

Project Update: December 2023

We have performed five field campaigns since December 2022, when the project started. In each of them, our team departed from Goiânia to Caldas Novas, in the State of Goiás, where our field base is. We stayed there for 2 weeks, the time needed to complete all the activities. Since we received the grant, we have been using the funding to rent a car for the field trip.

The first fieldwork was a pilot study that occurred from 18th – 22nd December 2022, in which we installed 14 camera traps in the Serra de Caldas Novas State Park (PESCaN) and surroundings to test the equipment with different settings (camera, video, or hybrid modes, sensor range and sensitivity, etc.). Additionally, this field trip was important to provide us a better picture of the field challenges related to logistics and travel within the study region. At that time, we recorded 12 species in a month. The second field trip was conducted from 20th January to 3rd February 2023, we obtained 47 species and proceeded with the installation across the study region from 18th – 28th March, 2nd – 15th July, until 11th – 21st September 2023 in the Mata Atlântica State Park (PEMA). The last campaign of 2023 just happened from 13th – 23rd November. In all the field trips, we checked the batteries and collected the SD cards containing the data. The fieldwork is scheduled to happen until around July 2025

To keep the whole structure of this project functioning, we are counting on the help of some institutions and people, such as the Environmental State Department (SEMAD) and the Park workers. For every field trip we have been counting on the assistance of Aliança da Terra's fire brigade (Figure 1). The crew has been helpful, since the beginning of this project, sharing the knowledge of the region and contributing with the logistics that facilitated the camera trap grid installation.



Figure 1. Research team and collaborators. From left to right in the first picture: Márcio Azevedo (fire brigade, Aliança da Terra), MSc. Filipe Guimarães Lima (Universidade Federal de Goiás), Ph.D. Alessandra Bertassoni (advisor, Universidade Federal de Goiás) in the Caldas Novas State Park - PESCaN. From left to right in the second picture: MSc. Filipe Guimarães Lima, Ph. D Alessandra Bertassoni, and Vitor Negreiros (fire brigade, Aliança da Terra) in a rural area of the surrounding of PESCaN.

Additionally, we also have some volunteers on each field trip, postgraduate and undergraduate students who are trained to develop abilities like field organisation and planning, camera trap installation, logistics, and image selection and storage (Figure 2). They have the experience of the routine, as well as the approaching and talking with the rural landowners, a key part for the success of this research, and the

handling with the eventual problems that might appear.

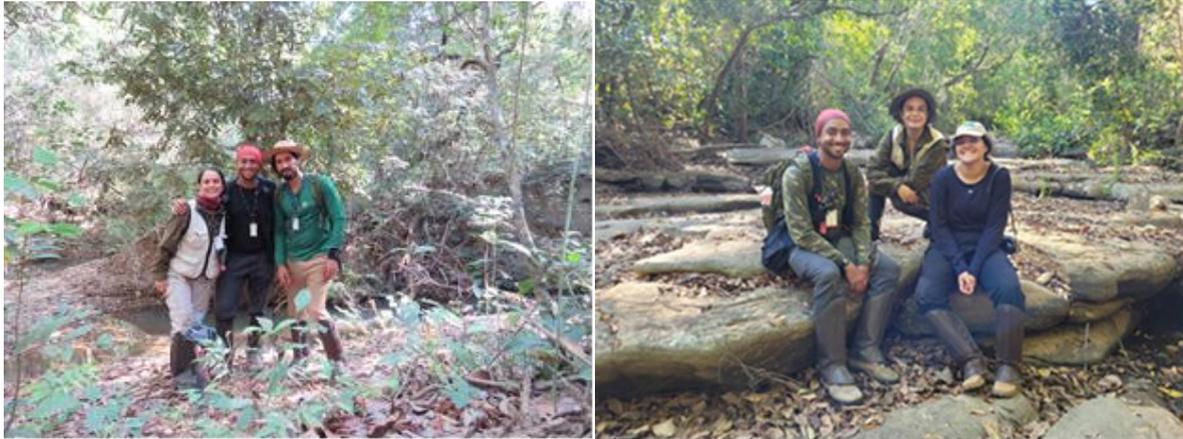


Figure 2. Research team and volunteers. From left to right in the first picture: Ph.D. Alessandra Bertassoni (advisor, Universidade Federal de Goiás), MSc. Filipe Guimarães Lima (Universidade Federal de Goiás), and MSc. Luiz Gabriel Dias (Universidade Federal de Goiás) in a rural area of Caldas Novas. From left to right in the second picture: MSc. Filipe Guimarães Lima, Ph. D Alessandra Bertassoni, and the undergraduate student Mariana Freitas (Universidade Federal de Goiás) in the surrounding area of PESCaN.

We successfully installed 75 camera traps throughout a variety of landscapes (habitat gradient) in five municipalities: Caldas Novas, Rio Quente, Marzagão, Água Limpa, and Buriti Alegre (Figure 3). The south of the state of Goiás is crucial for regional biodiversity owing to the fact that the region is an ecotone between the Cerrado and Atlantic Forest biomes. Ecotones are biodiverse systems for bringing species from both biomes and even species intrinsic to those transitioning zones.

The sampling stations are 3 km apart. To move around the study region, we use a GPS device which records our ways through trails, highways and dirt roads. To cover the study site, we rent a car, and even use the boat of the PEMA (Figure 4). The data collected in the last fieldwork are still being reviewed, however, for now, we have accumulated over 50 species including mammals, birds, and reptiles (Appendix 1). One of the mammal species recorded was the maned wolf (*Chrysocyon brachyurus*, Figure 5 and 6), which is the target species for my occupancy analysis. The maned wolf is a promising species for occupancy modeling once it is necessary to build a capture history from records, and for now we successfully have 14.

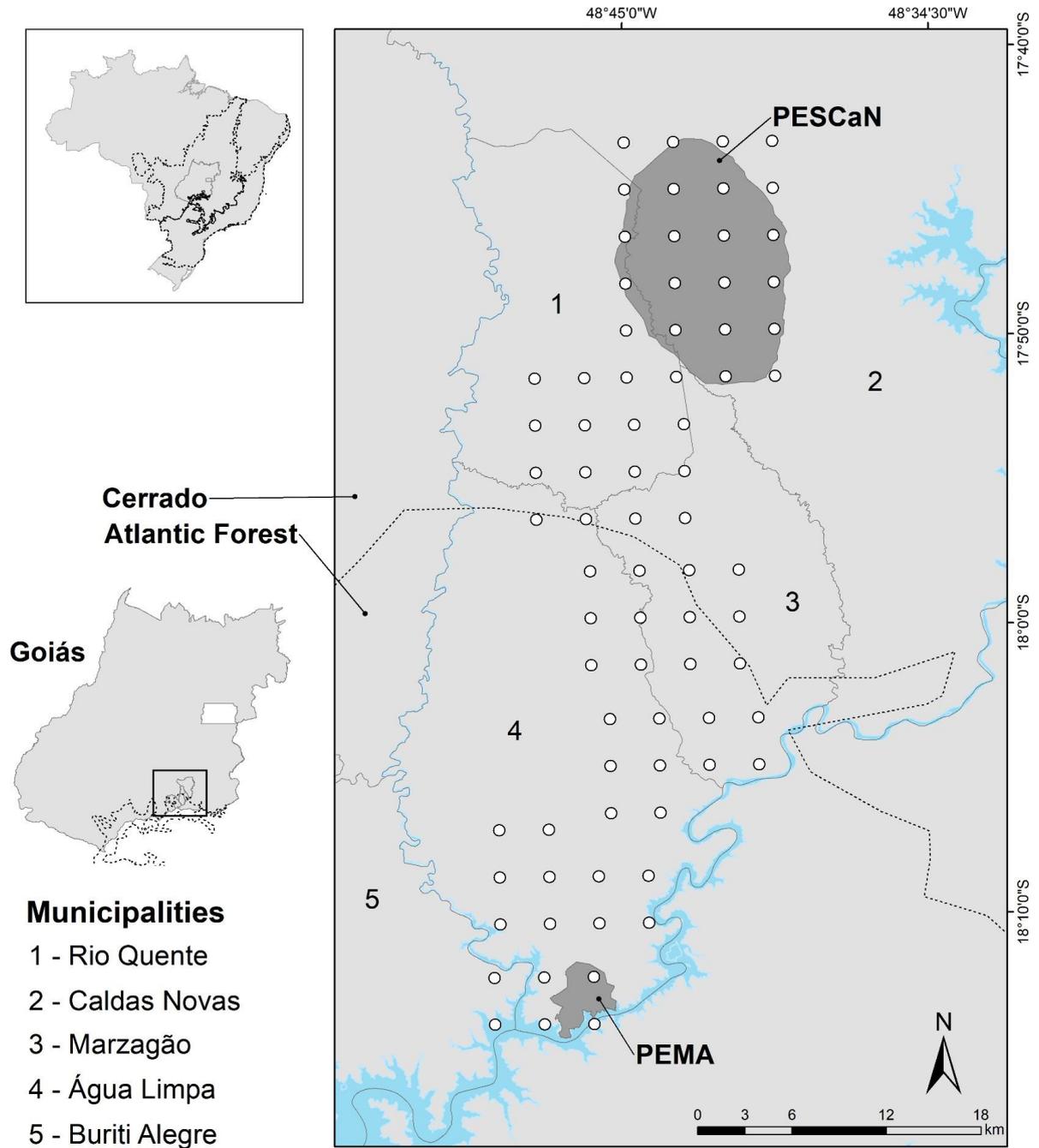


Figure 3. Study region. The points represent a sampling station with one camera trap each.



Figure 4. Car rented for the September 2023 field campaign and MSc. Filipe Guimarães Lima using the GPS device to find the camera trap sites escorted by José Augusto (boatman, SEMAD, on the left) and Diogo (environmental monitor, SEMAD, on the right).



Figure 5. Camera trap installation made by MsC. Filipe Guimarães Lima and Ph. D Alessandra Bertassoni and a maned wolf (*C. brachyurus*) recorded in Serra de Caldas Novas State Park - PESCaN.

We have recorded 27 native mammal species from 15 families, some of which are threatened with extinction such as the giant anteater (*Myrmecophaga tridactyla*), the giant armadillo (*Prionodontes maximus*) and the lowland tapir (*Tapirus terrestris*). Additionally, we also have recorded the domestic dog and cat, either in rural properties or in PESCaN. Domestic species threaten wildlife when they can freely access natural environments, especially protected areas. Domestic dogs are one of my species of interest and eventually I will assess their density, impact on habitat use by native mammals, ultimately providing the park chief information to elaborate management strategies.

In the last fieldwork we used a tablet device in the field (Figure 7), it helped us to previously watch some of the records before the data screening so we could check if the cameras were working from an adequate angle. Some animals are curious about the camera and interact with it, often misplacing it from the right angle. Once we are able to check it in the field we can straighten it promptly, besides we can be sure about the camera functioning, for instance, for how long the camera trap has been recording by watching the first and the last video at the moment.



Figure 6. Species recorded with the camera traps. From the left top: giant anteater and female with cub (*Myrmecophaga tridactyla*), maned wolf (*Chrysocyon brachyurus*), seriema (*Cariama cristata*), lesser anteater with cub (*Tamandua tetradactyla*), and the rhea (*Rhea americana*).



Figure 7. MSc. Filipe Guimarães Lima using a tablet to check out the records and camera trap functioning in the field.

Although our research is centered on mammals, camera trapping is not a specific sampling method, therefore we are able to register other taxonomic groups. For instance, we have recorded several birds such as ground species and, occasionally, small flying birds like doves and thrushes, and one lizard species. It is important to highlight that this research is the first systematic mid-term (2 years) project ever made in the region, providing data and monitoring on wildlife. We believe our project has the potential to obtain rich data that could be applied to answer other questions and be used in future research for both under and postgraduate students.

The next steps are to finish the data screening and spreadsheet the records, then I will discriminate the focal species data, which are the maned wolf, brown-brocket deer (*Subulo gouazoubira*), giant armadillo, and the domestic dog, in order to start my assays of occupancy and population analysis. For such analysis we will use fire historical maps provided by Aliança da Terra and other environmental data. Finally, prepare for the next field campaign that will be happening from 12th – 26th January 2024.

Appendix 1. List of the species recorded from December 2022 to September 2023.

Class	Order	Family	Scientific name	Common name
Aves	Caprimulgiformes	Caprimulgidae	Nyctidromus albicollis	Common pauraque
	Cariamiformes	Cariamidae	Cariama cristata	Red-legged seriema
	Columbiformes	Columbidae	Columbina talpacoti	Ruddy ground-dove
			Leptotila verreauxi	White-tipped dove
			Patagioenas picazuro	Picazuro pigeon
			Zenaida auriculata	Eared dove
	Coraciformes	Momotidae	Momotus momota	Amazonian motmot
	Culiciformes	Cuculidae	Crotophaga ani	Smooth-billed ani
	Falconiformes	Falconidae	Caracara plancus	Crested caracara
	Galbuliformes	Bucconidae	Monasa nigrifrons	Black-fronted nunbird
	Galliformes	Cracidae	Crax fasciolata	Bare-faced curassow
			Penelope supercilialis	Rusty-margined guan
	Gruiformes	Rallidae	Aramides cajaneus	Gray-necked wood-rail
	Passeriformes	Corvidae	Cyanocorax cristatellus	Curl-crested jay
		Furnariidae	Furnarius rufus	Rufous hornero
		Icteridae	Psarocolius decumanus	Crested oropendola
		Turdidae	Turdus leucomelas	Pale-breasted thrush
			Turdus rufiventris	Rufous-bellied thrush
	Pelecaniformes	Threskiornithidae	Mesembrinibis cayennensis	Green ibis
			Theristicus caudatus	Buff-necked ibis
	Piciformes	Picidae	Veniliornis passerinus	Little woodpecker
		Ramphastidae	Ramphastos toco	Toco toucan
	Strigiformes	Strigidae	Asio sp.	Owl
	Tinamiformes	Tinamidae	Crypturellus undulatus	Undulated tinamou
			Rhynchotus rufescens	Red-winged tinamou
Mammalia	Artiodactyla	Cervidae	Ozotoceros bezoarticus	Pampas deer
			Subulo gouazoubira	Gray brocket deer
		Tayassuidae	Pecari tajacu	Collared peccary
	Carnivora	Canidae	Cerdocyon thous	Crab-eating fox

			<i>Chrysocyon brachyurus</i>	Maned wolf
			<i>Lycalopex vetulus</i>	Hoary fox
		Felidae	<i>Herpailurus yagouaroundi</i>	Jaguarundi
			<i>Leopardus pardalis</i>	Ocelot
			<i>Leopardus sp.</i>	Tiger cat
			<i>Panthera onca</i>	Jaguar
			<i>Puma concolor</i>	Puma
		Mustelidae	<i>Eira barbara</i>	Tayra
		Procyonidae	<i>Nasua nasua</i>	Coati
			<i>Procyon cancrivorus</i>	Crab-eating raccon
	Cingulata	Chlamyphoridae	<i>Euphractus sexcinctus</i>	Six-banded armadillo
			<i>Priodontes maximus</i>	Giant armadillo
		Dasypodidae	<i>Dasyopus novemcinctus</i>	Nine-banded armadillo
	Didelphimorphia	Didelphidae	<i>Didelphis albiventris</i>	White-eared opossum
			<i>Gracilinanus/Cryptonanus sp.</i>	Gracile opossum
	Perissodactyla	Tapiridae	<i>Tapirus terrestris</i>	Lowland tapir
	Pilosa	Myrmecophagidae	<i>Myrmecophaga tridactyla</i>	Giant anteater
			<i>Tamandua tetradactyla</i>	Southern anteater
	Primates	Cebidae	<i>Callithrix penicillata</i>	Black-pencilled marmoset
			<i>Sapajus libidinosus</i>	Black-striped capuchin monkey
	Rodentia	Caviidae	<i>Hydrochaeris hydrochaeris</i>	Capybara
		Dasyproctidae	<i>Dasyprocta sp.</i>	Agouti
		Erethizontidae	<i>Coendou prehensilis</i>	Brazilian porcupine
Reptilia	Squamata	Teiidae	<i>Ameiva ameiva</i>	Giant ameiva