



Assessing the effects of human presence on reptile and amphibian population density in Southeastern Peru

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Introduction

From March 4, 2022, until March 11, 2022, we traveled to Southeastern Peru with intentions to survey species of reptiles and amphibians, or herptiles, within the Neotropics. We had two goals for our trip: to compare reptile and amphibian densities near and away from human activity, and to contribute to citizen science by adding our collected data to the iNaturalist online database.

Amphibians are cause for much concern amongst environmentalists due to their drastically declining numbers since the 1980s. It was determined that both habitat loss and human densities pose high risks to global amphibian populations (Sodhi *et al.* 2008). We expect to observe more herptiles in areas without solitary human presence and to observe higher levels of species diversity in these areas. We predict this knowing that wildlife in this area is subject to greater human presence, including tourists walking the trails around the resort multiple times a week, human voices around the lodging, and noises from incoming and outgoing boats.

Our aim is to provide evidence that supports the existence of the Anthropocene mass extinction event (Pievani *et al.* 2014), showing the detrimental effects human activities pose to wild populations, especially in the neotropics.

Methodology

We traveled to Puerto Maldonado, Peru for 6 days in March 2022 to observe and survey species of reptiles and amphibians in the area, embarking on guided tours around our lodge, Inkaterra Reserva Amazonica (IRA), and around more secluded forest areas along the Madre de Dios region.

Each herptile sighting was noted by recording the species, location, date, and time, and we took photos to upload onto iNaturalist to corroborate identification and contribute to citizen science.

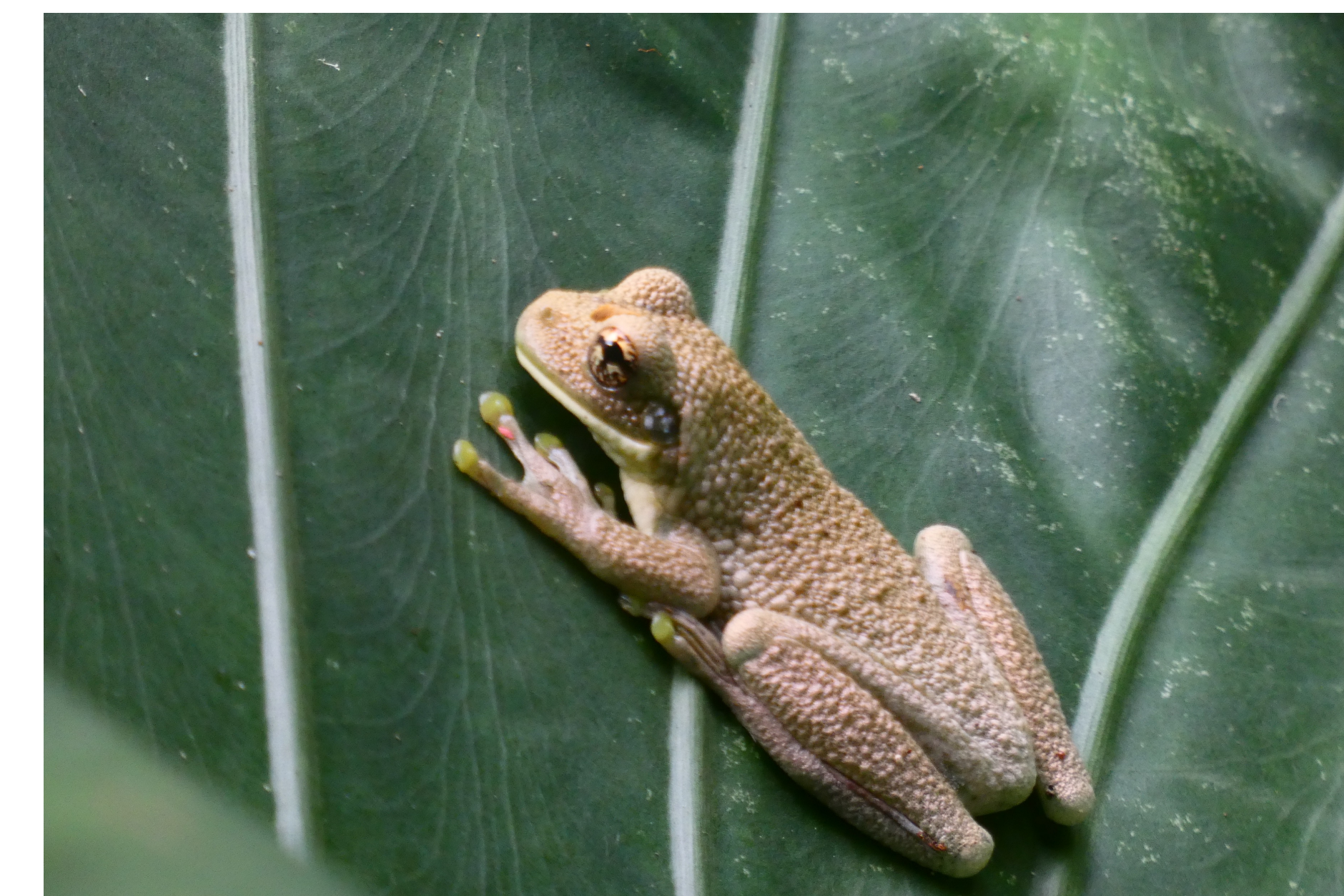
After the program, we organized our data into Table 1, noting how often each species we spotted was seen in or near the IRA or outside of the IRA.



Ameiva ameiva



Chelonoidis denticulatus



Trachycephalus typhonius



Caiman crocodilus

Results

Species	IRA	Outside IRA
<i>Trachycephalus typhonius</i>	9	11
<i>Leptodactylus didymus</i>	1	2
<i>Gastrophryne carolinensis</i>	1	8
<i>Leptodactylus bolivarius</i>	2	1
<i>Ameerega picta</i>	0	1
<i>Rhinella marina</i>	1	1
<i>Sphaenorhynchus lacteus</i>	0	1
<i>Pristimantis fenestratus</i>	0	1
<i>Dendropsophus leucophyllatus</i>	0	1
<i>Scinax pedromedinae</i>	0	1
<i>Chelonoidis denticulatus</i>	0	2
<i>Podocnemis unifilis</i>	0	2
<i>Amieva amieva</i>	6	4
<i>Gonatodes humeralis</i>	2	1
<i>Anolis nitens</i>	1	0
<i>Plica plica</i>	1	0
<i>Leptodeira annulata</i>	1	0
<i>Micrurus obscurus</i>	0	1
<i>Caiman crocodilus</i>	0	3
<i>Melanosuchus niger</i>	0	1
TOTAL INDIVIDUALS	25	42
TOTAL SPECIES	10	17

Table 1.

After 6 days in Peru, we spotted 20 different herptile species and 67 total individuals. This small sample size is not enough to fully support a hypothesis, but the beginnings of our data in Table 1 show a trend toward what we predicted: more total individuals and more total species were recorded in areas outside of the IRA where human presence was limited in comparison to at or around the resort. More data over a longer collection period should be taken to further support our findings.

Conclusion

Our conclusions lead us to tentatively state that prolonged human activity may have the ability to decrease reptile and amphibian presence in the neotropics.

In addition, collecting and storing data on the organisms we observed through citizen science resources like iNaturalist is important for future research. By having an organized data set established, scientists will have the ability to compare future sets of population densities to the current ones already developed. We believe that our study shows the importance and need for future population density studies in the neotropics to further determine recommendations for sustainable ecotourism to ensure lower effects of human density on surrounding biodiversity.

References

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- Sodhi, Navjot S., David Bickford, Arvin C. Diesmos, Tien Ming Lee, Lian Pin Koh et al. (2008), Measuring the Meltdown: Drivers of Global Amphibian Extinction and Decline. *PLoS ONE* 3(2): e1636. doi:10.1371/journal.pone.0001636.

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