Final Evaluation Report

Your Details	
Full Name	Paulo Braga Mascarenhas Júnior
Project Title	Broad-snouted caiman (*Caiman latirostris*) conservation in an altered Atlantic rainforest: Space-time ecology as tool for species management plan development
Application ID	32075-1
Date of this Report	16/02/2022

1. 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
Broad-snouted Caiman's population structure			■	We were able to carry out all planned field expeditions for night counts for the last year, with the data added to the past 7-year historical series.
Home range of adults Broad-snouted Caiman		■		We started collecting satellite telemetry data from July 2021 and will continue until the end of the transmitter battery lifespan (2 years).
Movements of adults Broad-snouted Caiman		■		We started collecting satellite telemetry data from July 2021 and will continue until the end of the transmitter battery lifespan (2 years).
Broad-snouted Caiman's preferred microhabitats			■	We were able to carry out all planned field expeditions for night counts for the last year, with the data added to the past 7-year historical series.
Broad-snouted Caiman's association and interactions with human activities		■		Although we were able to monitor the distribution of caiman associated with fishing nets and housing in the reservoir, we were unable to carry out the interviews and educational actions with the riverside community due to the COVID-19 pandemic.

2. Describe the three most important outcomes of your project.

a). Expand the data series of the population distribution of the broad-snouted caiman airstrip in the Tapacurá reservoir for 8 years (2013-2021), totalling 1947 counts in this period (For field expeditions: maximum = 70, minimum =6, average = 46, abundance = 1.4 ind/km), with 676 young individuals, 368 sub-adults, 335 adults and 568 unclassified. In field expeditions after the beginning of the pandemic, we observed a reduction in the number of young individuals compared to adults, which may eventually be related to a decrease in the birth rate or an increase in the mortality hatchlings and smaller specimens.

b). We evaluated the relationship between fishing activity and caiman distribution, accounting for a total of 324 fishing nets in the reservoir from April 2015 to November 2021, mainly in the sectors close to the river stream. After the beginning of the

pandemic, the number of fishing nets identified in the reservoir has grown, indicating an increase in fishing activity and potentially caiman bycatch.

c). We started the first telemetry monitoring of *C. latirostris* in northeast Brazil, with eight females and four males. In the first months of monitoring the area of use of adult specimens, we identified that males covered an area from 0.01 to 0.9 km², while females ranged from 0.4 to 1.7 km². In the next months, with more data, we will be able to infer more adequately about the movement patterns and area of use of the species in the Tapacurá reservoir.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

We had problems with the installation of the external gateway and the antenna to receive telemetry signals from caimans. As the easiest installation point (the main house on Tapacurá Ecological Station) was far from the lake and with a dense forest barrier, we decided to hire a company responsible for installing an internet cable from the house to the edge of the weir. With this, we were able to install our receiver on a pole closer to the water and reduce the signal attenuation.

We also had problems to attach the transmitters to the caiman. All equipment from the first five individuals (July 2021) were detached (we recovered two so far). We requested adjustments from the company responsible for producing the transmitters, such as the inclination of the fixing eyelets and the inclusion of a third point for passing the wires. In addition, we reinforced the fixation with epoxy glue. Caiman that are being monitored with this second attachment technique and new transmitters continues to properly send signals so far.

Finally, we were unable to continue with the educational activities with the riverside community associated with the Tapacurá reservoir. Due to the high number of COVID-19 cases in Brazil and Pernambuco, schools did not work face-to-face in the last year. In addition, all field activities were limited to five people due to sanitary measures determined by the Tapacurá Ecological Station, and access to the local community was not recommended to avoid possible transmission of the virus. We hope in 2022 we can restart contacts with riverside residents, depending on an improvement in the epidemiological scenario.

4. Describe the involvement of local communities and how they have benefitted from the project.

Between 2017 and 2019 we carried out educational activities in schools (exhibitions and lectures) around the reservoir, elucidating the importance of local reptiles and amphibian conservation. We also conducted interviews with local fishermen and community leaders, to draw up an adequate diagnosis of fishing and propose measures for sustainable fishing, to keep fish stocks at adequate levels and avoid bycatch with other vertebrates (e.g., caiman, turtles, snakes, and mammals). Unfortunately, since 2020, we are unable to carry out these activities due to the COVID-19 pandemic. We expect an improvement in the epidemiological scenario from 2022 onwards so that we can properly resume these activities.

5. Are there any plans to continue this work?

We intend to continue caiman night counts and captures for at least another year, while telemetry data must be collected until the end of the transmitter battery lifespan (later 2023). As mentioned above, we hope to resume activities with the local community in 2022, depending on an improvement in the epidemiological scenario of the pandemic in Pernambuco.

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

As this project is related to my doctoral thesis, the priority is to publish the results in scientific journals with a high impact factor, divided into at least three manuscripts, which deal with: (1) the demographic relationship over 7 years (2015 – 2022), (2) the relationship between the distribution of caiman and artisanal fishing and human activities and (3) the area of use and movement patterns of adult specimens. The articles will be also available on the ResearchGate platform, following legal determinations, to expand the range of the research with other researchers. Additionally, the results will also be presented at conferences and scientific events, in banners or oral presentations.

In addition to academic production, we intend to carry out the scientific dissemination of our research in social media. The main findings will be compiled and addressed in a simpler way on social networks, such as Instagram (@paulobraga.bio, @herpeto_ufpe, @liarufrpe and @crocodyliabrasil), Twitter (@paulobraga16), Facebook (Paulo Braga Mascarenhas and Liar UFRPE) and on main page of the Herpetology Laboratory of the Federal University of Pernambuco (www.herpetologyufpe.com).

Finally, as a form of accountability, we will present our findings to the entire staff of the Tapacurá Ecological Station, seeking to bring a sense of belonging to all service providers with the research.

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

With the robust set of data collected, there is a clear possibility of presenting our results to public entities to invest in protective measures and public policies for the region and associated species, as well as continuing to invest in educational actions with local communities. At the end of this project, we intend to monitor new areas to increase knowledge about the biology and ecology of crocodilians, given the scarcity of works with caiman in north-eastern Brazil.

I also intend to carry out an exchange program during my doctorate to have contact with foreign researchers and laboratories (Miami/FL, USA), to improve methodological techniques and analyse the data collected during the thesis to be able to apply it in studies in Brazil. To carry out this step, we depend on the opening/approval of the project by public notices. With the experience acquired with remote monitoring via telemetry, we intend to apply this methodology in new

environments, such as urban areas, and adapt this tool to other groups of vertebrates.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, the Rufford Foundation logo was present in all presentations about my project, always evident in the first slide and in the acknowledgments. Periodically, I posted on my social media (Instagram) information about the importance of The Rufford Foundation, recommending it to fellow scientists seeking funding.

The Rufford Foundation logo will remain in evidence in all activities related to my doctoral thesis, including in future panels that I will present at scientific events over the next years.

9. Provide a full list of all the members of your team and their role in the project.

Pedro Ivo Simões: Advisor of my doctorate, Pedro contributed to all stages of the project, from the formulation of the proposal to the purchase of equipment, participation in field trips and writing of manuscripts.

Jozelia Maria de Sousa Correia: Just like Pedro, Jozelia played an important role in the work as a co-supervisor, also participating in all stages of the project, from its formulation to the execution of field trips. She was also very important in institutional organization with the Federal Rural University of Pernambuco to allow our field expeditions during de COVID-19 pandemic.

Denisson da Silva e Souza: Veterinarian, Denisson was present at all field expeditions for the transmitter's attachments in caimans, performing all the necessary veterinary procedures for the execution of this stage.

Rafel Sá Barboza Leitão: He was present in field expeditions, assisting in the steps of night counts, captures and biometric data collection of caimans. Rafael will also be involved with activities with the riverside community throughout 2022.

Rayssa Lima dos Santos: She was present in field expeditions, assisting in the steps of night counts, captures, biometric data collection and transmitters attachment for telemetry of caimans.

10. Any other comments?

The funding provided by The Rufford Foundation was (and continues) to be essential for the realisation of my doctoral thesis. In addition, we are now able to improve the knowledge of *C. latirostris* in north-eastern Brazil, a region with so few studies on this species and highly impacted by anthropic processes. We are grateful for this first partnership and look forward to new opportunities in the future to continue producing science and knowledge for society, always aiming the conservation of biodiversity.

The Rufford Foundation
www.rufford.org

The Rufford Foundation
www.rufford.org

The Rufford Foundation
www.rufford.org