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Chapter 12

A survey of the large ground dwelling mammals of the Upper-Palumeu river region

Krisna Gajapersad

SUMMARY

During the survey of large and medium-sized mammals of the Kasikasima and Upper Palumeu regions we recorded 18 species. Camera traps were the most important tools for the survey, but direct observations were made and tracks, scat and scratch marks were also recorded. Important species such as Jaguar, Tapir and Giant river otter were recorded. All these species fulfil important roles in the ecosystem such as controlling populations and seed dispersers. The occurrence of a high diversity of large and medium-sized mammals in the surveyed area indicates that the ecosystem is healthy and relatively pristine. Southeastern Suriname is very important for large mammal species, because the area encompasses vast tracts of pristine forest and rivers. In fact, there are few places left on earth which are as pristine as Southeastern Suriname. Hunting and habitat destruction were identified as the greatest potential threats for this area.

INTRODUCTION

Large and medium-sized mammals are the most important targets for commercial and subsistence hunting for meat, skins and other parts of the body. Furthermore, large and medium-sized mammals play important roles in the ecosystem as agents of seed dispersal, animal population regulation, and habitat maintenance and modification. These important functions of large and medium-sized mammals in the ecosystem make them important indicators of the functioning of ecosystems and human pressure (Lahm and Tezi 2003). Historically humans have used animals for food and a variety of other uses (Leader-Williams et al. 1990, Milner-Gulland et al. 2001). Examples all over the world show the effects of overhunting from humans causing population decreases and extinction (Diamond 1989). Overexploitation was almost certainly responsible for historical extinctions of some large mammals and birds (Turvey and Risley 2006). Large mammals have slow reproductive rates, long development and growth times and large requirements of food and habitat, which make them more sensitive to hunting and habitat destruction (Purvis et al. 2000, Cardillo et al. 2005). Today, about 2 million people depend on wild meat for food or trade (Fa et al. 2002, Milner-Gulland et al. 2003), yet the majority of hunting is unsustainable (Robinson and Bennett 2004, Silvius et al. 2005).

Mammals as a group provide the main protein source for native Amazonian communities. Indigenous peoples have lived in Amazonia for tens of thousands of years (Redford 1992) and many, including the indigenous groups in Suriname, still remain within the forest and hunt mammals actively. In areas where they have been hunted, abundance of large mammals has decreased (Peres 1990; Cullen et al. 2000; Hill et al. 2003). Unmanaged hunting is commonplace in the Amazon and is depleting game populations, often to levels so low that local extinctions are frequent and the critical ecological roles performed by mammals are lost (Redford 1992; Bodmer et al. 1994). Overhunting then becomes a double-edged threat: to the biodiversity of the tropics and to the people that depend on those harvests for food and income. Little information is available on the occurrence, spatial variability in species richness, and sensitivity to hunting and other disturbances of medium and large mammals in Suriname, especially in the remote southern part of the country.

METHODS AND STUDY SITES

We surveyed medium- and large-bodied mammals by means of three main methods: camera trapping, searching for scat and animal tracks, and making visual and aural observations.

Camera traps were set approximately 500 meters apart along trails which were cut during the camera trap set up, on game trails and along an existing tourist trail. The Reconyx RM45 Rapidfire, Reconyx PC800 Hyperfire, Reconyx HC500 Hyperfire and the Snapshot Sniper are the four different camera models which were used for the survey. The camera traps operated day and night, photographing all ground-dwelling mammals and birds that walked in front of them. Camera traps were attached to trees approximately 30 cm above the forest floor. At the Upper Palumeu site

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(RAP Site 1) 12 camera traps were set up along one trail of approximately 5 kilometers that was cut during the set up of the camera traps. Camera traps were set up at locations where tracks and scat were found and along game trails. At Kasikasima (RAP Site 4) 14 camera traps were set up along two trails. Eight camera traps were setup along the tourist trail that leads from the tourist camp along the Palumeu river to the Kasikasima mountain and six camera traps were set up along an old trail, which leads from the second RAP camp to the Kasikasima mountain. The second trail had to be re-opened because it had not been used by local people for a long time. Cameras were placed in different habitats at each of the study sites. At the Upper Palumeu site 8 camera traps were set up in terra firme, two in swamp forest and two along dry creek beds. At the Kasikasima site 11 camera traps were set up in terra firme, two in swamp forest along creeks and one in a liana forest along the mountain. Elevations of camera trapping points at the Upper Palumeu site ranged between 278 and 407 meters and at the Kasikasima site the elevation ranged between 211 and 477 meters.

Camera trapping pictures were identified to species and independent pictures were used as single occurrences for analysis of the data obtained with the camera traps. Any photographs taken at least 30 minutes apart and photographs of different species and individuals were used as independent samples for analysis (O'Brien et al. 2003). Species accumulation curves and biodiversity indices were calculated with the software program EstimateS 8.2.0 (Colwell 2009).

Occurrences from photographs were compared with the nonparametric richness estimator Chao 1 among the Upper Palumeu and Kasikasima areas (Magurran 2004). For the analysis one day was split up in 2 camera trapping occasions.

Visual and aural observations, tracks, scat and scratch marks of large cats were recorded when walking the trails to set up and pick up the camera traps. Primates are not included in this chapter, since they were surveyed by a separate primatologist during the same expedition.

RESULTS AND DISCUSSION

During the RAP we recorded 18 species of medium- and large-bodied ground dwelling mammals (Table 12.1). We recorded 11 mammal species at the Upper Palumeu site (RAP Site 1) in a total of 99 camera trapping days with 11 camera traps. At the Kasikasima site (RAP Site 4) we found 15 mammal species in a total of 209 camera trapping days with 13 camera traps.

The large caviomorph rodents were the most frequently photographed by the camera traps; this group was assumed to be the most common group of medium- and large-bodied non-volant mammals in the area. The rodent species most frequently photographed by the camera traps were Paca (*Cuniculis paca*), Red-rumped Agouti (*Dasyprocta leporina*) (see page 32) and Red-acouchy (*Myoprocta acouchy*).

Table 12.1. Species of large and medium sized mammals of the Upper Palumeu (RAP Site 1) and Kasikasima (RAP Site 4).

Scientific name	Common name	Detection method	Site	IUCN Category
Cuniculus paca	Spotted Paca	CT	UP, KK	LC
Dasyprocta leporina	Red-rumped agouti	CT, O	UP, KK	LC
Dasypus kappleri	Great long-nosed armadillo	CT	KK	LC
Dasypus novemcinctus	Nine-banded armadillo	CT	UP, KK	LC
Didelphis marsupialis	Common opossum	CT	KK	LC
Eira barbara	Tayra	CT, O	UP, KK	LC
Leopardus pardalis	Ocelot	CT	UP, KK	LC
Leopardus wiedii	Margay	CT, O	KK	NT
Mazama americana	Red brocket deer	CT, O	UP, KK	DD
Mazama gouazoubira	Grey brocket deer	CT	UP	LC
Myoprocta acouchy	Red acouchi	CT	UP, KK	LC
Panthera onca	Jaguar	T	UP, KK	NT
Pecari tajacu	Collared peccary	CT	UP, KK	LC
Pteronura brasiliensis	Giant river otter	O	Makrutu	EN
Puma concolor	Puma	CT	KK	LC
Sciurus aestuans	Guianan squirrel	CT	KK	LC
Tayassu pecari	White-lipped peccary	O	KK	NT
Tapirus terrestris	Brazilian tapir	T	UP	VU

CT = Camera trap; O = Direct Observation; T = Tracks; UP = Upper Palumeu; KK = Kasikasima
IUCN Red List Categories: LC = Least concern; NT = Near threatened; DD = Data deficient; EN = Endangered; VU = Vulnerable

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Of the six species of cats known to occur on the Guiana Shield, the Jaguar (*Panthera onca*), Puma (*Puma concolor*) (see page 32), Ocelot (*Leopardus pardalis*) (see page 32) and Margay (*Leopardus wiedii*) (see page 31) were found during the survey. Ocelot was the most frequent recorded cat species during this survey and is common in the area. Tracks and scratch marks of Jaguar were found at the Upper Palumeu site. Tracks of Jaguar were also found in the area of the foot of the Kasikasima rock. During the survey the camera traps did not take pictures of Jaguar. The Jaguar, at top of its food chain, is an important keystone species, because it has a regulating function in the ecosystem where it occurs. The Jaguar preys on herbivorous and granivorous mammal populations and thus it has a positive effect on the plant communities in the ecosystem. Puma was photographed only once by the camera traps, on the frequently visited tourist trail that leads to the Kasikasima rock. It is very likely that the Puma also occurs in the Upper Palumeu area, but was only recorded in the Kasikasima area because the trail at Kasikasima is used frequently by these large cats. In both areas that were surveyed we recorded Red-brocket deer (*Mazama americana*) (see page 32). The Collared Peccary (*Pecari tajacu*) was recorded at both areas and was especially abundant in the Upper Palumeu area. The White-lipped Peccary (*Tayassu pecari*) was not recorded by the camera traps but a group was observed by the local workers during the survey at the Kasikasima area. The Giant river otter (*Pteronura brasiliensis*) was recorded at the mouth of the Makrutu creek. This species is an important indicator species, because they are very sensitive to changes in the aquatic ecosystem. The presence of Giant river otter in this area indicates that the aquatic ecosystem is still healthy. This species is also important for ecotourism, because it is very charismatic and easy to spot on the river. Two armadillo species were found during the RAP, including Great Long-nosed Armadillo (*Dasypus kappleri*) and the Nine-banded Armadillo (*Dasypus novemcinctus*). The Giant armadillo (*Priodontes maximus*) was not recorded during the RAP, but it is likely that it is present in both areas, because of the large burrows and sightings by local people. Surprisingly, the Brazilian tapir (*Tapirus terrestris*), which we expected to be quite common, was only recorded by tracks at one location at the Upper Palumeu site. A number of ground-dwelling bird species important as a food source for the local people were recorded by the camera traps and observed during the RAP, including Black curassow (*Crax alector*), Grey-winged trumpeter (*Psophia crepitans*) (see page 30) and Great tinamou (*Tinamus major*).

The species accumulation curves show that many more species likely occur at both sites than were found in this study, which is not surprising given the short sampling period (Figure 12.1). This is confirmed by the Chao 1 diversity estimator, which predicts that additional species would be detected by the camera traps with greater sampling effort at both sites (Figure 12.2).

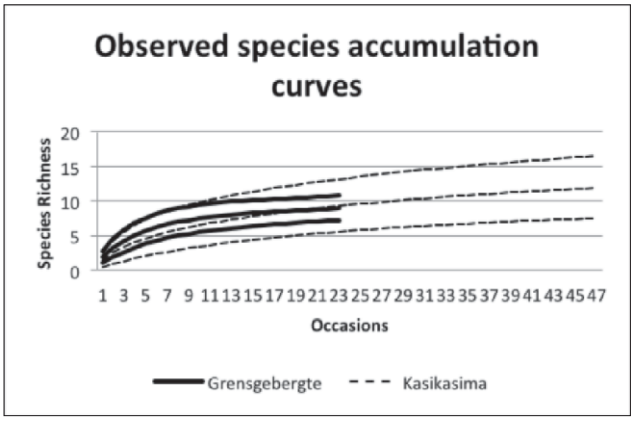


Figure 12.1. Observed species accumulation curves with confidence intervals (95%; upper and lower) from camera trap pictures.

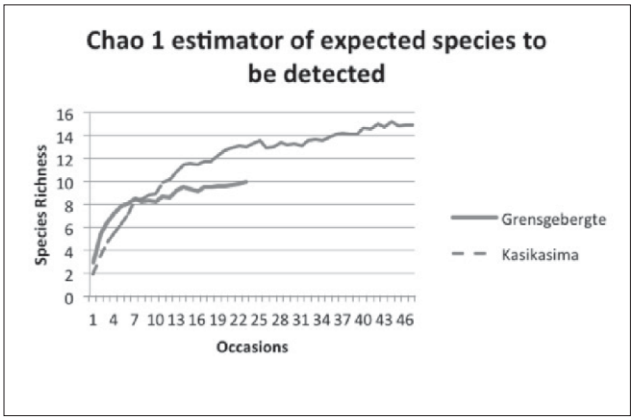


Figure 12.2. Chao 1 estimator of expected species to be detected by camera traps at each RAP survey site.

CONSERVATION RECOMMENDATIONS

It is likely that the medium- and large-bodied mammals found during this RAP survey are distributed throughout southern Suriname, since the medium and large mammal fauna (with the exception of primates) is generally consistently distributed throughout the Amazon Basin. The species recorded during this RAP were expected, although some species appear to occur at lower abundances than we expected. The camera traps were a very important tool during this RAP survey, because most of the large mammals were recorded by the camera traps and not by other observation methods. More species were recorded in the Kasikasima area than in the Upper Palumeu, but this may only reflect differences in sampling effort, with more camera trapping days around Kasikasima. Furthermore, the loud sound of the helicopter that flew daily in the Upper Palumeu area during the survey may have reduced mammal observations at this site.

The Upper Palumeu area is quite pristine, and is visited only occasionally by the local people while they travel from the villages in southern Suriname to villages in Brazil. Hunting does not seem to pose a threat for the large and

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medium-sized mammals in the Upper Palumeu area, because the area is so remote and very inaccessible. We found no signs of hunting or any other human disturbance. In the Kasikasima area there are more human activities than in the Upper Palumeu area, such as ecotourism and some hunting by a small number (10 - 20) of people that live in Kampu. Kampu is a small settlement along the Palumeu river a few kilometers downstream of the Papadron rapids. Currently the greatest potential threat for large and medium-sized mammals at Kasikasima would be hunting, but the results from the RAP survey show that hunting pressure is currently low.

The results of this RAP survey cannot provide an accurate indication of the population status of the different large mammal species, because we were not able to calculate species densities or relative abundance from the data that was gathered during the short timeframe of the survey. Nevertheless, the presence of species sensitive to hunting and disturbance such as Jaguar, Puma, Tapir, curassows and large primates also suggests that hunting pressure is low, and that the important ecological processes maintained by these species, such as seed dispersal and population regulation, remain intact.

Hunting is probably limited by reduced river access to some areas in the dry season, and more generally by distance from Palumeu and other villages. The absence of a market and the concentration of the indigenous people in Palumeu both reduce hunting pressure on large vertebrates in the region as a whole. The extensive surrounding forest acts as a source to offset local population depletion due to hunting. Nevertheless, the most significant current threat to medium- and large-bodied mammals in the area is hunting from Palumeu village. This could change if plans to build a road from northern to southern Suriname move ahead. A road would make the area accessible and hunting and habitat destruction would become important threats for large terrestrial vertebrates. Further plans to increase hydro energy capacity of the existing hydro lake in Brokopondo by diverting water from the Tapanahony river to the Jai creek could be a threat if the project would take place, because a part of the area in South Suriname will be flooded. Aquatic mammals, such as giant otters, may be particularly vulnerable.

Southeastern Suriname area is very important for large mammal species, because the area encompasses vast tracts of pristine forest and rivers. In fact, there are few places left on earth which are as pristine as Southeastern Suriname. Large mammal species have broad home ranges and can move freely across Southeastern Suriname in the absence of disturbance. The area is also connected to protected areas in Brazil to the south and to a national park in French Guiana to the east. This makes Southeastern Suriname part of a large wilderness area, which is important to sustain genetic diversity within large mammal species. Furthermore the area is important for the production of ecosystem services directly used by humans, such as water, food, medicines, recreation and lands of indigenous people. Since a large part of the rivers in Suriname originate in this area, protecting Southeastern Suriname guarantees flows of fresh water which is used for economic activities such as transportation, hydro energy, agriculture and mining. The area also has a high potential for ecotourism, because of the beautiful pristine landscape and rich biodiversity, particularly of charismatic mammals.

It is important to keep following and collecting data on the plans of the national government and others regarding development of large-scale projects in southern Suriname. Roads, mining and hydro energy projects in southern Suriname will certainly increase the threats for large and medium-sized mammal populations in this area. More data on large mammal populations will be necessary to manage these possible future threats. Recommended studies include more camera trapping and a sustainability evaluation of wild bushmeat hunting to have better baseline data.

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