UPDATE REPORT

Surveying remaining populations of the Northern-Muriqui in the Pedra Selada State Park, RJ and the surroundings of Itatiaia National Park, MG, Brazil

Submitted by

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April 2024 – December 2024

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Summary

1. Abstract

In this report we present the activities carried out between April 2024 to December 2024, comprehending one monthly field expedition of approximately 5 to 10 days. It was used two sampling methodologies: the transect with playback and flights with a thermal camera drone. During this period it was realized 11 transects with playback walking 66,06 km in total. Also, 159 drone flights were conducted, totaling 50 hours and 4 minutes, crossing 1090,96 km through the research areas. The result of the drone survey suggests the presence of one new registered social group of northern muriqui, totaling 33 individuals. Three additional species of primates were recorded during the flights: one solitary male individual of Brown howler monkey (*Alouatta guariba*), the Black-horned capuchin monkey (*Sapajus nigritus*), recorded in 3 flights, totaling 13 individuals and the Black-fronted Titi monkey (*Callicebus nigrifrons*) recorded in 11 flights, totaling 32 individuals. The transect with playback resulted in two visual registers of Black-fronted titi monkey, totaling 9 individuals and one register of a Brown howler monkey female, although we suspect that there are more individuals in the group who have not been identified. The method of transect with playback to survey areas with a high extent of forest is not very effective, due to the low possibility of finding primates near the trail, in an area where the playback vocalization reaches. Meanwhile, the use of a drone with a thermal camera has proven to be extremely efficient in surveying primates, accelerating sampling time and increasing detectability with the thermal camera. Furthermore, the thermal images provide an excellent tool for group counting and the zoom in color images allows the classification of the age and sex of the northern muriqui.

2. Goals and Activities

- Realize a survey of muriquis (Brachyteles spp.) and other primates in the forest areas surrounding the Itatiaia National Park and Pedra Selada State Park;

During the period of April 2024 to December 2024 it was realized one expedition per month of approximately 10 days to survey the primates in forest remnants of Atlantic Forest existing in Serra da Mantiqueira mountain range (Figure 1) of Southern Minas Gerais, located in the municipality of Bocaina de Minas and in the Southern Fluminense Mesoregion, located in the Southeast portion of Rio de Janeiro, including Itatiaia National Park and Pedra Selada State Park (Figure 2).

Figure 1. Aerial image of Serra da Mantiqueira Mountain Range.

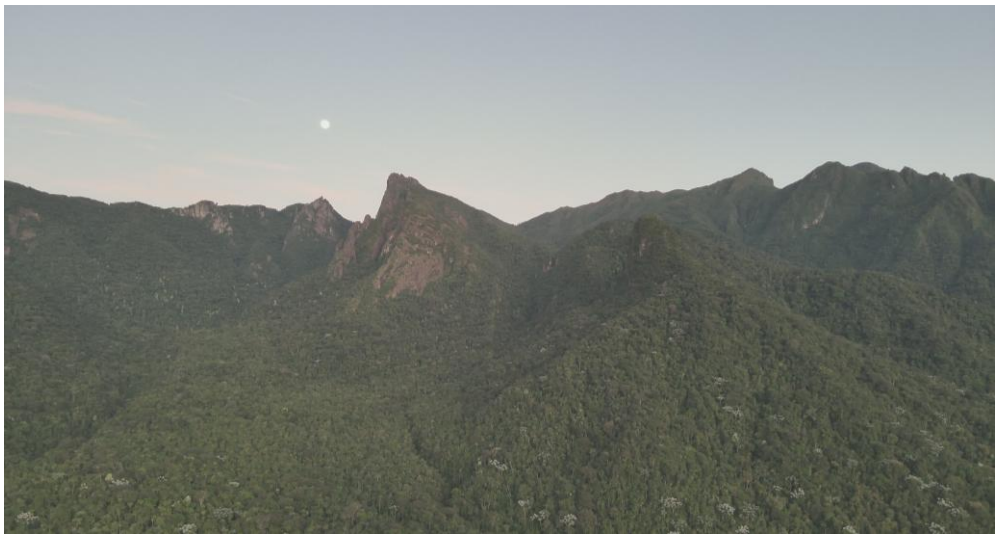
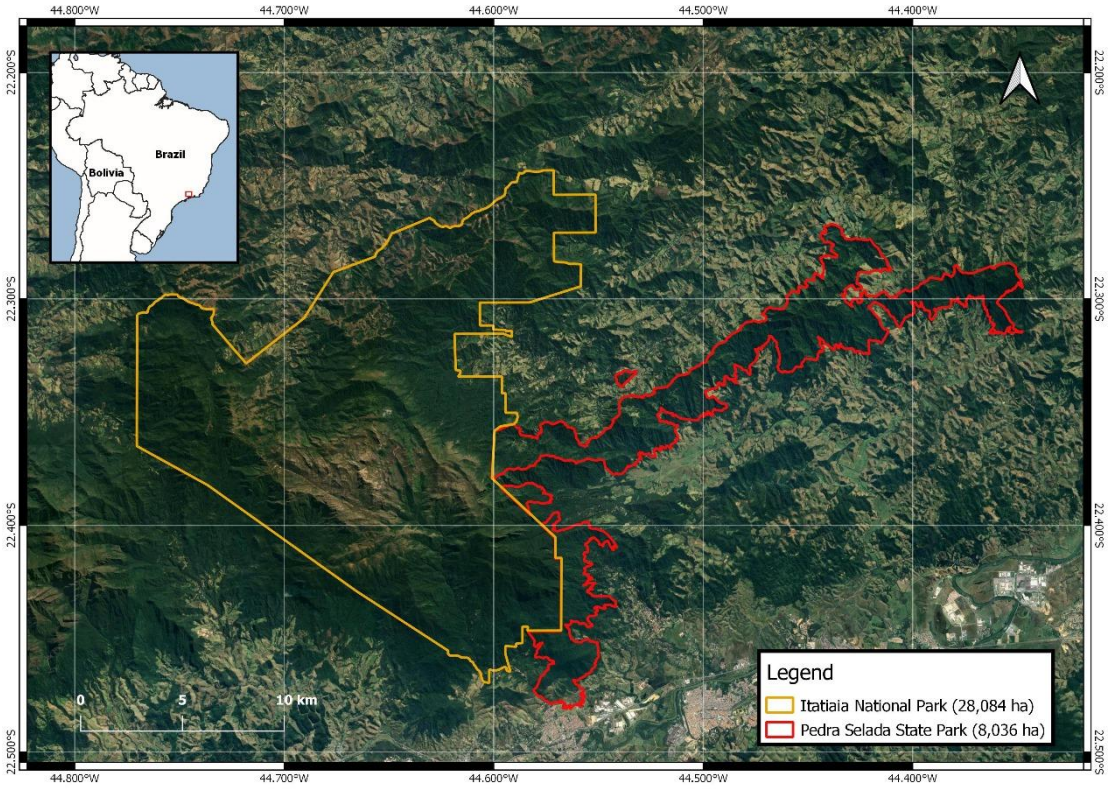


Figure 2. Map illustrating the study area, highlighting Itatiaia National Park, Pedra Selada State Park and the surrounding forest fragments.



The primate's survey began early in the morning and continued throughout the day until late afternoon. To help locate the primates, drones equipped with high-resolution and thermal cameras were flown over suitable locations for flights, previously identified through satellite images in the study area (Figure 3). We used two drone models with thermal cameras, the Mavic 2 Thermal enterprise (Figure 4) and Mavic 3 Thermal Enterprise (Figure 5), that were kindly provided in partnership with other projects. Also, when the drone pilots of the team were not available, transects with playback were performed (Figure 6).

Figure 3. Drone flights realized in the primate's survey in the study area.

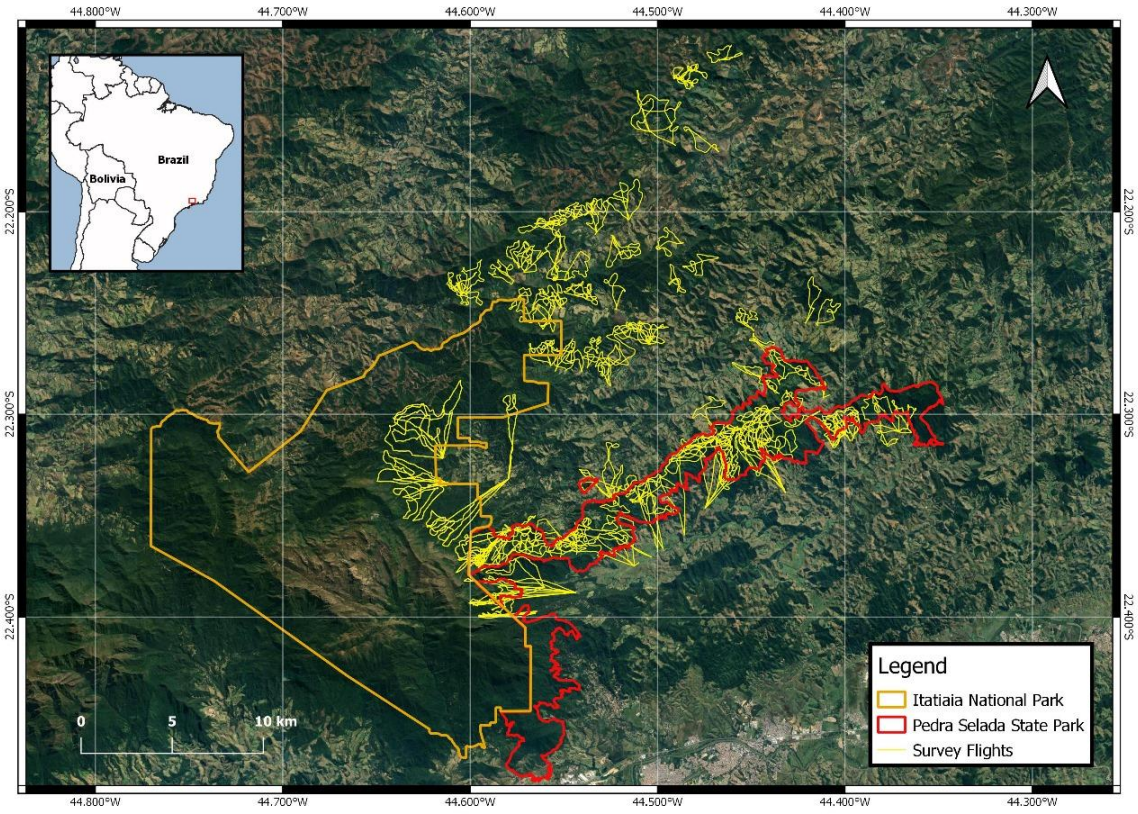


Figure 4. Team members before flight with Mavic 2 Thermal enterprise.

Figure 5. Partner team member operating Mavic 3 Thermal enterprise.

Figure 6. Transect using the playback vocalization method with a megaphone.

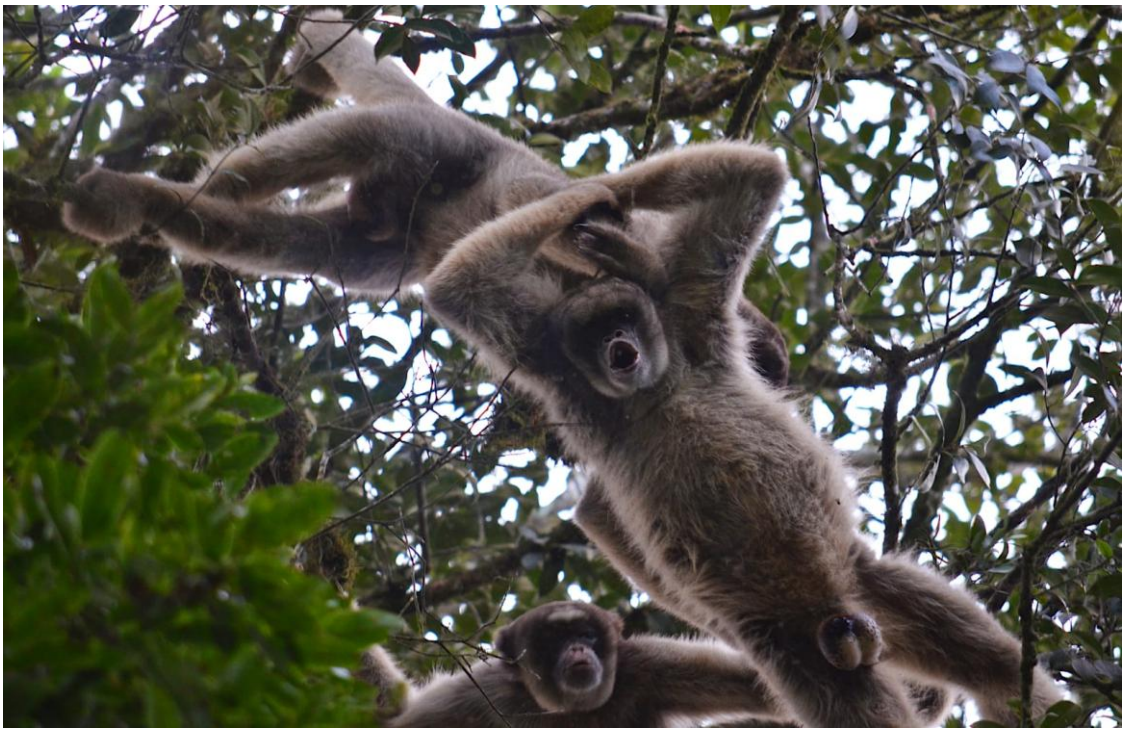
– Confirm which species of muriqui (Brachyteles spp.) occurs in each area;

We could identify through the high quality drone color image the phenotypic patterns that represent the characteristics of the Northern muriqui *(Brachyteles hypoxanthus)*, like the depigmentation of face and genitalia (Figure 7a and 7b). Although this signs present characteristics of the Northern muriqui, we must confirm through genetic analysis of the individuals and continue surveying the area, as we may not have found all groups. Furthermore, a local nature guide encountered a foraging group of Northern muriqui in September 2024, while trekking inside the Private Natural Reserve called Dois Peões, in Serrinha do Alambari, in which the forest is continuous with Itatiaia National Park and Pedra Selada State Park (Figure 8).

Figure 7a. Individuals representing the phenotypic characteristics of the Northern muriqui *(Brachyteles hypoxanthus)* recorded by drone at the border of Itatiaia National Park.

Figure 7b. Register of copulation of the Northern muriqui *(Brachyteles hypoxanthus)* recorded by drone at the border of Itatiaia National Park.

Figure 8. Individuals representing the phenotypic characteristics of the Northern muriqui (Brachyteles hypoxanthus) recorded by local residents at Serrinha do Alambari (RJ), in September 2024.



- Obtain population demographic data and quantification of primate's groups found;

The demographic data and quantification of primates were obtained through the drone technology with a hybrid system that combines color and thermal camera, which allows to detect the primates through the contrast between their warm body temperatures and the cool tree canopies, in the colder moments of the day. When detected, individuals were counted through the analysis of the images and videos to determine the maximum count of primates recorded in each flight. Also, the color zoomed images contributed to identify the sex/age classes and count the infants, as thermal images do not show them when they are clinging to their mothers (Figure 9). In total, we registered one new social group, making it possible to perform a preliminary count of at least 33 individuals (Table 01). Most sighted individuals were identified according to their sex and age categories, according to Strier (1986) (Table 2). It was not possible

to identify all individuals due to limitation of flight duration, however a few individual identification was made through the drone images and videos filming, using as a base the unique patterns of depigmentation of the face and genitalia that allow individual recognition of muriquis (Strier, 1987). Furthermore, other primates registered during the expeditions were identified and counted (Table 1).

Table 1: Table presenting the number of the primates individuals recorded in the survey.

Species	Number of Individuals	Number of Groups
Brachyteles hypoxanthus	33	1
Alouatta guariba	2	2
Sapajus nigritus	13	3
Callicebus nigrifrons	41	13
Callithrix spp.	0	0
Total	89	19

Table 2: Table presenting the number of northern muriqui individuals recorded and identified according to sex and age categories in each registered locality (M-male; F-female; A-adult; S-sub-adult; J-juvenile; I-infant).

Locality	Full classification	Partial classification	Non-classified	Highest count
Gigante Group	4MA, 9FA, 2FS, 4FJ, 1MI	2J	11	33
Serrinha do Alambari	3MA	1A	6	10
Total	**19**	**3**	**21**	**43**

Figure 9. Register of an infant clinging to its mother after breastfeeding.

– Characterize the conservation status of the visited areas;

Preserved areas with primary trees and in more advanced successional stage of regeneration are found within the Itatiaia National Park (INP) and on its edges, in which a large part of its core remained unexplored due to difficult access.

In Pedra Selada State Park (PSSP) most of the visited areas are degraded or in an earlier to middle stage of regeneration. Most of the forests have been well explored, many of which were pastures and are regenerating, where we can find a few areas of forests interspersed with eucalyptus and ferns. The edge parts of PSSP contiguous with INP are in a more advanced stage of regeneration, making it possible for the INP muriqui groups to use these areas. The “new” group registered near the giant's rock on the eastern edge of Itatiaia National Park was found approximately 1.2 km from the adjacent border with the Pedra Selada State Park, indicating that this group may also use this area. Furthermore, in September we received two reports: from a tour guide and from a tourist who were hiking in the Serrinha do Alambari forests and saw individuals of northern muriquis. The tour guide counted approximately 10 individuals while trekking and registered on video, and the tourist, registered with good quality photograph, some individuals. The registers were made in different days, but with a short period of time. These registers indicate that this group probably uses the PSSP area that are contiguous with INP.

Although, the areas not inserted in Itatiaia National Park and Pedra Selada State Park were highly exploited for timber extraction and pasture for dairy cattle production, the creation of Mantiqueira Mountain Range Environmental

Protection Area (in portuguese: APA Serra da Mantiqueira) in 1985, enabled the regeneration of deforested areas and preservation of remaining forest areas.

Even though most of the forests are secondary, there is a large ecological corridor that connects the conservation units, forming a mosaic of forests that allows the movement of animals through the areas, ensuring the integrity of ecological processes between conservation units. The Itatiaia National Park serves as a preservation matrix for the Northern muriqui population.

– Produce a synthesis map containing all forest fragments visited, the size of their respective areas and geographic coordinates, highlighting those where the presence of the species is suspected or confirmed, as well as other priority areas for conservation in the Atlantic Forest;

Maps were produced presenting all registers location of northern muriquis, brown howler monkeys, black-horned capuchin monkeys and black-fronted titi monkeys (Figures 10 to 14).

Figure 10. Registers location of northern muriquis, brown howler monkeys, black-horned capuchin monkeys and black-fronted titi monkeys identified in the survey.

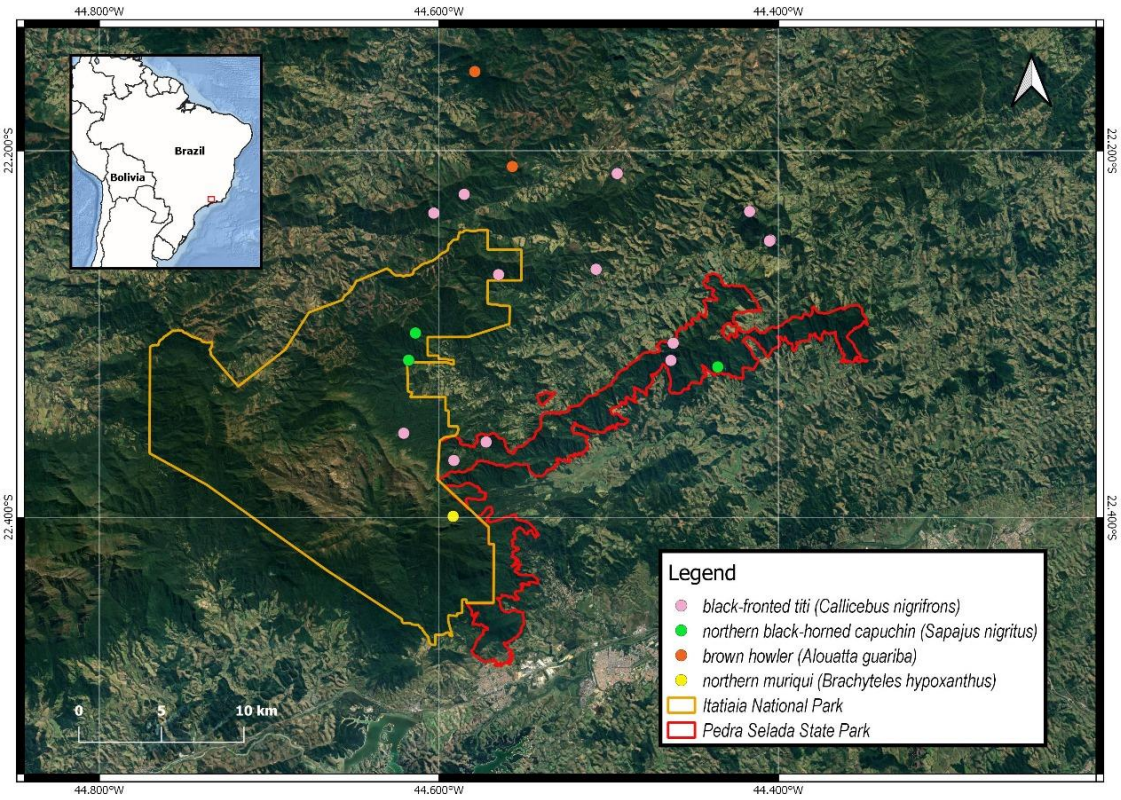


Figure 11. Register of Northern muriqui *(Brachyteles hypoxanthus)* .

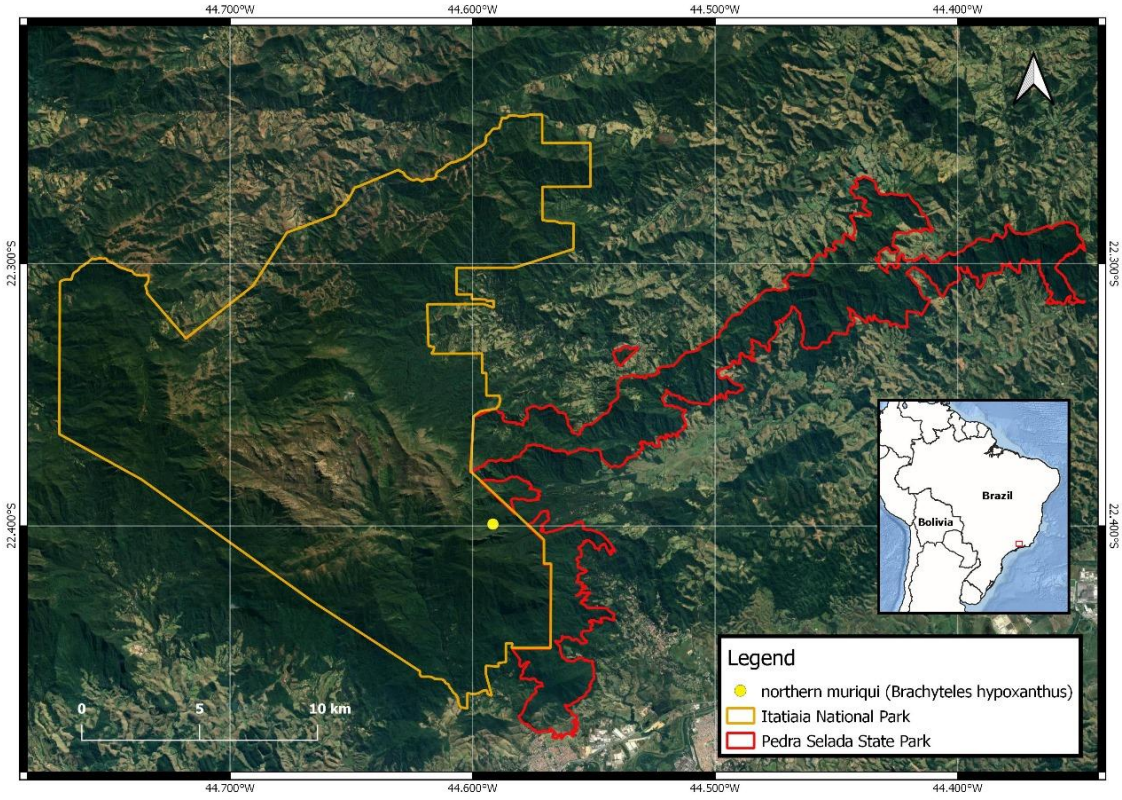


Figure 12. Registers of brown howler monkeys *(Alouatta guariba)*.

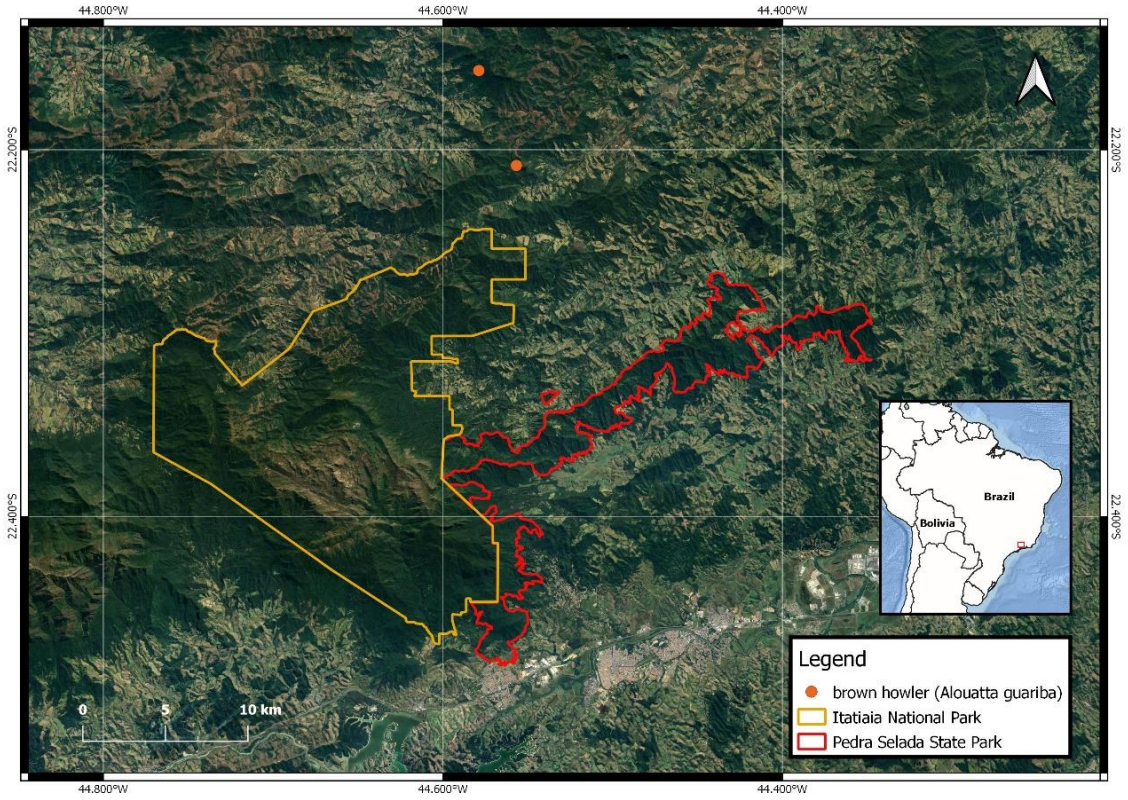


Figure 13. Registers of black-horned capuchin monkeys *(Sapajus nigritus)*.

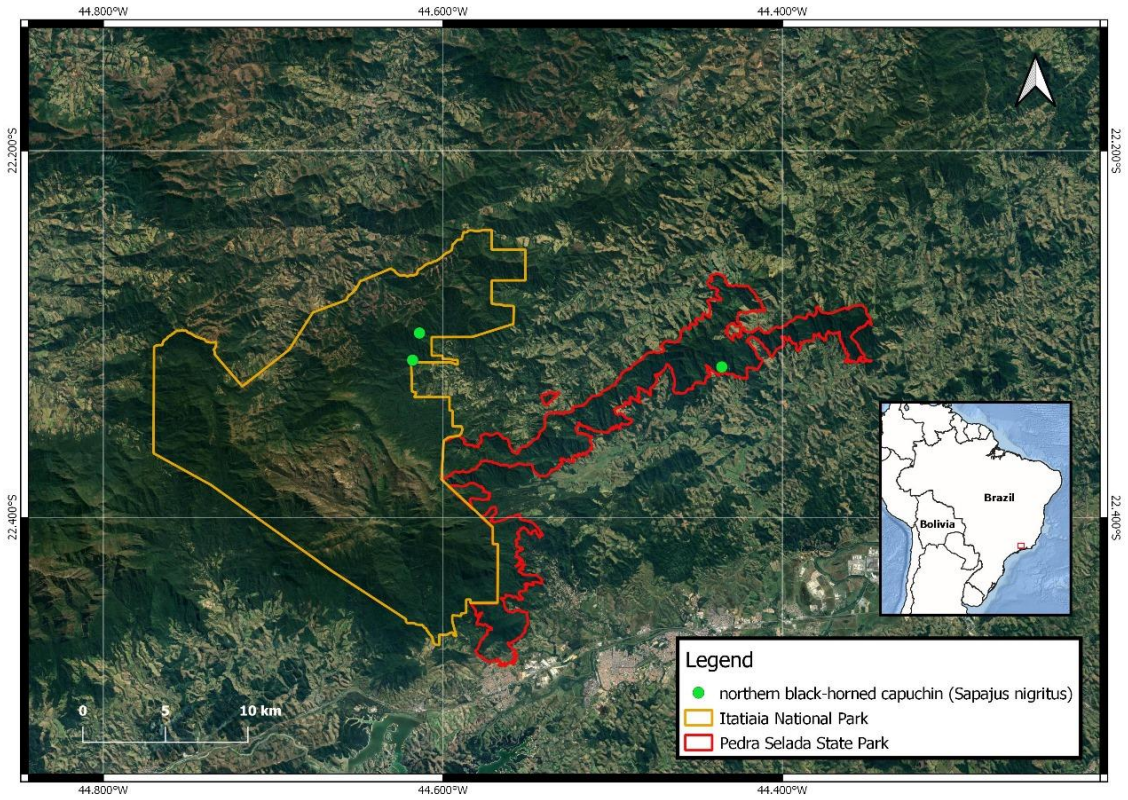
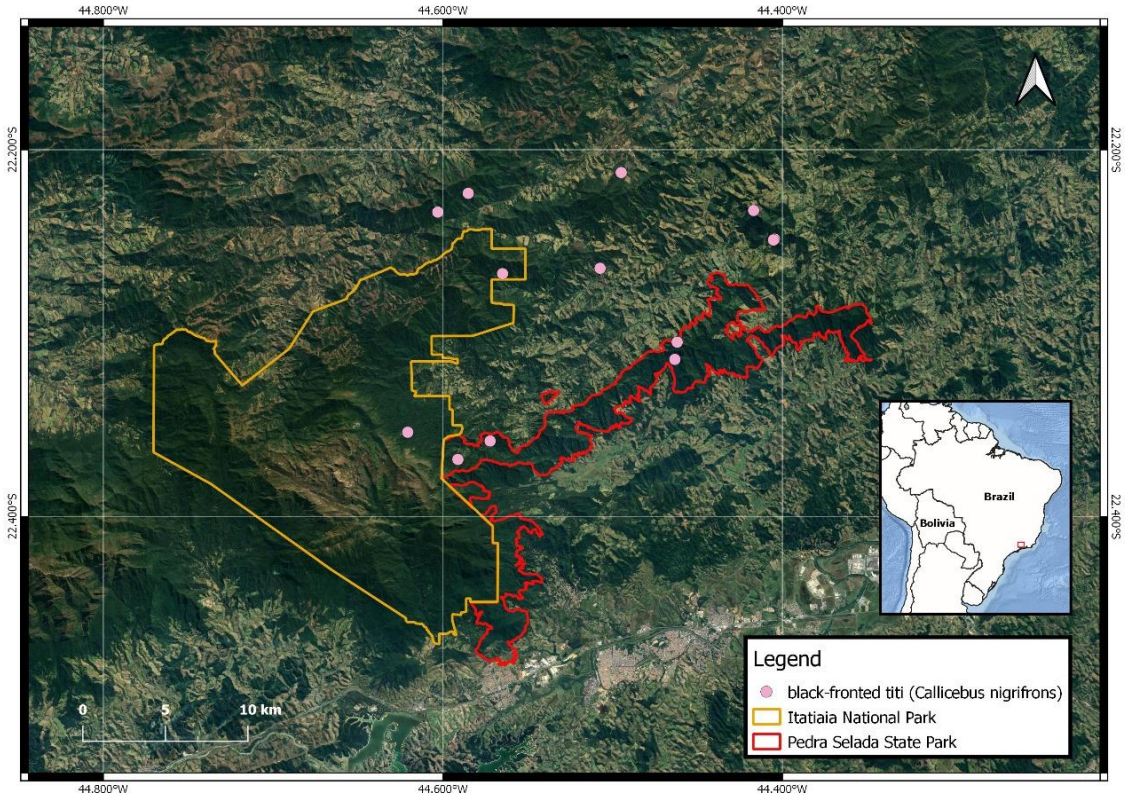


Figure 14. Registers of black-fronted titi monkeys *(Callicebus nigrifrons)*.



3. Outcomes and Indicators

A population survey study has been conducted to gather essential demographic data and acquire necessary knowledge of distribution and occurrence area of remaining groups and to have a better understanding of the muriquis population dynamics in the research area, identifying priority areas for conservation interventions. Based on these data, population management strategies, such as selective translocation between groups, can be proposed to improve genetic diversity and the long-term viability of populations.

In 2019, Chaves et al. has confirmed through genetic analyses the haplotype of northern muriqui of the Itatiaia National Park population. There are five priority areas for in situ conservation of the northern-muriqui, (*Brachyteles hypoxanthus*), as they are areas that still maintain the largest known populations of the species. The confirmation of the northern muriqui in the Itatiaia National Park, indicates the need of more applied studies in the region and surroundings to confirm the importance of this site for the species, making it the sixth most important site (JERUSALINSKY et al. 2011).

Although we have registered a great number of other primate's species, we could only register one new group of the Northern Muriqui until now. The species is critically endangered with only 12 known populations remaining through its distribution area, and is under pressure from several threats, like hunting, forest fires, deforestation, fragmentation and eventual diseases, that generated significant decrease in their numbers (MELO et al., 2021). Due to

that, the possible remaining groups took refuge in mountainous regions inaccessible to humans, in places that have remained preserved (TALEBI et al, 2011). Through interviews conducted during the survey, we were able to confirm that many old local residents reported the existence of “monos” in the region, up until 10 years ago. Currently, we assume that their number has decreased due to the threats that the species faces. However, it is extremely important to better investigate the region to be certain about the existence of other remaining groups.

All collected information will contribute to the development of strategies and decision making for the management and conservation of the Northern Muriqui. Furthermore, the obtainment of reliable demographic data and quantification of the remaining population of *Brachyteles hypoxanthus* are recognized as important measures in the National Action Plan for the conservation of the Atlantic Forest Primates and the Maned Sloth coordinated by the National Center of Research and Conservation of Brazilian Primates, ICMBio.

We recommend the implementation of a continuous population monitoring to assess the status of the Itatiaia National Park northern muriqui population and establish a robust survey study in areas that have not yet been well studied. Furthermore, when implementing long-term monitoring, management actions can be achieved, such as translocation of isolated migrant female to reinforce other small populations.

4. Bibliography

CHAVES, P. B., MAGNUS, T., JERUSALINSKY, L., TALEBI, M., STRIER, K. B., BREVES, P., et al. 2019. Phylogeographic evidence for two species of muriqui (genus Brachyteles). Am. J. Primatol. 81:e23066.

JERUSALINSKY, L., TALEBI, M. G. and MELO, F.R. 2011. Plano de Ação Nacional para a Conservação dos Muriquis. Brasília: Instituto Chico Mendes de Conservação da Biodiversidade, 144 p.

MELO, F.R., BOUBLI, J.P., MITTERMEIER, R.A., JERUSALINSKY, L., TABACOW, F.P., FERRAZ, D.S. & TALEBI, M. (2021) Brachyteles hypoxanthus (amended version of 2019 assessment). The IUCN Red List of Threatened Species.

STRIER, K.B. 1986. The behavior and ecology of the wooly spider monkey, or muriqui (Brachyteles arachnoides E. Geoffroy, 1806). PhD thesis, Cambridge University of Harvard.

STRIER, K.B. 1987. Activity budgets of woolly spider monkeys, or muriquis (Brachyteles arachnoides). American Journal of Primatology 13 (4): 385-395.

TALEBI, M.; MELO, F.R.; DIAS, L.G.; CUNHA, A.A.; MENDES, S.L.; BREVES, P. & JERUSALINSKY, L. 2011. Contextualização sobre Brachyteles arachnoides e Brachyteles hypoxanthus. In: Talebi, M. & Melo, F.R (ed.), *Plano de Acao Nacional para a Conservacao dos Muriquis.*, ICMBio (Instituto Chico Mendes de Conservacao da Biodiversidade).