached files).

1. **Changes and reasons leading to modifications:**

In the view of National economic and political situation of Argentina, we are sorry to inform that we were not able to develop some of the activities programmed for the last part of the year. Funds were transformed to national currency (peso Argentino) as soon as they were transferred (more than a year ago), and with the current huge devaluation of the country's currency and the following elevation of costs of fuel and supplies in general, costs for some activities were unaffordable, and therefor reassigned and modified.

Some of the activities not totally achieved were:

- Artistic trails: We were able to design and coordinate with local actors, and we plan to finish the activities in the next few months. Since costs of transportation and materials escalated, we will be replacing some materials and local owners have offered to fund remaining activities during summer 2024.

- PBio Congress: Due to the elevation of transportation costs (plane and bus fares), we had to replace these activities. We reassigned sources to the participation and co-coordination of the course in Jujuy, including the participation of Helena Bergallo (from PPBio Mata Atlantica, PPBio Brasil) and Guadalupe Laitan (from PPBio Santiago del Estero, PPBio Argentina). And we presented one poster including a joint effort to create and analyze a data base of small mammals in La Florida, San Luis in the SAREM reunion in Jujuy (JAM 2023).

- Audiovisual material: We are still working on the edition of the second piece and will share both materials in 2024.

- Ilustrated story for children: We were not able to develop the second illustrated story, because of the small budget (due to inflation as explained above), but we used the funds planned for this activity to print and share the first illustrated story, Relatos del Tuyum (developed and illustrated during the Rufford small grant 1). We also developed and made a "try out" with some products, like puzzles, stickers and games (see explanation above).

2. **General Conclusion and Comments:**

In general, we achieved most of the activities planned at the moment of presentation of this Project and we were also able to reassess and incorporate new non-scheduled activities in order to accomplish and even surpass the goals and expectations.

We are very glad to inform you that this Project has successfully ended and are happy to advance that we will be preparing for the Submission of Rufford Grant 3 in 2024. In this sense we have outlined four strategies during this Grant (Rufford Grant 2), that will enable us to think and foresee ways of managing a sustainable generation of incomes and/or lowering the costs of research instruments (these strategies need further proof, improvements, adaptations and detailed assessment that could be done in the future):

- Games and Products that include Native fauna.

- Educational material (books and posters) including biodiversity

- Ecological Research Measuring/Sampling devices: Part 1: Data loggers

- Training (Courses and workshops) for biodiversity monitoring

The funding granted by Rufford Foundation has strongly sustained the growing process of our Project and has allowed the acquisition of equipment for high standard ecological monitoring, as well as the means to share our results through the development, printing and communication of material, in scientific meetings and in the different conservation initiatives of our territory. Rufford Foundation 's support has become a huge asset for the development of our activities and the accomplishment of our goals, dreaming each year with bigger, more expansive methods, strategies and proposals. We are forever grateful for the confidence, the flexibility and the opportunity.

We await for your comments and suggestions eagerly.