Project Update: August 2021

During this semester (March-August 2021) I undertook a 36-day sampling effort in the study area, continuing with the installation and monitoring of camera traps. I also collected information on the conditions and attributes of the area at the landscape level. This information will be useful, for the next 2 months, to generate habitat models, considering both expert knowledge and potential distribution models. The purpose of this is to identify priority zones for the conservation of habitat connectivity of focal species in the study area.

Also, I am forming collaborative links with researchers from Guatemala, such as José Fernando Ramírez Moreira and Dr Manolo J. García Vettorazzi, with whom we plan to implement a connectivity analysis at a biogeographic level, considering the areas where the tapir and the white-lipped peccary live along with their distribution in the Mayan Forest (i.e., Mexico, Guatemala, and Belize). The analysis will be based on circuit and graph theory to generate maps of structural and functional connectivity in potential terms (see Link Mapper Tools (circuitscape.org)). The connectivity analyses were performed using Circuit scape ® software with Coopernicus -Sentinel 2. 2019 satellite image coverages (Fig. 1). Resistance layers were considered for the percentage of coverage, Euclidean distance to water bodies, roads, and population centres.

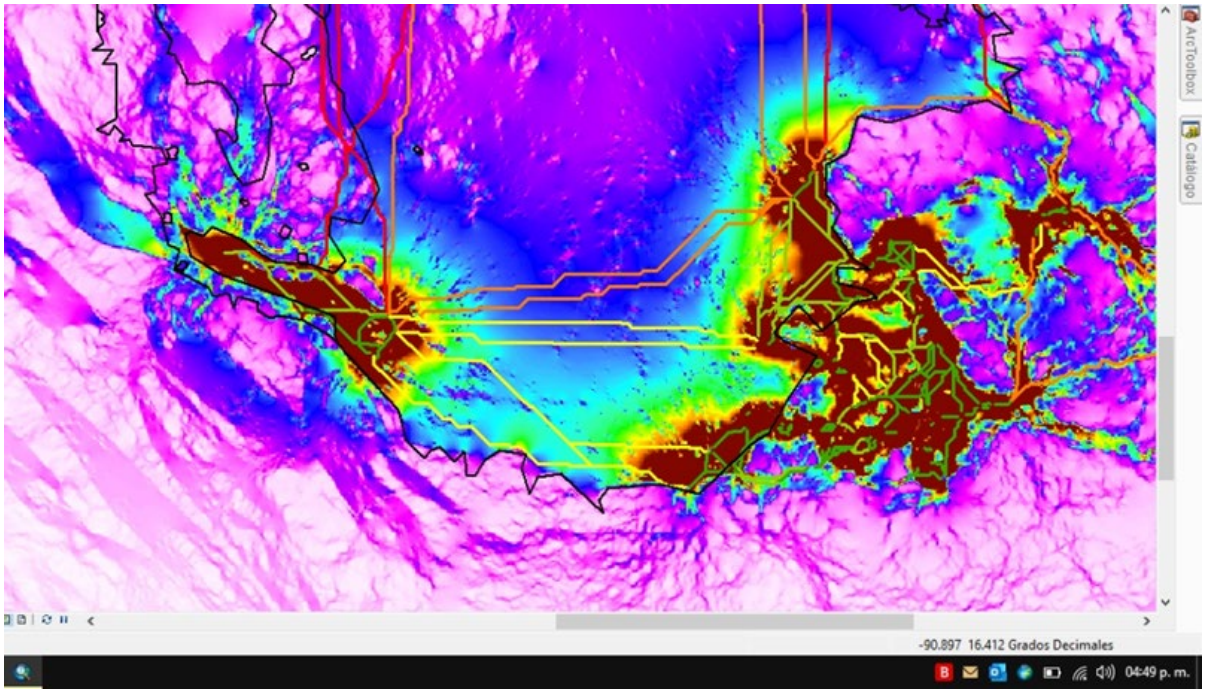

Figure 1. A preliminary result showing the main core areas and least-cost corridors, as well as Pinch points or bottleneck areas in the study landscape for *Tapirus bairdii*.

Monitoring and database component.

Between March and July 2021, I carried out three field trips to continue with the collection of data associated with the presence/absence of the ungulates under study, as well as the identification of other landscape-level variables, such as vegetation type and land use (i.e., vegetation type and land use). Visits were made to community forest areas and other forest relicts belonging to several rural ejidos that are located adjacent to the Montes Azules Biosphere Reserve (REBIMA), within

the boundaries of the municipality of Marqués de Comillas and Benemérito de Las Américas, as well as within the protected area (Figure 2).

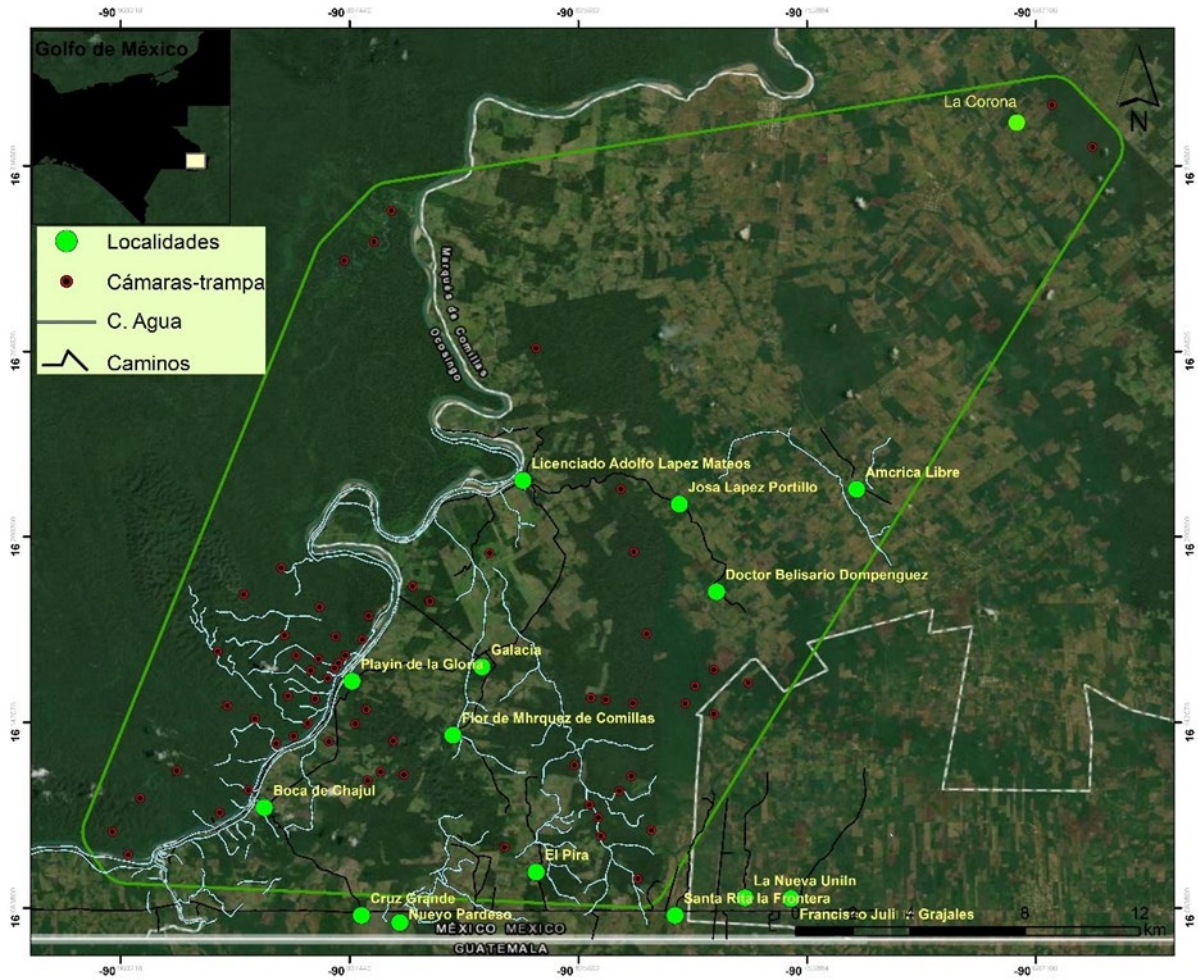

Figura 2. Cobertura con 66 cámaras-trampas en el área de estudio, separadas en promedio por 1.5 km entre sí. Se muestra un xtend de 624 km^2 por efecto de la geometría mínima de delimitaición, como área de muestreo.

Results Abundance and Density

Cuadro 1. Abundancia relativa y densidad estimadas por observación directa (REBIMA-Marqués de Comillas; Febrero-Diciembre 2020).

Especie	Abundancias (n/km recorrido*100)				Densidades (n/km^2)			
	Temporada seca (133.6 km)	Temporada Lluvias (129.2 km)	ARS	ARL	DS	EE	DL	EE
Tapirus bairdii	2	0	1.49	0	1.63	1.49	0	0
Pecari tajacu	16	13	11.97	8.33	3.55	2.56	2.4	1.47
Tayassu pecari	56	90	41.91	57.66	5.60	2.45	7.85	6.03

AR(S): Abundancia relativa en temporada seca; AR (L): Abundancia relativa en temporada de lluvias; D (S): Densidad en temporada seca; EE: Error estándar; D (L): Densidad en temporada lluviosa.

Outline and remaining work schedule

By the end of October 2021, with the presence-pseudo-absence data (1,0) I will generate the reports of the occupancy patterns of these species at a regional level in the study area (genuine and main objective of this study). Derived from such analysis, I will begin to conclude a scientific article tentatively titled as: "Determinants

of Central American tapir and white-lipped peccary occupancy in the Selva Lacandona". This manuscript will consider scenarios of fragmentation and climate change and the effect on ungulates to stochastic events. It will also incorporate reports of the following state variables associated with occupancy, abundance, and density, as well as the variation of these parameters in seasons and spaces (sites with the frequent presence of humans [outside protected areas] and within the NPA).

I started working on this chapter at the end of July 2021, and I expect it to be finished and ready to be submitted by the end of December 2021. A second article is in preparation and addresses the last objective of this project, which would be to generate habitat suitability models with suitability indexes (HSI), considering two different but complementary approaches: 1) connectivity models through circuit analysis that consider least-cost routes (metabolic and ecological); and 2) current flows in the face of "resistance" that the habitat or landscape of study opposes for the movement and use of resources within an ecosystem (McRae and Kavanagh 2011). The second approach is based on expert opinion (Wakeley 1988), in short, to identify priority corridors and core areas for the conservation of habitat connectivity for these species. This work, likewise, I intend to have it ready by the end of February 2022. And annex it to a third report.

Table 2. Schedule of activities 2021.

ACTIVITIES	August	September	October	November	December
Bimonthly sampling	X		X		X
Drafting of article 1	X	X	X	X	X
Partial report writing	X				
Extraction of landscape parameters	X		X		X
Collaborative meeting for connectivity and movement analysis in Selva Maya		X	X	X	X
Drafting of Article 2	X	X	X	X	X
Analysis of landscape parameters and connectivity					
Analysis of final data for both Chapters					X
Submission of Article 1					X

References:

McRae, B.,y Kavanagh D. M. 2011. Linkage Mapper connectivity analysis software. The Nature Conservacuy, Fort Collins.

Wakeley JS. 1988. A method to create simplified versions of existing habitat suitability index (HSI) models. Environ Manage. 12(1):79–83. doi:10.1007/BF01867379.

Annex A. Photo: Fredy Falconi**.** Logging in community forest reserves in Marqués de Comillas, Chiapas. June 2021

Annex B. Installation of camera traps in the study area