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Wild mammals of the Sierra de Tabasco State Park, Tabasco, Mexico.

Mamíferos silvestres del Parque Estatal de la Sierra de Tabasco, Tabasco, México.

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ABSTRACT

In México, terrestrial mastofauna is represented by 522 species, 146 of which are found in Tabasco state. It is worthwhile to contribute to the regional mastofauna knowledge in areas that have been scarcely studied, especially in conservation areas. This research aimed to create a wild mammal record present in the Sierra de Tabasco State Park (STSP), for which nine sampling sites were established in which direct and indirect methods were used to survey mammal species. Nine orders, 25 families, 60 genera, and 69 species were recorded, of which 20 are listed in some risk category according to NOM-059 and the IUCN. Bats (Order: Chiroptera) are the best-represented group with 31 species. Forty-seven percent of the mammal species in the state are found in the STSP, making it the most mammal-rich protected area in the state. The present study provides updated information on the biological knowledge of mastofauna in the STSP that could permit the designing of better conservation strategies, policies, and plans for the sustainable use of mammals in the region.

KEY WORDS: Protected area, Chiroptera, Conservation, Wildlife surveys.

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RESUMEN

La mastofauna terrestre mexicana está representada por 522 especies, de las cuales 146 se encuentran en el Estado de Tabasco. Es relevante contribuir al conocimiento regional de la mastofauna en regiones que han sido poco estudiadas, sobre todo en las áreas naturales protegidas. El objetivo de este trabajo fue elaborar un inventario de los mamíferos presentes en el Parque Estatal de la Sierra de Tabasco (PEST), para ello se establecieron nueve sitios de muestreo en los cuales se utilizaron métodos directos e indirectos para el registro de las especies de mamíferos. Se registraron nueve órdenes, 25 familias, 60 géneros y 69 especies, de las cuales, 22 se encuentran enlistadas en alguna categoría de riesgo de acuerdo con la NOM-059 y la UICN. Los murciélagos (Orden: Chiroptera) son el grupo mejor representado con 31 especies. El 47 % de las especies de mamíferos del Estado se encuentran presentes en el Parque Estatal de la Sierra de Tabasco lo que la sitúa como el área natural protegida con la mayor riqueza de mamíferos en la entidad. Este estudio proporciona información actual sobre el conocimiento biológico de la mastofauna en el Parque Estatal de la Sierra de Tabasco que permitirá elaborar estrategias de conservación y planes de aprovechamiento sustentable de los mamíferos en la región.

PALABRAS CLAVE: Área natural protegida, Chiroptera, conservación, inventario.

Introduction

Worldwide, Mexico is among the three countries with the greatest richness of mammals (MDD, 2022). The Mexican mastofauna is represented by 14 orders, 46 families, and 564 species; of which 522 (93 %) correspond to terrestrial mammals and 42 (7 %) to aquatic mammals (Sánchez-Cordero *et al.,* 2014). Tabasco is located in southern Mexico, in one of the regions with the greatest diversity of mammals in the country; the state has 152 native species, 146 correspond to terrestrial mammals and 8 to aquatic species; of the total, seven are endemic species of Mexico and 53 are in some category of risk according to Mexican regulations (Hidalgo-Mihart *et al.,* 2016). Tabasco state has a Sierra region, where the municipalities of Tacotalpa, Teapa, and Jalapa are located. It is a mountainous and rainy area of the state, characterized by the presence of valleys, hills, canyons, and mountain ranges with altitudes of less than 1000 masl (Martínez-Becerra *et al.,* 2019). Natural vegetation corresponds to high and medium evergreen forest, which is restricted to the mountainous zone of Teapa and Tacotalpa municipalities; there is also secondary vegetation, wetland plants, and agricultural zones (Rullán-Silva *et al.,* 2011). This region is considered a priority area for terrestrial biodiversity conservation given the great flora and fauna diversity (Arriaga *et al.,* 2009).

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Mammals constitute a group of great ecological, socioeconomic, and cultural importance. They participate in diverse ecological processes such as seed dispersal, pollination, and pest control, contributing to the functioning of natural and/or transformed ecosystems; Besides, are essential elements of food chains as predators and/or prey (Lacher *et al.,* 2019). Mammals are a source of protein for many human communities living in and around forested areas (Naranjo, 2010). In addition, they represent an important source of economic income as they are marketed as pets, and specific extracts are used as medicine to treat respiratory diseases and cancer (Ramírez-Mella *et al.,* 2016). Despite the importance of mammals, they face several threats, including invasive species, habitat loss, wildlife poaching and illegal trade, urbanization, agricultural land expansion, pollution, and climate change (Harfoot *et al.,* 2021). To face these threats, naturally protected areas (NPAs) play a significant role in mammal conservation at local and regional scales (Ceballos, 2007).

The Sierra de Tabasco State Park (STSP) was decreed as a natural protected area in 1988 to safeguard the last remnants of the high and medium evergreen rainforest, as well as several endangered wildlife species (POE, 1988). However, knowledge about its biological diversity is still scarce. So far, the most complete biological surveys correspond to vascular plants, fungi, gastropods, amphibians, and birds (Jiménez-Pérez & Alcudia-García, 2019). For mastofauna, there is no updated inventory; only scarce information is available regarding the presence of mammals and was generated by analyzing the wildlife use and exploitation by local communities (De la Cruz-Félix & Bello-Gutiérrez 2008; Centeno & Arriaga-Weiss, 2010; Contreras-Moreno *et al.,* 2012; Gallina *et al.,* 2012; Pozo-Montuy *et al.,* 2019).

The present research aimed to provide an updated list of the mammal species that have been recorded in STSP based on systematic field sampling, thus allowing an increase of the knowledge of biological resources in STSP naturally protected areas, as well as providing basic information for decision-making on conservation, use, and management of this group of organisms within the NPA and the region.

Material and Methods

Study area

STSP is located in the south-central region of Tabasco state, in the municipalities of Tacotalpa and Teapa (Figure 1), with an area of 15,113.21 ha. The climate is hot and humid with rainfall throughout the year, an average annual temperature of 25 °C, and scoring total annual precipitation ranges from 2,900 to 3,600 mm (SEDESPA, 2002). The predominant vegetation types are tall and medium evergreen forests (original vegetation), which covered most of the STSP. It is also found in secondary vegetation in different stages of succession, hydrophytes vegetation, agricultural areas where annual and/or perennial crops are established, and large extensions of cattle pastures that have replaced the original vegetation (Arreola *et al.,* 2011).

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Fieldwork

The present study was carried out from November 2004 to October 2005 in the Madrigal, Poana, and Tapijulapa mountain ranges, which are part of STSP. Twelve monthly trips were made with a duration of 3 days and 3 consecutive nights at each sampling site. Three sites were established per mountain range (nine sites in total) and two types of vegetation were considered at each site for the sampling of terrestrial mammals: medium evergreen forest and secondary vegetation. To generate the inventory, Sherman traps, mist nets, direct observations during walks, and track searches were used.

Flying mammals (bats) were captured using six mist nets of 12 m long by 3 m high. Nets were divided into the selected vegetation types and maintained active for six hours starting at dusk (18:00 to 00:00 h). Standard somatic measurements were taken from each individual captured, consisting of total length, tail, leg, ear, forearm (millimeters), and weight (grams). Species identification was carried out using the field key of Medellín et al. (1997). All individuals were released after being identified at the capture site.

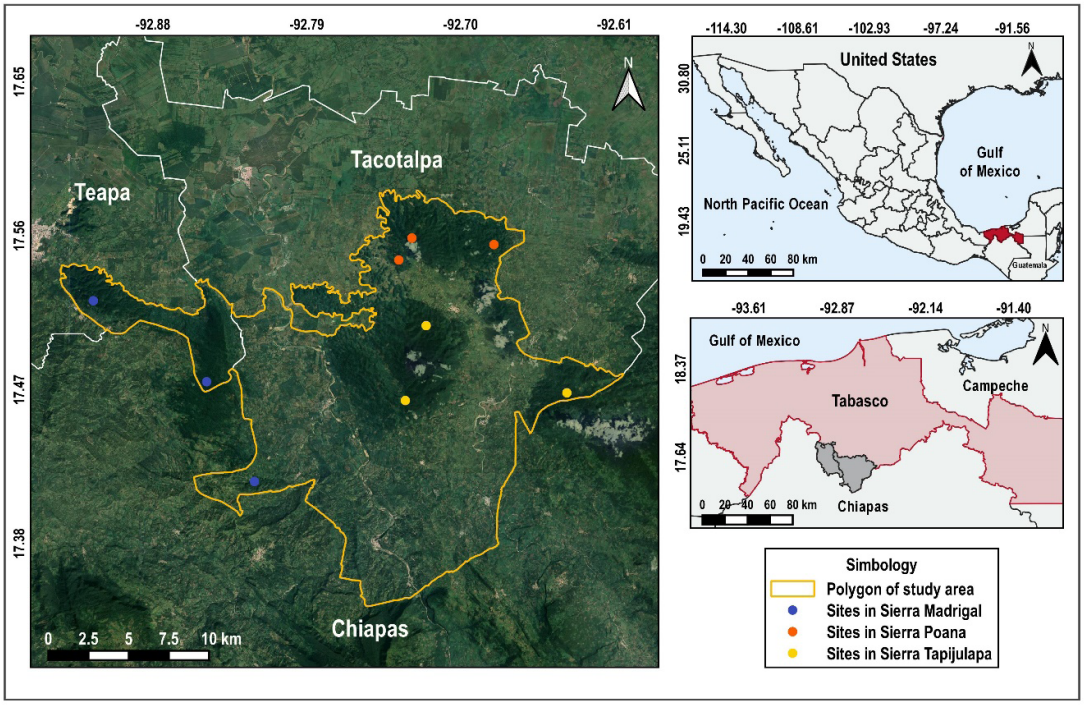

Figure 1. Location of study sites in the Sierra de Tabasco State Park (STSP), Tabasco Mexico.

Source: Own elaboration based on Google Earth images and cartography of the Comisión Nacional para el Conocimiento y Uso de la Biodiversidad.

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Small mammals (rodents) were captured with 80 Sherman-type traps placed in a 400 m-long transect (40 traps in each vegetation type). Traps were placed 10 m apart and baited with a mixture of oatmeal, vanilla, and peanut butter. Traps were maintained active for 12 hours (18:00 to 06:00 h). Standard somatic measurements were taken from each individual captured, consisting of total length, tail, leg, ear (millimeters), and weight (grams). Captured individuals were identified using the field guides of Reid (1997). After identification, organisms were released at the site of capture. Some specimens that died in the traps were prepared for identification by experts in small rodent systematics from the Centro de Investigaciones Biológicas campus Xalapa of the Universidad Veracruzana.

For the recording of medium and large mammals (> 500 g in weight) a transect of 500 m in length and variable width was established in each type of vegetation. Diurnal walks were carried out during the first hours of the day (05:00 to 08:00 h) while nocturnal walks were made during the first hours of the night (18:00 to 21:00 h). The observed individuals were identified through the field guides of Reid (1997) and Aranda (2000). At the end of the daytime rounds, a search for tracks (tracks, excreta, burrows, bones, and skin) was conducted for three consecutive hours. Mammal tracks were identified using the guide of Aranda (2000).

All the obtained records were reviewed and taxonomically updated according to the Mammal Diversity Database of the American Society of Mammalogists (MDD, 2022). The risk category for each species was determined according to the Official Mexican Standard NOM-059-SEMARNAT-2010 (SEMARNAT, 2010); and the international vulnerability level was estimated according to the International Union for Conservation of Nature Red List (IUCN, 2023).

Data analysis

The Chao1 nonparametric estimator, which is based on the species that are represented only by a single individual in the sample (singletons) and the number of species represented by exactly two individuals in the sample (doubletons), was used to estimate the number of species not detected during sampling (Chao 1984). The online software SpadeR (https://chao.shinyapps.io/SpadeR/ Chao et al. 2015) was used to obtain the estimator value. The completeness of the inventory was estimated as the percentage represented by the observed species richness (Sobs) relative to the maximum expected richness according to the Chao1 estimator. Such analysis was performed for each of the mountain ranges including all mammals and subsequently for each group (terrestrial and flying mammals).

Results and Discussion

A total of 8 orders, 22 families, 53 genera, and 61 species of mammals were recorded. In addition, eight species were non-systematically recorded, including the jaguar (*Panthera onca*), margay (*Leopardus wiedii*), and red brocket deer (*Mazama temama*). Including them in the STSP mastofauna would increase the number of taxa to 9 orders, 24 families, 60 genera, and 69 species (Table 1). 69 mammal species were recorded in

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STSP, representing 13 % of the species in Mexico (Sánchez-Cordero *et al.,* 2014), 33 % of the mammals recorded in the southern region of the country (Lorenzo *et al.,* 2008), and 47 % of the richness reported for Tabasco State (Hidalgo-Mihart *et al.,* 2016). Data show that this NPA has the highest diversity of mammals in the State. Twenty-nine percent (20 species) are listed in NOM-059-SEMARNAT-2019, 7 are endangered species (P), 10 are threatened species (A) and 3 correspond to species subject to special protection (Pr). Regarding the IUCN red list, 87 % of the species (60 sp.) are of least concern (LC); 6 % (4 sp.) near threatened (NT); 3 % (2 sp.) endangered (EN), and in the critically endangered (CR) and data deficient (DD) categories, one species per category was recorded (Table 1). Among the strategies that can be applied for the conservation of these species are the Programas de Acción para la Conservación de Especies (PACE) and the Programa de Conservación de Especies en Riesgo (PROCER) of the National Commission of Natural Protected Areas (CONANP-Mexico).

The Chiroptera order is the best-represented group with five families, 25 genera, and 31 species, representing 45 % of the species recorded in STSP; the least represented orders are Cingulata, Pilosa, and Lagomorpha with one species each (Table 2). The best-represented family was Phyllostomidae with 19 genera and 25 species, which constitutes 36 % of the mammal species recorded in STSP. 17 % of the families (n = 12) were represented by single species (Table 2). The taxonomic composition of the recorded species in the present study is consistent with that obtained in a similar analysis conducted in the region, where 18 to 78 species of bats, 6 to 28 species of rodents, 2 to 7 marsupials, and 5 to 19 carnivores have been reported (Sánchez-Hernández *et al.,* 2001; Guzmán & Bello-Gutiérrez 2006; Lira-Torres *et al.,* 2012; Llaven-Macías, 2013; Gordillo-Chávez *et al.,* 2015). Bats, along with rodents, are the best-represented taxonomic orders in most studies of mammals in tropical regions, which should be expected as both groups have low extinction and high speciation rates, which has favored their diversification in the Neotropics (Rolland *et al.,* 2014).

Table 1. Taxonomic list of mammals recorded in the Sierra de Tabasco State Park (STSP), Mexico.

	Mountain range			Vegetation type		Category of risk	
Taxon	Madrigal	Poana	Tapijulapa	Evergreen Forest	Secondary vegetation	NOM-059	IUCN
Caluromys derbianus	•	/	•	•	/	A	LC
Didelphis marsupialis	•	/	•	•	•		LC
Didelphis virginiana	•	/	•	•	/		LC
Philander opossum	•	•	/	•	•		LC
Marmosa mexicana	•	/	/	•	/		LC
Dasypus novemcinctus	•	•	•	•	•		LC
Cyclopes dorsalis	/	/	•	•	/	P	LC
Peropteryx macrotis	•	/	/	•	/		LC
*Saccopteryx bilineata**	•	/	/	/	/		LC
Natalus mexicanus	/	/	•	•	/		LC

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Table 1. Taxonomic list of mammals recorded in the Sierra de Tabasco State Park (STSP), Mexico.

Taxon	Mountain range			Vegetation type		Category of risk	
	Madrigal	Poana	Tapijulapa	Evergreen Forest	Secondary vegetation	NOM-059	IUCN
Pteronotus mesoamericanus	•	/	•	•	•		LC
Carollia perspicillata	•	•	•	•	•		LC
Carollia sowelli	•	•	•	•	•		LC
Desmodus rotundus	/	•	•	/	•		LC
Anoura geoffroyi	•	/	•	•	•		LC
Choeroniscus godmani	•	•	•	•	•		LC
Hylonycteris underwoodi	•	/	•	•	/		LC
Glossophaga mutica	•	•	•	•	•		LC
Lonchorhina aurita	/	/	•	•	•	A	LC
Micronycteris microtis	/	•	•	•	•		LC
Trachops cirrhosus	•	/	•	•	/	A	LC
Lophostoma brasiliense	/	/	•	•	/	A	LC
Lophostoma evotis	•	•	•	•	•	A	LC
Mimon cozumelae	•	•	•	•	•	A	LC
Artibeus jamaicensis	•	•	•	•	•		LC
Artibeus lituratus	•	•	•	•	/		LC
Dermanura phaeotis	•	•	•	•	•		LC
Dermanura tolteca	/	/	•	•	•		LC
Dermanura watsoni	•	•	•	•	•	Pr	LC
Centurio senex	/	/	•	•	/		LC
Chiroderma salvini	/	/	•	•	/		LC
Platyrrhinus helleri	•	•	•	•	•		LC
Uroderma convexum	•	/	•	•	•		LC
Vampyressa thyone	•	/	•	•	•		LC
Sturnira hondurensis	•	•	•	•	•		LC
Sturnira parvidens	•	•	•	•	•		LC
Bauerus dubiaquercus	/	•	/	•	/		NT
Myotis pilosatibialis	•	•	•	•	•		LC
Ateles geoffroyi	•	•	•	•	•	P	EN
Alouatta pigra	•	•	•	•	•	P	EN
Sylvilagus sp.	•	•	•	/	/		-
Sciurus aureogaster	•	•	•	•	•		LC
Sciurus deppei	•	/	/	•	/		LC
*Heterogeomys hispidus**	•	•	•	/	/		LC
Heteromys desmarestianus	•	•	•	•	•		LC
Coendou mexicanus	•	/	/	/	•	A	LC
Dasyprocta mexicana	•	/	/	•	/		CR
Cuniculus paca	•	•	•	•	•		LC

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Table 1. Taxonomic list of mammals recorded in the Sierra de Tabasco State Park (STSP), Mexico.

Taxon	Mountain range			Vegetation type		Category of risk	
	Madrigal	Poana	Tapijulapa	Evergreen Forest	Secondary vegetation	NOM-059	IUCN
Peromyscus totontepecus	•	•	•	•	•		LC
Oligoryzomys fulvescens	•	•	•	/	•		LC
Sigmodon hispidus	•	•	•	/	•		LC
Handleyomys rostratus	•	•	•	•	•		LC
Herpailurus yagouaroundi	•	•	/	•	•	A	LC
Leopardus pardalis	•	•	•	•	•	P	LC
*Leopardus wiedii**	/	•	/	/	/	P	NT
*Panthera onca**	/	/	•	/	/	P	NT
*Canis latrans**	/	•	•	/	/		LC
Urocyon cinereoargenteus	•	/	•	•	•		LC
Conepatus semistriatus	•	/	•	•	•		LC
*Lontra longicaudis**	/	•	•	/	/	A	NT
Eira barbara	/	/	•	•	•	P	LC
Galictis vittata	/	/	•	/	•	A	LC
Bassariscus sumichrasti	•	/	•	•	•	Pr	LC
Potos flavus	•	•	/	•	•	Pr	LC
Nasua narica	•	•	•	•	•		LC
Procyon lotor	•	/	•	•	•		LC
Dicotyles tajacu	•	•	•	•	•		LC
*Mazama temama**	/	/	•	/	/		DD
Odocoileus virginianus	/	/	•	•	•		LC

* = species recorded non-systematically. • = Presence, / = Absence. NOM-059: A = Threatened, P = Risk of extinction, Pr = Subject to special protection. IUCN: DD = Data Deficient, LC = Least Concern, NT = Near Threatened, EN = Endangered CR = Critically Endangered.

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Table 2. Number of species and genera by family and taxonomic orders of mammals recorded in the Sierra de Tabasco State Park (STSP), Mexico.

Order	Family	Generate	Species
Didelphimorphia	Didelphidae	4	5
Cingulata	Dasypodidae	1	1
Pilosa	Cyclopedidae	1	1
Chiroptera	Emballonuridae	2	2
	Natalidae	1	1
	Mormoopidae	1	1
	Phyllostomidae	19	25
	Vespertilionidae	2	2
Primate	Atelidae	2	2
Lagomorpha	Leporidae	1	1
Rodentia	Sciuridae	1	2
	Geomyidae	1	1
	Heteromyidae	1	1
	Erethizontidae	1	1
	Dasyproctidae	1	1
	Cuniculidae	1	1
	Cricetidae	4	4
Carnivora	Felidae	3	4
	Canidae	2	2
	Mephitidae	1	1
	Mustelidae	3	3
	Procyonidae	4	4
Artiodactyla	Tayassuidae	1	1
	Cervidae	2	2

Bats are counted among the most threatened mammal species by anthropogenic activities. In Mexico, the main factors affecting bats are land use change, pollution and/or use of toxic substances, climate change, human-bat conflicts, and the establishment of human infrastructure (Saldaña-Vázquez *et al.,* 2023). Nowadays, there is no available information regarding what factors are affecting the STSP bat community; this situation is alarming given that bats contribute to important ecological processes such as pollination, seed dispersal, and arthropod predation (Kunz *et al.,* 2011). The bat populations decrease could threaten the ecosystem services provided that improve the well-being of local populations (Kunz *et al.,* 2011).

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The low representation of small rodents in this study could be since the same bait (oats, peanut butter, and vanilla) was used throughout the study. For a small rodent survey study, a variation of baits within the same transect is recommended to increase the number of captured species (Álvarez-Castañeda *et al.,* 2015). The low number of small rodents could also be explained by the lack of additional sampling techniques, such as Pitfall traps that are ideal for shrews or those known as Gopher Traps, which are recommended for fossorial species (Álvarez-Castañeda *et al.,* 2015).

Obtained inventory completeness values were above 90 %, suggesting that a high percentage of mammal species inhabiting the three analyzed mountain ranges of STSP were recorded (Table 3). In the case of Sierra Madrigal, it was obtained a lower value for flying mammals (88 %) (Table 3). Based on the geographic distribution of mammal species, STSP has a high potential to harbor not recorded species in this study, such as the anteater (*Tamandua mexicana*), weasel (*Mustela frenata*), or the water opossum (*Chironectes minimus*) that could be present in STSP (Bello-Gutiérrez, 2004). Another factor that influences the recording of species is the sampling techniques; in the case of bats, the use of mist nets allows the capture of most species of the Phyllostomidae family which forage at the understory level, while the species that feed above canopy such as those belonging to Molossidae and Vespertilionidae families are usually recorded by using ultrasonic detectors (Pech-Canché *et al.,* 2011; Rizo-Aguilar *et al.,* 2015).

The highest richness of mammals was recorded in the Tapijulapa Sierra, while the lowest richness was recorded in the Poana Sierra. When analyzing richness by groups (terrestrial and flying mammals), the results are similar for bats, while for terrestrial mammals, the highest richness was recorded in the Sierra de Madrigal. The Sierra de Poana presented the lowest richness in both groups (Table 3). The Tapijulapa and Madrigal sierras maintain a large extension of medium evergreen forest in good condition; on the other hand, the Poana Sierra was the most affected by the forest fires that occurred in 1998, which caused a large part of the medium evergreen forest to disappear; currently, the sierra is dominated by secondary vegetation. Tropical rainforests are considered complex habitats in their structure and plant composition, which facilitates the presence of a large number of wildlife, such as mammals, which tend to be more diverse and abundant in tropical rainforests compared to secondary vegetation or highly fragmented landscapes (Ahumada *et al.,* 2011; de la Peña-Cuellar *et al.,* 2012; García-Morales *et al.,* 2014).

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Table 3. Species richness observed (S_{obs}), estimated (Chao1), and percent inventory completeness (CI) for each mammal group in each mountain ranges in the Sierra de Tabasco State Park (STSP), Mexico.

Group / ecological index	Mountain range		
	Madrigal	Poana	Tapijulapa
All mammals			
S_{obs}	48	33	53
Chao 1	51	35	57
CI	94 %	94 %	93 %
Terrestrial mammals			
S_{obs}	27	16	25
Chao 1	27	16	26
CI	100 %	100 %	95 %
Flying mammals			
S_{obs}	21	17	28
Chao 1	24	18	31
CI	88 %	94 %	90 %

STSP represents an important conservation area for threatened species or species with restricted distribution, including the spider monkey (*Ateles geoffroyi*), which is the most threatened primate species by deforestation in Mexico (Vidal-García & Serio-Silva 2011). This species is considered endangered by Mexican regulations and the IUCN red list. Current records in Tabasco state place it only in STSP. Other important species are the tropical cacomixtle (*Bassariscus sumichrasti*) and the Mexican macaque (*Dasyprocta mexicana*), which are species that live exclusively in jungle areas and are rarely found in disturbed areas (Arita, 2005; Nava, 2005). In the case of bats, some species live in continuous areas of the jungle or large fragments of vegetation, such as the wrinkle-faced Bats (*Centurio senex*), fringe-lipped bats (*Trachops cirrhosus*), fringe-lipped bat (*Trachops cirrhosus*), Brazilian pygmy round-eared bat (*Lophostoma brasiliense*) and the underwood's long-tongued bat (*Hylonycteris underwoodi*) are considered sensitive to habitat modification (Galindo-González, 2004).

In the present study, it was observed that some mammal groups such as small rodents and some bats are very difficult to distinguish using morphological criteria in the field, and therefore, sometimes is necessary to collect some individuals to compare them with deposited specimens

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in specialized scientific collections or taking samples for genetic identification (Álvarez-Castañeda *et al.,* 2015). Limitations in species identification may affect the number of taxa present in a given geographic area (Godínez *et al.,* 2011). In the case of mammals in STSP, it is considered that taxonomic limitations did not affect the number of species reported. However, some changes in the nomenclature were observed; eight taxa underwent modifications at the species level and two at the genus level. Recent integrative and/or molecular taxonomic studies have allowed many subspecies or synonymies to be recognized as valid species, while others, on the contrary, were synonymized under an existing name (Díaz *et al.,* 2021). Therefore, species lists change over time with the new information emergence, making it necessary a recurrent updating to adjust the taxonomy to new proposals.

During the development of the present study, some threats were identified that put the mammal species present in STSP at risk. These include conflicts between wildlife and human activities. The proximity of grazing areas and crops to areas of continuous vegetation promotes negative interactions (Hill, 2004). As a result of these interactions during the sampling period, one individual jaguar (*Panthera onca*) was killed by local inhabitants due to livestock predation. Another case is that of the Brocket deer (*M. gouazoubira*) which was hunted to avoid losses on a bean crop (*Phaseolus vulgaris*). Another threat to wild mammals in the area is domestic dogs used for subsistence hunting. This is demonstrated by a specimen of margay (*Leopardus wiedii*) that was preyed upon by a domestic dog (*Canis lupus familiaris*) owned by a local hunter. It has been shown that domestic dogs can be important predators of small and medium-sized mammals in protected natural areas (Carrasco-Román *et al.,* 2021). In addition, dogs could act as reservoirs or vectors of diseases, including canine distemper, which can be transmitted to STSP mammals (Deem *et al.,* 2000).

Finally, given the present data, the following recommendations are suggested for future studies: 1) An inventory of small mammal species should be elaborated, including different capture techniques (e.g. box traps, pitfall traps, and traps for fossorial animals); as well collecting specimens and/or taking samples for further molecular analysis that allow the correct taxonomic identification, to evaluate the role of STSP in the conservation of this diverse group, which was poorly represented in this study. 2) Continue to generate basic information on all mammal groups, emphasizing the threats they face within STSP, such as ecosystem transformation, conflicts with farmers and ranchers, and the transmission of emerging and re-emerging diseases. 3) Conduct habitat evaluations and population monitoring of species that are within any of the national and international protection criteria, which will allow coordinating actions aimed at reducing the risk of extinction of the species.

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Conclusions

The present work provides results of a systematic monitoring that represents basic information on the mastofauna present in the protected natural area Sierra de Tabasco State Park (STSP). A total of 69 mammal species were identified, of which 27 are listed in national and international risk categories. The results indicate the importance of STSP for the conservation of mammals in the region, as it constitutes the habitat for 47 % of the mammal species recorded in Tabasco. It is necessary to deepen the knowledge of small rodent species through systematic inventories, as well as the implementation of conservation programs for species at risk.

Authors contribution

Conceptualization of work: EJGC, RGM; methodology development: EJGC, RGM; software management: RGM; experimental validation, EJGC, RGM; analysis of results, EJGC, RGM; Data management, RGM; manuscript writing and preparation, EJGC, CVG, RGM; writing, revising, and editing, EJGC, CVG, RGM; project manager, JBG; fund acquisition, JBG.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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