

Mammals

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Study area

The mammals study area is one of the most narrow definitions of the Guayana Shield region. It is encompassed on the north by the Orinoco river, on the south by the Amazon river, and on the west by the connected headwaters of the Negro and Cassiquiare rivers. It includes French Guiana, Suriname, Guyana, northern Brazil, and southern Venezuela. Mammalogists dating back to Alfred Russell Wallace have referred to this area as the “Guiana region,” and have traditionally used it in biogeographic studies.

Previous scientific efforts

Only a few sites are reasonably well studied for mammals in the Guayana Shield (e.g., Paracou, French Guiana; Iwokrama Forest, Guyana; Imataca Forest Reserve, Venezuela). Some mammalogical surveys have been conducted in portions of most countries, although the timing and intensity of those inventory efforts is highly variable. The notable exception is Brazil, which accounts for about half of the Guayana Shield region. Other than the vicinity of Manaus, the region north of the Amazon river in Brazil is essentially unstudied and unknown for mammals, yet it is probably the area most threatened by colonization.

Priority area definitions

The priorities for mammals are based primarily on species richness and endemism within the context of previous biodiversity surveys. Recent fieldwork in the Amapá savannas of northeastern Brazil has identified a unique mammalian fauna, including undescribed species, more similar to the Cerrado than to other areas of the Guayana Shield. The Acarai-Tumucumac Uplands is an important transition zone between biogeographic assemblages of the Amazonian and Atlantic Coast watersheds. With an admixture of lowland and upland forest, this area contains a large proportion of Guianan endemics in a pristine environment that is virtually unexplored for mammals. The Guiana Highlands has several endemic species that are known by only a few specimen records from restricted areas (e.g., *tepuis*). The remoteness of and consequent logistical difficulties of working in the Highlands contribute to our incomplete understanding of its fauna.

Table 6. Threatened mammal species (based on estimated distributions) in the Guayana Shield (total=23).

Common name	Scientific name	Status*
Small-footed water rat	<i>Nectomys parvipes</i>	CR
Pacarana	<i>Dinomys branickii</i>	EN
Oyapock’s fish-eating rat	<i>Neusticomys oyapocki</i>	EN
Venezuelan fish-eating rat	<i>Neusticomys venezuelae</i>	EN
Giant armadillo	<i>Priodontes maximus</i>	EN
Giant otter	<i>Pteronura brasiliensis</i>	EN
Brazilian bare-faced tamarin	<i>Saguinus bicolor</i>	EN
White-bellied spider monkey	<i>Ateles belzebuth</i>	VU
Goeldi’s monkey	<i>Callimico goeldii</i>	VU
Greater ghost bat	<i>Diclidurus ingens</i>	VU
White-faced tree rat	<i>Echimys chrysurus</i>	VU
Guianan bonneted bat	<i>Eumops maurus</i>	VU
Bushy-tailed opossum	<i>Glirionia venusta</i>	VU
Marmosa emiliae	<i>Gracilinanus emiliae</i>	VU
Fernandez’s sword-nosed bat	<i>Lonchorhina fernandesi</i>	VU
Marinkelle’s sword-nosed bat	<i>Lonchorhina marinkellei</i>	VU
Giant anteater	<i>Myrmecophaga tridactyla</i>	VU
Amazonian sac-winged bat	<i>Saccopteryx gymnura</i>	VU
Ega long-tongued bat	<i>Scleronycteris ega</i>	VU
Bush dog	<i>Speothos venaticus</i>	VU
South American tapir	<i>Tapirus terrestris</i>	VU
Carriker’s round-eared bat	<i>Tonatia carrikeri</i>	VU
Schultz’s round-eared bat	<i>Tonatia schulzi</i>	VU

*CR=Critically Endangered, EN=Endangered, VU=Vulnerable
Sources: 2002 IUCN Red List of Threatened Species and Patterson, B.D., et al. 2003. *Digital Distribution Maps of the Mammals of the Western Hemisphere*. Version 1.0. Arlington, VA: NatureServe.

Discussion

The Guayana Shield contains approximately 275 reported species of mammals, an estimated 23 of which are threatened (see Table 6). Most people are familiar with larger species such as the cats and monkeys, but few realize that over half of the mammal species are bats and one-fifth are rodents. These animals are typically small, secretive, and nocturnal, which makes them difficult to study and document. However, studies in other areas indicate that most bats and rodents provide important ecosystem services such as seed dispersal, pollination, and insect predation. Compared to mammal diversity in other parts of the world, the Guayana Shield contains a unique combination of high biodiversity, high rates of endemism, and pristine, predominantly lowland

forest habitats. Interspersed within this tropical rain forest is a mosaic of riverine forest, savanna, gallery forest, highland forest, *tepui* bogs, marsh forest, and mangrove swamps that each potentially harbor a distinct mammalian fauna.

At present our knowledge of the mammalian fauna and our ability to contribute meaningfully to conservation planning is impeded by our lack of information on mammals in many key regions (e.g., Acarai-Tumucumac Uplands, Guiana Highlands, Amapá Savannas) and the dearth of intensive long-term studies at individual sites. Although we have made great strides in understanding the Guiana fauna in recent years, this unique and largely pristine community remains largely unknown. A first priority to conservation planning for mammals, then, is to conduct basic inventories, including genetic sampling, in order to determine levels of diversity, rates of endemism, and the local distributions and habitat associations of individual species.

Physical Geography

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Study area

The study area for physical geography includes the core of the Guayana Shield Precambrian Craton and the drainage limits of river basins whose water chemistry is highly influenced by sediments originating in the Guianan region. The Guayana Shield lies north of the Amazon river and, together with the Guaporé (Brazil) Shield, is part of the northern Amazonian Craton of Precambrian origin, which formed about 200 MA after the rupture of the super-continent Pangea. Precambrian cratonic rocks constitute most of the exposed crust in the Guayana Shield drainage basins. The Guayana Shield includes the northern region of Brazil, the Venezuelan Guayana, Guyana, Suriname, French Guiana, and some remnants in Colombia and Bolivia.

Variations in geographic factors such as geology, geomorphology, climatology, hydrology, pedology, and river chemistry play a key role in regulating terrestrial and aquatic biodiversity distribution, richness, and functioning. Some of these factors have important dynamisms. Human needs for environmental goods and services, however, actually or potentially modify

these variations. Consequently, the existing major environmental variability along the Guayana Shield was analyzed separately, with a focus on environmental diversity and extremes as well as the actual or potential human need for water, the most important and basic service of the physical environment. The Guayana Shield as a whole discharges roughly 110,000 m³/s of fresh water, or around 10 percent of the total global discharge.

Previous scientific efforts

Previous efforts to evaluate key environmental factors have been scattered throughout the region and mainly consist of government inventories of large-scale natural resources for purposes of economic development (e.g., mining, hydroelectricity, navigation). Besides geologic and geomorphologic maps based in large part on radar information, most previous studies aimed at producing sound scientific data are flawed in some way. Some studies, for example, lack correct location information, or the data for a specific time series such as climate. Moreover, not enough is known about the region's susceptibility to climate change and El Niño/Southern Oscillation (ENSO). Further data might be found, however, in the technical reports of governmental or private agencies.

Priority area definitions

Priority areas for physical geography were defined to include the following: (1) highlands with elevations above 1,000 meters, thus guaranteeing runoff regulation and protecting river sources and the biogeochemical cycles of major watersheds; (2) watersheds with high water yield (average 55.0 to 85.0 l/s km²), thus guaranteeing abundant fresh water; (3) landscapes with high geologic and geomorphologic variation, thus guaranteeing high landscape diversity; (4) areas with high fluvial dynamics and the confluence zones of major rivers in their junctions with the Orinoco and Amazon rivers as well as coastal areas, thus including environmentally unique hydrological extremes for biota and guaranteeing high diversity of riparian ecosystems; (5) watersheds in rivers close to major cities, thus guaranteeing fresh water production for human use; and (6) extremely oligotrophic systems or areas with Spodosols or Histosols and black water rivers, thus protecting environmentally unique chemical extremes for biota and guaranteeing high diversity of riparian ecosystems.