

# **TERRESTRIAL MAMMAL SURVEY OF BAHÍA HONDA (VERAGUAS, PANAMA)**

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## **Introduction**

The Republic of Panama has one of the most diverse mammalian fauna within the Central American region. Two hundred fifty five mammal species have been reported; leading in number of species are the bats with 114 followed by rodents with 56 spp., and cetaceans with 26 spp. Panamanian mammals show a range in body size from <6 g, in shrews and bats, to >400 kg in cetaceans. Mammals are characterized by being endotherms with constant temperature and having the body covered by hair, as well as by having to feed their offspring with milk. This animal group inhabits polar, temperate, subtropical, and tropical climates, which include lowlands and highlands, savannas, and deserts. Mammals carry out their activities in terrestrial, subterranean, aerial, arboreal, lacustrine, and marine environments, some with diurnal and others with nocturnal habits. Panamanian mammals show a diversity of food habits that include the consumption of insects, fruits, seeds, nectar and pollen, leaves, grasses, vertebrate's meat, blood and plankton.

Although Panamanian mammals are one of the most studied groups in Panama, there are still regions in the country without detailed studies of these animals. Due to the fact that the coastal forest in the Pacific slope of Veraguas Province have been scarcely studied in terms of wild mammals and that most of these forests have disappeared due to the development of agriculture and cattle raising activities, it is crucial to collect information about the fauna inhabiting the area. The purpose of this work is to present an initial description of the mammalian fauna observed during field work or reported by local people at Bahía Honda in Veraguas.

### **Study Site and Methods**

Two field visits were made to the study site at Bahía Honda, one from June 19 - 25, 2001 and the other one from November 21 - 24, 2002. Localities visited included Canales de Tierra island and, in the mainland, Playa del Sol and El Edén. At Canales de Tierra island work was conducted in habitats with a somewhat hilly topography and forests in a late regeneration phase, presenting a closed canopy with trees of 25 m height and an understory ranging from open to partially closed. At Playa del Sol, habitats included altered forests closed to a creek, with an understory from open to closed, containing grasses, heliconids and shrubs from 3-5 m, while the canopy was formed by palms and trees of 10-12 m and also mango and avocado fruit trees. Habitats sampled at El Edén were represented by young secondary and mature forests close to a river, with trees of 10-20 m and an open understory of 5 m. Species were recorded by means of interviews to local people and by indirect and direct observations. Vocalizations, tracks and feces were part of the indirect observations and direct observations were made by observation and capture with traps and mist nets set in the understory and in the canopy level.

## Species Account

### Order Didelphimorphia

### Family Didelphidae

#### ***Caluromys derbianus*** (Waterhouse, 1841); Woolly Opossum

*Description:* Medium sized, 200-400 g, and long tailed. Upperparts pale gray with orangish patches, commonly has 3 orange patches on neck and shoulders. Underparts are creamy white, fur long and woolly. Ears large and pale pinkish. Dark brown median line on forehead. Eyes large, brown, and bright. Tops of feet white.

*Distribution:* Mexico to W Colombia and N Ecuador. Wide distribution in Panama, common in both Pacific and Atlantic slopes, lowlands to 1,200 m.

*Ecology:* Nocturnal and arboreal animal. Its diet includes mainly fruits, but also eats insects and flowers. When visiting tree flowers during the dry season, this marsupial may act as a pollinator.

#### ***Didelphis marsupialis*** (Linnaeus, 1758); Common Opossum (photo 1)

*Description:* Large sized, 0.5-2.5 kg, upper parts blackish or gray, under parts yellow or cream. Ears naked, entirely black.

*Distribution:* Mexico to Peru, Bolivia and N Argentina. Abundant species in Panama, with wide distribution, from lowlands to 1,600 m.

*Ecology:* Nocturnal, arboreal and terrestrial animal, with an omnivore diet, which includes fruits, insects and small vertebrates. Some indigenous groups and campesinos use this species as meat. It is also considered a pest, because sometimes it feeds on poultry and bananas.

#### ***Chironectes minimus*** (Zimmermann, 1780); Water Opossum

*Description:* Medium sized, 600-790 g, strikingly marked. Upper parts pale gray with 4 broad, chocolate-brown to black bands across back, joined by a narrow, dark line down spine, under parts white. Ears short and black. Tail broad and

hairy at base, black with a white tip. Hind feet webbed between all toes. Pouch present in female and male.

*Distribution:* Mexico to Peru, SE Brazil and N Argentina, absent from much of the Amazon basin. It is considered as common in Panama, with a wide distribution, lowlands to 1,250 m.

*Ecology:* Nocturnal, terrestrial, and semiaquatic marsupial. Its diet includes crustacean, fish, frogs, and insects.

***Metachirus nudicaudatus*** (E. Geoffroy St.-Hilaire, 1803); Brown Four-eyed Opossum

*Description:* Medium sized, 254-619 g. Upper parts dull brown grading to tan on sides and below ears; under parts pale yellow. Ears brown and face dark brown, with a narrow, dark stripe extending from forehead to nape of neck. Cheeks and spots above eyes cream-colored. Tail sparsely haired for its entire length, bicolor, brown above, white below, fading gradually to all white at tip. Feet whitish.

*Distribution:* Fragmented, Mexico to Nicaragua, Peru and N Argentina. Possibly with a wide distribution in Panama, lowlands to 650 m.

*Ecology:* Nocturnal and terrestrial. It is an omnivore, feeds on insects, small vertebrates, and fruits.

***Philander opossum*** (Linnaeus, 1758); Gray Four-eyed Opossum

*Description:* Medium sized, 263-1400 g. Upper parts dark gray-brown to blackish gray peppered with white hairs; under parts and tops of feet cream or yellow. Head blackish, with contrasting cream spots above the eyes and cream cheeks.

*Distribution:* Mexico to Paraguay and N Argentina. Possibly with a wide distribution in Panama, lowlands to 650 m.

*Ecology:* Solitary, nocturnal, terrestrial and arboreal animal. It is an omnivore, with a diet on insects, crustacean, small vertebrates, and fruits. Sometimes it is considered as pest, because it feeds on poultry and their eggs.

Order Xenarthra

Family Myrmecophagidae

***Tamandua mexicana*** (Saussure, 1860); Vested Anteater

*Description:* Medium sized, 3.8-8.5 kg. Long, tapered snout and blotchy, almost naked, prehensile tail. Upper parts cream to golden brown with a black vest. Forelimbs powerful, forefoot with 2 large and 2 small claws, 5 claws on hind foot.

*Distribution:* Mexico to NW Peru and NW Venezuela. Common in Panama, wide distribution, lowlands to 1,200 m.

*Ecology:* Diurnal and nocturnal, solitary animal. Both terrestrial and arboreal, with an insectivore diet, feeds on ants and termites.

Family Megalonychidae

***Choloepus hoffmanni*** (Peters, 1859); Hoffmann's Two-toed Sloth

*Description:* Medium sized, 4-8 kg. Fur long and shaggy. Body and tops of feet dull cream-brown, leg usually darker, dull red-brown. Fur on head pale gray, often with a greenish cast on crown, white around face. Snout bulbous, pig like. Eyes large, brown. No tail. Forelegs slightly longer than hind legs, 2 claws on forefoot, 3 claws on hind foot.

*Distribution:* Honduras and N Nicaragua to Peru and E Brazil. Common in Panama, with a wide distribution, lowlands to 1,500 m.

*Ecology:* Solitary, arboreal and nocturnal, with slow movements. Its body temperature is regulated with ambient temperature. Its diet consists on leaves and fruits.

Family Bradypodidae

***Bradypus variegatus*** (Schinz, 1825); Brown-Throated Three-toed Sloth (Photo 2)

*Description:* Medium sized, 2.3-5.5 kg. Grizzled, grayish, coarse looking fur. “Cute smiling” face, with a small dark snout, dark mask through eyes. Short, stubby tail. Forelegs much longer than hind legs, palms and soles fully furred; 3 claws on each foot. Patch of short, orange fur with a black central line or black spots on midpart of male.

*Distribution:* C Honduras to E Peru and NW Argentina. Common in Panama, wide distribution, lowlands to 1,200 m.

*Ecology:* Solitary and arboreal, both active by day and night. Its body temperature is regulated with ambient temperature. It moves to the ground one or twice per week to urinate or defecate, and sometimes to move to other tree. It is a good swimmer. Its fur is associated to red algae, which gives it the look of moss and acts like a camouflage. It is a folivore, feeds on leaves.

#### Family Dasypodidae

***Cabassus centralis*** (Miller, 1899); Naked-tailed Armadillo

*Description:* Medium sized, 2.5-3.5 kg. Upper parts mostly dark gray-brown, carapace has 10-13 bands on back. Claws broad and long.

*Distribution:* S Mexico, Belize, patchily distributed through Central America to N Colombia and NW Venezuela. Rare in Panama, possibly distributed throughout the country.

*Ecology:* Solitary, nocturnal, and fossorial animals. This species may spend more time underground than other armadillos. Its diet includes termites, ants, and other invertebrates.

***Dasypus novemcinctus*** (Linnaeus, 1758); Nine-banded Armadillo (photo 3)

*Description:* Medium sized, 3-7 kg. A dark gray carapace with small scutes and 8-9 movable bands on back covers body. Tail, head, and ears long and narrow. Snout long, ears prominent and naked.

*Distribution:* SE and C United States, through Mexico, Central America to Uruguay and N Argentina. Common in Panama, with wide distribution, from lowlands to 1,800 m.

**Ecology:** Mainly a solitary and nocturnal animal. Terrestrial, but they are good diggers of dens. Its diet includes invertebrates, such as beetles, termites, ants, earthworms, but sometimes eats small vertebrates and fruits.

#### Order Chiroptera

#### Family Mormoopidae

***Pteronotus parnelli*** (Gray, 1843); Common Mustached Bat

**Description:** Medium sized, 12-26 g, forearm 55-63 mm. Fur short, pale to dark brown, or rarely orange. Ears narrow and pointed. Eyes tiny. Lips thickened, with a long mustache on the sides and a small leaf (fold of skin) below the flared lower lip. Tail more than half the length of long tail membrane.

**Distribution:** Sonora and Tamaulipas, Mexico, Central America to Peru and E Brazil. Abundant in Panama throughout the country, lowlands to 1,500 m.

**Ecology:** Roosts in large caves, usually with other mormoopids species. It uses the lower forest level, understory, feeding on aerial insects, mainly orthopterans, beetles and moths.

#### Family Phyllostomidae

***Tonatia silvicola*** (D'Orbigny, 1836); White-throated Round-eared Bat

**Description:** Medium sized, 25-39 g, forearm 50-56 mm, with huge, rounded ears. Upper parts gray or gray-brown; belly pale gray-brown, throat and hair at base of ears very pale gray or white. Ears almost naked, joined by a low band across top of head. Face naked, nose leaf small, chin groove bordered by rows of tiny, round warts. Tail short, less than half the length of long tail membrane.

Forearm and feet naked, calcar longer than foot.

**Distribution:** Honduras to Bolivia, NE Argentina and E Brazil. Common in lowland Panama, wide distribution, lowlands to 650 m.

**Ecology:** Groups of 6-10 have been found roosting in arboreal termite nests, as well in hollow trees. It flies in the understory foraging for gleaning insects, mainly beetles, cicadas, sometimes it can eat fruits and small vertebrates.

***Phyllostomus discolor*** (Wagner, 1843); Pale Spear-nosed Bat

*Description:* Medium sized, muscular, 26-51 g, forearm 60-68 mm. Upper parts gray-brown, brown or less commonly orange, often flecked with whitish hairs. Under parts noticeably paler than upper parts. Fur short and sleek. Ears triangular, tips pointed, sometimes held curled back. Chin groove bordered by conspicuous beadlike warts. Calcar shorter than foot.

*Distribution:* Mexico, through Central America to N Argentina, SE Brazil and Paraguay. Common in lowland Panama, possibly throughout the country, lowlands to 1,200 m.

*Ecology:* Roosts in hollow trees, occasionally in caves. Groups of 400 individuals are composed of small harems and small all male clusters. It frequently feeds on nectar, but also eats insects and fruits.

***Glossophaga soricina*** (Pallas, 1766); Common Long-tongued Bat (photo 4)

*Description:* Small sized, 7-12 g, forearm 33-38 mm. Upperparts reddish brown to gray brown, under parts paler, gray-brown with pale frosting. Fur bicolor, base of hairs whitish. Muzzle elongated; lower jaw almost the same length as upper jaw. Tongue very long and narrow. Nose leaf rather small. Chin groove bordered by narrow pads with serrated edges (appears warty). Four lower incisors present, in contact with each other, forming a smooth-looking row. Four upper incisors small, almost equal in size, procumbent. Tail short, about 1/3 length of naked tail membrane. Forearm and legs naked; wings attach to ankles.

*Distribution:* Mexico, through Central America to S Peru, SE Brazil and N Argentina. Abundant in lowland Panama, lowlands to 1,200 m.

*Ecology:* Roosts in small to large groups in caves, hollow trees, tunnels, and buildings. It flies in the understory. Its diet varies with season, feeding primarily on nectar and pollen in the dry season and moths and fruits in the wet season.

***Carollia castanea*** (H. Allen, 1890); Chesnut Short-tailed Bat (photo 5)



*Description:* Small sized, 11-16 g, forearm 34-38 mm. Upper parts reddish brown, deep chestnut, or dull brown, rarely grayish; under parts slightly paler. Fur about 6 mm long faintly tricolor, dull brown at base. Muzzle rather short, with a large central wart on chin bordered by “U” shaped row of smaller warts. Tail short, about 1/3 length of naked tail membrane. Forearms naked and wings attach to ankles.

*Distribution:* W Honduras to Venezuela, Bolivia and W Brazil. Common in lowland Panama, widely distributed, lowlands to 1,000 m.

*Ecology:* Roosts in caves, tunnels, and hollow trees. It prefers to fly in the understory. It feeds mainly on *Piper* fruits in the dry season and other fruits in the wet season, sometimes it feeds on insects.

***Carollia perspicillata*** (Linnaeus, 1758); Seba’s Short-tailed Bat (photo 6)

*Description:* Small sized, 15-25 g, forearm 41-45 mm. Upper parts gray-brown, dull brown, or bright orange; under parts slightly paler. Fur rather short (5-6 mm), tricolor, brownish at base, usually not contrasting sharply with whitish middle, tips gray-brown. Ears medium sized, tips pointed. Muzzle short, with a large central wart on chin bordered by “U” shaped row of smaller warts. Tail short, about 1/3 length of naked tail membrane. Base of forearms lightly haired with very short hair. Wings attach to ankles.

*Distribution:* Mexico, through Central America and N South America to SE Brazil and Paraguay. Abundant in lowland Panama, and uncommon or rare above 900 m.

*Ecology:* Roosts in caves, tunnels, and hollow trees and logs, buildings, and under bridges. Groups are usually small, but may number up to 1,000. Larger roosts are arranged into clusters of bachelor males and clusters of females with a single territorial male. It prefers to fly in the understory. Its diet consists of fruits and flowers from diverse plant species, mainly *Piper* and *Cecropia*.

***Sturnira lilium*** (E. Geoffroy St.-Hilaire, 1810); Little Yellow-shouldered Bat

*Description:* Small and stocky, 13-18 g, forearm 37-42 mm. Upper parts usually orange-brown, sometimes grayish or bright orange; shoulder patches deep yellow, orange, or dark red (patches present in large adult males); under parts paler than upper parts. Fur short (3-5 mm) and velvety. Muzzle blunt, forehead rounded. Ears and nose leaf short. Tail membrane greatly reduced, well haired; legs muscular; well haired on inner edge, sparsely haired over knees and on adjoining wing membrane. Forearms thinly haired on upper and lower surface.

*Distribution:* Mexico, through Central America to N Argentina, Uruguay and E Brazil. Abundant on dry and semideciduous lowland forest in Panama, as well as in fruit plantations, lowlands to 1,250 m.

*Ecology:* Roosts occasionally in caves, tunnels, and under bridges. It flies in the understory and canopy forest. It feeds on fruits of *Piper*, Melastomataceae and Solanaceae, and in occasions on nectar and pollen.

***Artibeus watsoni*** (Thomas, 1892); Thomas' Fruit-eating Bat

*Description:* Small sized, 9-15 g, forearm 35-41 mm. Upper parts gray-brown or tan, under parts slightly paler. Fur rather long and fluffy (6-7 mm on upper back), faintly tricolor. White facial stripes usually prominent, edges slightly uneven. Ears and nose leaf pale brown; base of ears sometimes edge white, cream, or less commonly yellow.

*Distribution:* Mexico, through Central America to Colombia, and possibly in Ecuador and Peru. Common in lowland wet forests in Panama and middle elevations to 1,500 m.

*Ecology:* Roost in small groups in tents made from modified leaves of *Anthurium*, *Heliconia*, banana, bifid and palmate palms and cyclanths. This species seems to be an obligate tent-maker. It flies in the canopy level, with frugivory diet, including *Ficus* y *Cecropia*.

***Artibeus phaeotis*** (Miller, 1902); Pygmy Fruit-eating Bat

*Description:* Small sized, 9-15 g, forearm 35-40 mm. Upper parts sandy brown or gray brown; under parts slightly paler. Fur moderately short and smooth (4-6 mm on upper back), faintly tricolor. White facial stripes crisply outlined, usually prominent. Ears and nose leaf pale brown, sides clearly edged yellow or rarely white.

*Distribution:* Mexico, through Central America to Ecuador and Guyana. Common on lowland dry forest in Panama and uncommon on elevations, mainly in central and Caribbean region, lowlands to 1,200 m.

*Ecology:* Roosts in tents made from modified palm, banana and *Heliconia* leaves. It flies in the canopy level of the forest, with frugivory diet, including *Ficus*, *Cecropia* and *Spondias*, occasionally consumes pollen and insects.

***Artibeus jamaicensis*** (Leach, 1821); Jamaican Fruit Eating Bat (photo 7)

*Description:* Large and stocky, 29-51 g, forearm 55-67 mm. Upper parts gray or gray-brown; under parts paler, tips of hairs frosted with white or pale gray. Fur short and velvety. Facial stripes usually narrow and indistinct, rarely bold. Muzzle short and broad. Upper surface of tail membrane and legs nearly naked.

*Distribution* Mexico, through Central America to Ecuador and Venezuela, and the Antilles. This species is common in lowland forests in Panama, with wide distribution, including islands, lowlands to 1,700 m.

*Ecology:* Roosts in caves, tunnels, hollow trees, bridges, and in foliage. This species form harems of a single male and 4-11 females. The male defends its roosts against other males. This abundant bat is lunar phobic, being less active or inactive around full moon. This bat uses both the understory and the canopy, foraging for fruits, mainly *Ficus*. It is one of the best-studied bat species in tropical America.

***Artibeus intermedius*** (Davis, 1984); Intermediate Fruit-eating Bat (photo 8)

*Description:* Large and stocky, 40-54 g, forearm 61-69 mm. Fur usually golden brown (blonde to dark brown); under parts not frosted. Fur rather short and

velvety. Facial stripes usually distinct, sometimes faint, upper stripes broader than lower stripe. Muzzle short and broad. Upper surface of tail membranes and legs well haired.

*Distribution:* Mexico through Central America to N South America, common in all type of lowland forests. Its distribution in Panama is unknown, lowlands to 1,700 m, it seems more common in middle elevations.

*Ecology:* Roosts singly or in small groups near the mouth of caves or in shaded crevices of cliffs, or under foliage. It flies mainly in the canopy level foraging for fruits.

***Artibeus lituratus*** (Olfers, 1818); Great Fruit-eating Bat

*Description:* Very large and stocky, with powerful, broad shoulder, 53-73 g, forearm 69-78. Upper part brown (yellow-brown, tan, or dark brown); under parts gray-brown, fur not frosted. Fur rather short and velvety. White facial stripes usually distinct, sometimes faint; upper stripes broader than lower stripe. Muzzle short and broad. Upper surface of tail membrane and legs well haired.

*Distribution:* Mexico, through Central America to Brazil, N Argentina and Bolivia, as well the Lesser Antilles. Abundant in Panama in the lowland forest and middle elevations, wide distribution, lowlands to 1,700 m.

*Ecology:* Roosts in caves, tunnels, hollow trees, and foliage. Groups appear to be composed of a single dominant male and several females. These bats fly in the canopy level, foraging for fruits, mainly *Ficus* and *Dipteryx*.

***Platyrrhinus helleri*** (Peters, 1867); Heller's Broad-nose Bat

*Description:* Fairly small, 11-21 g, forearm 37-41 mm. Upper parts pale to dark brown or reddish brown; hairs bicolor, pale at base; prominent white back stripe extends from crown to rump. Upper white facial stripe distinct extends just beyond front of ear, lower facial stripe less prominent. Ears and nose leaf edged with cream or white. Muzzle broad and relatively elongated. Tail membrane short, "V" shaped, fringed with whitish hair.

*Distribution:* Mexico, through Central America to Bolivia and Amazonian Brazil. Abundant in Panamanian lowland forests, wide distribution, lowlands to 1,200 m.

*Ecology:* Roosts in small groups in caves, buildings, tunnels, and among foliage. This species fly at the canopy level while foraging for fruits to eat, mainly *Ficus*, *Cecropia*, and *Acnistus*.

***Uroderma bilobatum*** (Peters, 1866); Common Tent-making Bat

*Description:* Medium sized, 13-20 g, with forearm of 40-44 mm. Upperparts dark gray or gray-brown, hairs bicolor, pale at base; narrow, whitish back stripe extends from back of head or neck to rump. Underparts gray-brown. White facial stripes prominent above and below eye. Ears and noseleaf brown, prominent edged with yellow or white. Muzzle relatively long and broad. Tail membrane relatively long (14-16 mm), "U" shaped, nearly naked on upper surface and entirely naked along its edge.

*Distribution:* Mexico, through Central America to Peru, Bolivia and E Brazil. Abundant in Panamanian lowland forests, lowlands to 1,500 m.

*Ecology:* Roosts in groups of 2-59 in tents made from modified leaves. This species makes a variety of tent types and appears to be an obligate tent rooster. It favors large, single leaves of bananas, pinnate palms, among others. The bat's prominently striped face may function as disruptive camouflage inside a tent with multiple leaflets. It flies mainly at the canopy level and its diet consists of fruits.

***Desmodus rotundus*** (E Geoffroy St.-Hilaire, 1810); Common Vampire Bat

*Description:* Moderately large, 19-43 g, forearm 53-65 mm. Upperparts usually gray-brown, sometimes orangish; underparts gray-brown, well frosted with white, sharply demarcated from upperparts. Fur short, coarse, and shiny. Ears triangular, length greater than width. Eyes relatively small. "M" shaped nosepad above nostrils. Upper incisors long and pointed. Tail membrane reduced to a narrow "U" shaped band, lightly haired. Wind membranes blackish, leading

edge often white, wind tips sometimes pale, but not white. Forearms nearly naked. Thumbs very long, with 2 well developed pads on underside near base.

*Distribution:* Mexico, through Central and South America to Chile and N Argentina. Most numerous in cattle country in Panama, uncommon to rare in mature forest, lowlands to 1,750 m.

*Ecology:* Roosts in caves, sink holes, mines, and hollow trees during the day, sometimes in numbers of up to 2,000. This bat has long wings and is a fast flier, but is also agile on the ground. The long, well-developed thumbs and large hind feet enable it to walk, run, and jump with great dexterity. The common vampire feeds on vertebrate blood, and seems to favor blood of large mammals, including humans. Several individuals may feed from the same bite. Anticoagulants in the saliva result in a tell-tale streak of blood on the victim. Females roost in stable groups of 8-12 and cooperate with one another, if one fails to eat, the others will feed her by regurgitating part of their meal. Breeding may occur year-round. These bats are vectors of rabies and other diseases.

## Order Primates

### Family Cebidae

***Cebus capucinus*** (Linnaeus, 1758); White-faced Capuchin (photo 9)

*Description:* Medium sized, 1.8-4.0 kg. Mostly black, with contrasting yellow-cream fur on head, chest, and shoulders. Face pink. Tail prehensile.

*Distribution:* W Honduras to W Ecuador. Locally abundant throughout Panama, lowland to 1,800 m.

*Ecology:* This species showed aggressive behavior when encounter in the forest. This monkey is diurnal and arboreal, its activity starts at first light, about 30 minutes before dawn. It is most active in the morning and late afternoon. This monkey uses all levels of the forest, and travels on the ground to cross open areas, drink, or forage. The diet consists of ripe fruits, flowers, insects, small vertebrates, and bird eggs. Calls include growls, barks, whines,

screams, and chatters. Group size ranges from 5-30, large group disperse widely to forage. The white-faced monkey is used as food by some indigenous groups and as pet by campesinos.

#### Family Atelidae

##### ***Alouatta palliata*** (Gray, 1849); Mantled Howler Monkey

*Description:* Large and stocky, 3.6-7.6 kg. Mainly black, with long, yellowish fur on the sides of the body (yellow mantle may be reduced or absent in parts of Panama). Head large; face naked and black, bearded. Long, prehensile tail with naked pad on underside near tip. Adult male larger than female, with longer beard and a prominent, white scrotum.

*Distribution:* Mexico, possibly S Guatemala; Honduras to Colombia. Locally abundant throughout Panama, lowlands to 1,600 m.

*Ecology:* This primate produces powerful calls. It is diurnal and arboreal and is slow-moving and spends a good deal of time resting or asleep during the day. The mantled howler lives in groups of 10-20 or more. The diet consists mainly of young leaves, but also eats flowers and fruits. It is one of the best studied New World monkeys.

#### Order Carnivora

#### Family Procyonidae

##### ***Nasua narica*** (Linnaeus, 1758); White-nosed Coati

*Description:* Medium sized, 3.0-7.0 kg. Body dark brown, reddish orange, or yellow-brown; grizzled with cream on shoulders. Throat, spots above and below eyes, and lower portion of muzzle whitish, muzzle very long and snout mobile. Legs and feet with long and strong claws.

*Distribution:* SW United States, through Mexico and Central America to E Panama and N Colombia. Locally abundant throughout Panama in mature and disturbed forest, lowlands to 3,000 m.

**Ecology:** Mainly diurnal, both terrestrial and arboreal. It lives in stable groups of 10 or more that are composed of females, juveniles, and young males. Adult males are solitary, except during the breeding period. The diet is omnivore, feeds on invertebrates found in the leaf litter and under rotting logs, sometimes small vertebrates and fruits.

***Potos flavus*** (Schreber, 1774); Kinkajou

**Description:** Medium sized, 2.0-4.6 kg. Upperparts usually golden brown, less commonly pale gray-brown or dark brown. Underparts creamy yellow or orangish. Head broad; muzzle short and blunt. Tongue long and narrow. Ears short and rounded, on sides of head. Prehensile tail long and tapered, tip dark brown (some in Panama have a small white tip). Males have a bare patch on the throat and is larger than female.

**Distribution:** Mexico, through Central America to S Brazil. Common in mature and disturbed forest in Panama, lowlands to 2,200 m.

**Ecology:** This species is the most commonly seen nocturnal, arboreal mammal in Central America. It can hang freely from the tail. Although primarily nocturnal and arboreal, it sometimes descends to the ground and is occasionally active during the day. Daytime dens are in tree holes or on crotches of trees. Calls include whistles, screams, grunts, and barks. This species is an important seed disperser of several forest trees and probably also acts as a pollinator. Fruits make up most of the diet; figs and hog plums (*Spondias mombin*), complemented with nectar (e.g. balsa *Ochroma pyramidale*). Sometimes insects and small vertebrates are taken.

***Procyon lotor*** (Linnaeus, 1758); Northern Raccoon

**Description:** Medium sized, 3.3-7.8 kg. Back arched, rump higher than shoulders. Upperparts grizzled gray-brown; underparts buff. Ears edge white. Face with distinctive black mask extending onto cheeks, bordered by white eyebrows. Tail clearly ringed orangish and black.



**Distribution:** S Canada and United States through Mexico to C Panama. Locally common in W and C Panama, lowlands to 1,800 m.

**Ecology:** This is a solitary, terrestrial, and nocturnal animal. During the day it sleeps in hollow trees, under rocks, in burrows, or in buildings. It is usually associated to wetlands. Its omnivore diet includes invertebrates (crabs and cryfish), vertebrates (fish, frogs, turtle eggs, birds and bird eggs), fruits, seeds, vegetables, and garbage.

#### Family Mustelidae

***Lontra longicaudis*** (Olfers, 1818); Neotropical River Otter

**Description:** Large sized, 5.0-9.5 kg. Long, stocky body and short legs. Upperparts brown, paler on sides; underparts cream-colored. Fur short and shiny. Head small with a short, broad muzzle and small ears. Tail long and tapered, and thick at base. Feet broad, toes webbed.

**Distribution:** Mexico, through Central America to N Argentina and Uruguay. Uncommon in Panama, but it seems to be present in most rivers, lowlands to 1,800 m.

**Ecology:** Semiaquatic and mainly diurnal. It dens in burrows on banks; the entrance may be above or below the water level. This animal is always near water, it is a good swimmer, but moves awkwardly on land. Feces are usually deposited in a prominent position on a rock and are characterized by a large proportion of invertebrate exoskeleton. The diet is mainly fish, mollusk, and crustaceans, small mammals and birds are occasionally taken.

***Eira barbara*** (Linnaeus, 1758); Tayra

**Description:** Large, 3.0-6.0 kg, long-legged weasel with a long, bushy tail. Body, legs, and tail blackish brown, head and neck dark gray-brown, slightly paler than body; usually with a white diamond on the throat. Feet large, with long, powerful claws.

**Distribution:** Mexico, through Central America to Bolivia and N Argentina. Uncommon in Panama, but it shows a wide distribution, lowlands to 2,400 m.

*Ecology:* Mainly diurnal, sometimes crepuscular, terrestrial and arboreal. It travels in singly or in pairs. At night tayras den in hollow trees or in burrows. If alarmed on the ground, it gives a sharp snort, races to a tree, and climbs partway up. The diet includes fruit, invertebrates, small and medium sized mammals, and lizards.

***Conepatus semistriatus*** (Boddaert, 1784); Striped Hog-nosed Skunk (photo 10)

*Description:* Large and stocky, 1.4-3.5 kg. Body black with 2 narrow, white stripes from forehead to upper rump; stripes are separated by a thin black line down spine. Large, naked, piglike snout. Tail black at base, then white.

*Distribution:* Mexico to W Panama; Venezuela to Peru and E Brazil. Rare in Panama, possibly with wide distribution, but reports are mainly from W Panama, lowlands to 1,600 m.

*Ecology:* They are mainly found in disturbed areas, terrestrial, and nocturnal, although they can be active also during the day. They rest by day in burrows or under tree falls. If alarmed, they lift the tail and spread urine. They walk smelling, scratching, and foraging their preys in the ground. The diet mainly includes invertebrates, some small vertebrates and possibly fruits are also eaten.

Family Felidae

***Leopardus pardalis*** (Linnaeus, 1758); Ocelotb (photo 11)

*Description:* Largest of the small spotted cats, 7.0-14.5 kg. Upperparts, sandy brown to pale yellow, patterned with black rosettes or long ovals with tawny brown centers. Underparts white with black spots. Tail narrow, not bushy; shorter than hind legs. Eyes medium sized, yellowish. Feet large, forefoot broader than hind foot.

*Distribution:* S Texas, United States, through Mexico and Central America to N Argentina. Common in all types of forests in Panama, lowlands to 2,200 m.

*Ecology:* Mainly nocturnal or crepuscular. Solitary and terrestrial. They hunt and capture their preys in the ground, rarely climbing a tree, but for resting or crossing a river. When they are active by day they remain hidden in the dense vegetation. Sometimes they are predated by jaguars. The diet mainly includes small and medium sized mammals (mice to sloth), but sometimes iguanas, snakes, and birds are eaten. It is included in CITES Appendix I in Panama.

## Order Artiodactyla

### Family Tayassuidae

***Tayassu tajacu*** (Linnaeu, 1758); Collared Peccary (photo 12)

*Description:* Medium sized, 12-26 kg. Large, triangular head, stocky body, and thin legs. Coarse fur is grizzled, dark gray-brown, with a cream-colored collar from shoulders to chest. Young paler, pinkish.

*Distribution:* SW United States through Mexico and Central America, NW Peru and N Argentina. Wide distribution, common in Panama where it has not been extirpated by hunting, lowlands to 2,200 m.

*Ecology:* Active by day or night. When resting, groups shelter in abandoned burrows or in caves. Gregarious, they form herds of 2-50, but they are usually 15 or fewer. Herds have large home range, averaging 118 hectares. The diet consists mainly of fruits and seeds, sometimes vegetable matter, roots, and few invertebrates are eaten.

### Family Cervidae

***Odocoileus virginianus*** (Zimmermann, 1780); White-tailed Deer (photo 13)

*Description:* Large sized, slim, 27-40 kg, with long legs, a flat back, and a long narrow head. Upperparts gray-brown to orange-brown (darker, red-brown in C Panama), underparts white. Males have antlers that renew every year. Tail edge and underside white. Young reddish brown with white spots and stripes.

*Distribution:* S Canada and United States through Mexico and Central America to Bolivia, Guyanas and N Brazil. Common in Panama where it has not

extirpated by hunting, lowland to 2,200 m. It has not been reported in the Caribbean region of Veraguas and Colon, neither in E Panama (Darien and San Blas).

*Ecology:* Active by day or night, solitary or in small groups. It is mainly found at forest edges or grasslands, as well as cultivated fields. When disturbed, it gives a sharply exhaled whistling snort, raises and fans out the tail to expose the white flag. During the breeding season, males mark with urine the territory of females which they are going to reproduce. They are prey of jaguars, pumas, and coyotes. The diet includes leaves and twigs, fruits and nuts.

## Order Rodentia

### Family Sciuridae

***Sciurus granatensis*** (Humboldt, 1811); Red-tailed Squirrel

*Description:* Medium sized, 212-538 g. Upperparts dark brown, with a bright orange or orange-frosted tail. Coloration variable: belly deep orange, tail bright orange with a black tip (C Panama) or sometimes with a black line from midback to tail base (E Panama). Ears medium sized. Larger and more thickly-furred at higher elevations.

*Distribution:* N Costa Rica to Ecuador and N Venezuela. Abundant in Panama, wide distribution, lowlands to 2,250 m.

*Ecology:* Diurnal and arboreal squirrel and uses all levels of the forest but seems to spend more time in the ground than other tree squirrels. This species is usually solitary and territorial and occupies a home range of 1-4 hectares. The diet includes large and hard seeds of *Dipteryx panamensis* or palms, soft fruits, and sometimes bark and fungus are also eaten. Nuts are often carried away and stored on the ground, fruits are sometimes cached in trees.

***Sciurus variegatoides*** (Ogilby, 1839); Variegated Squirrel

*Description:* Large sized, 447-909 g. Extremely variable, all but the black form have tails thickly edged with white or cream. There are at least 8 distinct color patterns and several intermediate forms.

*Distribution:* Mexico to C Panama. Abundant in C and W Panama, mainly in the Pacific slope, lowlands to 2,500 m.

*Ecology:* Diurnal and arboreal squirrel, form pairs and is territorial. This squirrel is more common in dry forest and open fields. This species dens in tree holes and constructs leaf nests on branches. Nest consists in clusters of leaves and dry small branches. The diet consists of soft fruits, including mangoes, guava and guacimo, sometimes flowers and seeds, and nuts are also eaten. Among its predators, besides carnivores, are white-faced monkeys.

Fam Geomyidae

***Orthogeomys cavator*** (Bangs, 1902); Chiriqui Pocket Popher

*Description:* Fairly large, 470-908 g. Head broad with rounded snout, facial hairs short and pale, ears short, and small eyes. Tail short and naked. Muscular feet with well developed curved and pointed claws. Upperparts blackish brown, underparts gray-brown, fur dense and coarse.

*Distribution:* S Costa Rica to W Panama. This species has been only reported for Chiriqui and the mountains of Veraguas. Locally common in open and cultivated fields, lowlands to 2,500 m.

*Ecology:* This is a fossorial species, which as the other members of the genus should be solitary, except during the breeding season. It builds a network of subterranean tunnels and the amount of soil excavated is accumulated in the surface as mounds, which show their presence. They have a good sense of smell, but a poor sight and hear sense. The diet includes tubers and roots, as well as agricultural crops. In agricultural areas it is considered as a pest.

Family Heteromyidae

***Heteromys desmarestianus*** (Gray, 1868); Forest Spiny Pocket Mouse (photo 14)

*Description:* Medium sized, 46-87 g. Upperparts blackish-brown, frosted with yellow-brown hairs, and underparts white. It has cheek pouches. Tail bicolor, with visible scales. Soles of hind feet naked.

*Distribution:* Mexico, through Central America NW Colombia. In Panama, this species has been mainly reported in the W Caribbean slope, Chiriqui, C Panama, and Darien. It is common in wet forest, lowlands to 2,400 m.

*Ecology:* Nocturnal and terrestrial mouse. This mouse makes burrows under tree roots or in open areas on the forest floor. Nests are located in burrows or under logs. The diet includes palm nuts, other seeds, fruits and insects. Seeds may be stored in burrows or in caches above the ground. These mice live longer than many rodents of similar size, and some may survive until 3 years in the wild.

#### Family Muridae

***Oryzomys talamancae*** (J. A. Allen, 1899); Talamanca Rice Rat

*Description:* Medium sized, 47-74 g. Back tawny brown, grading to pale or deep orange on sides; underparts grayish white. Fur thick, smooth, and shiny. Ears brown, almost naked. Tail faintly bicolor, almost naked. Feet long and narrow, tops white; hairs extend over claws of hind foot.

*Distribution:* S Costa Rica to Ecuador and N Venezuela. Common in Panama, wide distribution, lowlands to 1,000 m.

*Ecology:* This rice rat is nocturnal and terrestrial. It is associated to logs, rocks or to the base of large trees. The diet includes seeds, fruit, and insects.

#### Family Erethizontidae

***Coendou rothschildi*** (Thomas 1902); Rothschild's Porcupine

*Description:* Medium sized, 2 kg. Entirely spiny. Spines are blackish in midsection with pale yellow tips and are evenly spaced over the body. Eyes rather small, nose pink, bulbous. Tail prehensile, broad at base.

*Distribution:* Endemic, it has been only reported for Panama. Uncommon lowland mammal, wide distribution, except Caribbean slope of W Panama.

**Ecology:** Nocturnal and arboreal animal. It is found mainly in mature or late secondary forest. When alarmed, it lifts its long and pointed dorsal spines, which can easily detach from its body. Because of its penetrating and irritating condition, spines can cause pain and hurt to predators. The diet consists of fruit, leaves, and barks.

#### Family Agoutidae

***Agouti paca*** (Linnaeus, 1766); Paca (photo 15)

**Description:** Large and stocky; piglike, 5-12 kg. Upperparts reddish brown, marked with rows of white spots; underparts white. Legs short, 4 toes on forefoot, 5 toes on hind foot.

**Distribution:** Atlantic slope of Mexico, through the Yucatan Peninsula and Central America to Paraguay and S Brazil. Common in Panama, wide distribution, lowlands to 2,000 m.

**Ecology:** It is strictly nocturnal, terrestrial, and solitary. It lives in dens and small spaces inside tree roots. Dens have more than one entrance and one of these is always near a river, which is used to escape from predators. It is a good swimmer. If alarmed, it can produce deep barks and ominous grinding sounds. The diet includes fruit, seeds, and young plants. In Panama, the paca is under a heavy hunting pressure because of its good meat.

#### Family Dasyproctidae

***Dasyprocta punctata*** (Gray, 1842); Central American Agouti (photo 16 y 16b)

**Description:** Medium sized, 2-4 kg. Orange-brown with a rounded back and long, skinny legs. Color varies from entirely yellowish or orange, finely grizzled with black, to dark brown foreparts. Rump hairs long, sometimes erected into a fan. Ears naked, pinkish, with rounded tips.

**Distribution:** Mexico through Central America to S Bolivia and N Argentina. Common in Panama, mainly in lowlands, wide distribution, lowlands to 2,400 m.

**Ecology:** It is diurnal, terrestrial, form couples. It sleeps in hollow logs, under buttress roots, rocks, or in tangles of vegetation. When food is abundant, it carries seeds away and buries them for future use, depositing each seed in different place. Since not all seeds are recovered, this rodent is an important seed disperser. The diet consists mainly of seeds (*Dipteryx panamensis*) and fruits; small amount of plant material and fungi are included. This species is also under heavy hunting pressure.

#### Order Lagomorpha

#### Family Leporidae

#### ***Sylvilagus brasiliensis*** (Linnaeus, 1758); Forest Rabbit

**Description:** Small sized, 0.68-1.25 kg, with an inconspicuous tail and relatively short ears. Underparts buffy-orange grizzled with black, small orange patch on nape, legs and feet orange-brown. Throat orangish, belly whitish with gray underfur.

**Distribution:** Mexico, through the wetter parts of Central America (except El Salvador) to Peru, Bolivia, S Brazil and N Argentina. Common in Panama, mainly in open fields, lowlands to 1,000 m.

**Ecology:** This rabbit is mainly nocturnal, terrestrial, and solitary. During the day it rests under logs, rocks, or in dense cover. The female builds above-ground nests of dry grass, with a central chamber and several small chambers at the end of the runway system. When feeding it can often be approached closely. If discovered it will remain motionless for some time and then dash to a nearby shelter. The diet consists mainly of short grass, twigs, and seedlings.

#### **Discussion**

The survey of terrestrial mammals of Bahía Honda suggests that this region might have a high diversity of wild mammals. This mammal community is



composed of species with wide distribution in the country and others with restricted distribution. We recorded a total of 45 species of mammals, included in 22 families and 8 orders. This species richness represents 18% of the total species reported for Panama. The dominance pattern of orders in number of species was similar to the pattern of total species for the country (Panama). Bats (Chiroptera) were the dominant group, following by rodents (Rodentia), and carnivores (Carnivora) (Table 1). Within bats, the family Phyllostomidae was the most diverse both in number of species and feeding habits (e.g. insectivore, nectarivore, frugivore, and sanguivore). The frugivore bat genus *Artibeus*, was the dominant in number of species (5 spp.).

The comparison of Bahía Honda with other lowland sites in terms of species richness showed similar values, except for island sites (Table 1). Both the surveys of the lowland site of the proposed Altitudinal Biological Corridor of Gualaca (Chiriquí) and Parque Natural Metropolitano (Panama) show similar species richness to Bahía Honda. However, species richness for Parque Nacional Coiba (PNC) (Veraguas) is lower than other sites, whereas species richness for Barro Colorado Island (BCI) (Canal Area) shows higher values than other sites (Table 1). Sites with similar diversity reported similar sampling effort. The lower diversity of PNC might result in part of the island isolation. For BCI, mammalian studies began during the 1920s, and for some groups, such as bats, long term monitoring has been carried out for several years. Results from BCI indicate that more intense sampling effort is needed, specially with bats and rodents, in order to survey most of the species present in the compared sites.

Among the mammals recorded in Bahía Honda, we found one endemic species, Rothschild's porcupine (*Coendou rothschildi*), as well as two rare species in the country, naked-tailed armadillo (*Cabassus centralis*) and striped hog-nosed skunk (*Conepatus semistriatus*). We also recorded some species of hunting value, such as the Central American agouti (*Dasyprocta punctata*),

*paca* (*Agouti paca*), collared peccary (*Tayassu tajacu*) and white-tailed deer (*Odocoileus virginianus*), which can locally be exterminated by overexploitation. Species such as the ocelot cat (*Leopardus pardalis*) are of high conservation concern for Panama due to the fact that they are threatened by habitat loss and hunting. The presence of the vampire bat (*Desmodus rotundus*) is of sanitary concern, because when feeding on mammal blood, it can transmit diseases, such as rabies, to domestic animals and humans.

With regard to zoogeography, studies in Bahía Honda might bring information that will contribute to the understanding of climatic, vegetation, and topographic changes that have occurred in Panama since the Pliocene. The presence of species such as the bat *Artibeus phaeotis* and rodents *Orthogeomys cavator* and *Heteromys desmarestianus*, which have not been reported in the Pacific slopes of Veraguas, support the above statement. Although detailed studies on these species are needed, their presence suggest the previous existence of a connection between the coastal forests and the more inland forest. Remnants of Pacific wet forest might function as refuge of forest species that dispersed 3 Mya through the Panamanian land bridge. It is expected that with additional studies the number of mammal species recorded for Bahía Honda will increase, as well as contribute to the ecological knowledge and conservation of Panamanian species.

#### LIST OF MAMMAL SPECIES IN THE BAHÍA HONDA REGION

Order Didelphimorphia

Family Didelphidae

***Caluromys derbianus*** (Waterhouse, 1841)

***Didelphis marsupialis*** (Linnaeus, 1758)

***Chironectes minimus*** (Zimmermann, 1780)

***Metachirus nudicaudatus*** (E. Geoffroy St.-Hilaire, 1803)

***Philander opposum*** (Linnaeus, 1758)

Order Xenarthra

Family Myrmecophagidae

***Tamandua mexicana*** (Saussure, 1860)

Family Megalonychidae

***Choloepus hoffmanni*** (Peters, 1859)

Family Bradypodidae

***Bradypus variegatus*** (Schinz, 1825)

Family Dasypodidae

***Cabassus centralis*** (Miller, 1899)

***Dasypus novemcinctus*** (Linnaeus, 1758)

Order Chiroptera

Family Mormoopidae

***Pteronotus parnelli*** (Gray, 1843)

Family Phyllostomidae

***Tonatia silvicola*** (D'Orbigny, 1836)

***Phyllostomus discolor*** (Wagner, 1843)

***Glossophaga soricina*** (Pallas, 1766)

***Carollia castanea*** (H. Allen, 1890)

***Carollia perspicillata*** (Linnaeus, 1758)

***Sturnira lilium*** (E. Geoffroy St.-Hilaire, 1810)

***Artibeus watsoni*** (Thomas, 1892)

***Artibeus phaeotis*** (Miller, 1902)

***Artibeus jamaicensis*** (Leach, 1821)

***Artibeus intermedius*** (Davis, 1984)

***Artibeus lituratus*** (Olfers, 1818)

***Platyrrhinus helleri*** (Peters, 1867)

***Uroderma bilobatum*** (Peters, 1866)

***Desmodus rotundus*** (E. Geoffroy St.-Hilaire, 1810)

Order Primates

Family Cebidae

***Cebus capucinus*** (Linnaeus, 1758)

Family Atelidae

***Alouatta palliata*** (Gray, 1849)

Order Carnivora

Family Procyonidae

***Nasua narica*** (Linnaeus, 1758)

***Potos flavus*** (Schreber, 1774)

***Procyon lotor*** (Linnaeus, 1758)

Family Mustelidae

***Lontra longicaudis*** (Olfers, 1818)

***Eira barbara*** (Linnaeus, 1758)

***Conepatus semistriatus*** (Boddaert, 1784)

Family Felidae

***Leopardus pardalis*** (Linnaeus, 1758)

Order Artiodactyla

Family Tayassuidae

***Tayassu tajacu*** (Linnaeus, 1758)

Family Cervidae

***Odocoileus virginianus*** (Zimmermann, 1780)

Order Rodentia

Family Sciuridae

***Sciurus granatensis*** (Humboldt, 1811)

***Sciurus variegatoides*** (Ogilby, 1839)

Family Geomyidae

***Orthogeomys cavator*** (Bangs, 1902)

Family Heteromyidae

***Heteromys desmarestianus*** (Gray, 1868)

Family Muridae

***Oryzomys talamancae*** (J. A. Allen, 1899)

Family Erethizontidae

***Coendou rothschildi*** (Thomas 1902)

Family Agoutidae

***Agouti paca*** (Linnaeus, 1766)

Family Dasyproctidae

***Dasyprocta punctata*** (Gray, 1842)

Order Lagomorpha

Family Leporidae

***Sylvilagus brasiliensis*** (Linnaeus, 1758)

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Table 1. Comparison of terrestrial mammal species richness by total and by taxonomic order reported for Bahía Honda and other lowland sites in Panama.

Order	Site				
	Bahía Honda	Parque Nacional Coiba <sup>1</sup>	Parque Natural Metropolitano <sup>2</sup>	Corredor Altitudinal de Gualaca <sup>3</sup> (0-200 m)	Isla Barro Colorado <sup>4</sup>
Didelphimorphia	5	3	2	1	6
Xenarthra	5	-	6	5	6
Chiroptera	15	30	17	20	66*
Primates	2	2	2	3	5
Carnívora	7	-	9	9	12
Artiodactyla	3	2	1	2	4
Perissodactyla	-	-	-	-	-
Rodentia	7	1	7	5	17
Lagomorpha	1	-	1	1	1
Total	45	38	45	46	117

<sup>1</sup>Ibañez, C.; J. Pérez-Jordá; J. Juste, & A. Guillén. 1997. Los Mamíferos Terrestres del Parque Nacional de Coiba (Panamá). Pp. 469-484. In: S. Castroviejo & M. Velayos (Eds.) Flora y Fauna del Parque Nacional de Coiba (Panamá). Agencia Española de Cooperación Internacional, Madrid.

<sup>2</sup>Samudio, R., R. Samudio, Jr. & M. Aguirre. 1998. Componente de Fauna Silvestre: Informe Final. Actualización del Plan de Manejo del Parque Natural Metropolitano. 47 pp.

<sup>3</sup>ANCON. 1999. Evaluación Ecológica del Propuesto Corredor Biológico Altitudinal de Gualaca – Provincia de Chiriquí, República de Panamá. Panamá. 181p.

<sup>4</sup>Glandz, W. E. 1990. Neotropical Mammals Densities: How Unusual Is the Community on Barro Colorado Island, Panama?. Pp. 287-313. In: A.H. Gentry (Eds.) Four Neotropical Rainforest. Yale University, New York.

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**LIST OF PICTURES OF MAMMALS FROM BAHÍA HONDA**

Fig. 1. *Didelphis marsupialis* (Didelphidae)

Fig. 2. *Bradypus variegatus* (Bradypodidae)

Fig. 3. *Dasypus novemcinctus* (Dasyproctidae)

Fig. 4. *Glossophaga soricina* (Phyllostomidae)

Fig. 5. *Carollia castanea* (Phyllostomidae)

Fig. 6. *Carollia perspicillata* (Phyllostomidae)

Fig. 7. *Artibeus jamaicensis* (Phyllostomidae)

Fig. 8. *Artibeus intermedius* (Phyllostomidae)

Fig. 9. *Cebus capucinus* (Cebidae)

Fig. 10. *Conepatus semistriatus* (Mustelidae)

Fig. 11. *Leopardus pardalis* (Felidae)

Fig. 12. *Tayassu tajacu* (Tayassuidae)

Fig. 13. *Odocoileus virginianus* (Cervidae)

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Fig. 15. *Agouti paca* (Agoutidae)

Fig. 16A. *Dasyprocta punctata* (Dasyproctidae)

Fig. 16B. *Dasyprocta punctata* (Dasyproctidae)

Fig. 17A. *Alouatta palliata* (Atelidae)

Fig. 17B. *Alouatta palliata* (Atelidae)

Fig. 17C. *Alouatta palliata* (Atelidae)

Fig. 18A. *Trampas*

Fig. 18B. *Trampas*