Paula Elias Moraes

Multiple threats and a mosaic of habitat patches of varying quality: the persistence of large mammals across a post-frontier Amazonian region

Múltiplas ameaças e um mosaico de manchas de habitat de diferentes qualidades: a persistência de mamíferos de maior porte em uma região de pós-fronteira na Amazônia

São Paulo

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Orientadora: Prof^{a}. Dr^{a}. Renata Pardini

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Dedico à minha família pelo apoio incondicional em todas as etapas e por ser meu alicerce e refúgio.

Nos teus rios quero navegar
O teu ar respirar
Tua beleza contemplar
Embalando os sonhos meus
De ver-te sempre verdejante
Parte integrante
Deste país gigante
Que luta pra manter-te inteira
Intacta, linda, majestosa
Amazônia, pulmão do mundo
Nossa sempre serás!

Mazé Carvalho

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1. ABSTRACT

The expansion of human activities is associated to a myriad of anthropogenic threats that affect tropical biodiversity, especially habitat loss and fragmentation, the continued human population growth and the expansion of infrastructure, as roads and highways. Although anthropogenic threats are expected to interact and to create mosaics of patches of varying quality, their additive and interaction effects on biodiversity, as well as the extent native species are able to use remnants of distinct quality, have yet been poorly studied. Indeed most studies focused on only one or few threats in isolation, on the patch rather than the landscape scale and did not considered the varying quality of remnants. Large mammals are a good study model as they have a set of traits that make them particularly vulnerable to several anthropogenic threats. Due to the difficulties in gathering data on these elusive species at adequate spatial scales, interviews with local residents have increasingly being used to access their distribution and can provide reliable information. By estimating the occurrence of 15 large mammal species through interviews with the head of 12 households within each of 20 landscapes across a 1-million ha post-frontier region in Amazonia, we investigated: (i) which habitat type at which spatial scale is associated with species occurrence, and (ii) the effects, relative importance and interactions of four anthropogenic threats – habitat cover, habitat fragmentation, human population density and road density – on species persistence. Presence/ absence data across the surroundings of 227 households was analyzed using generalized linear mixed-effects models, and a two-step model selection based on Akaike´s Information Criteria. The persistence of larger and endangered species was not necessarily affected by habitat quality, but they responded to habitat cover mostly at larger spatial scales. The chance of persistence of all species - even the two smallest that were not affected by habitat loss alone – was disrupted by some combination of the four anthropogenic threats. Additive effects between anthropogenic threats were more important than their interaction in determining the occurrence of large mammals. While the effects of habitat loss were stronger than the effects of habitat fragmentation *per se*, road density was as important as habitat loss to species occurrence. Finally, there was no clear pattern in threat status or body size underlying the response of large mammals to combined anthropogenic threats. Our study suggest that protected areas in public or private lands in Amazonia should be large to secure the persistence of large mammals, but may include mosaics of primary and secondary forest. The findings also highlight the need to take into account the accumulated impacts of multiple threats simultaneously – particularly, the consequences of the expansion of the road network – in planning and management, as a way to avoid underestimating the chance of extinctions. Preventing Amazonian landscapes to become heavily deforested and altered is critical, as the persistence of even common species can be impaired, affecting one of the most important ecosystem services provided to local residents – bushmeat – and potentially eroding the value people attribute to forests.

2. RESUMO

A expansão das atividades humanas está associada a várias ameaças antrópicas que afetam a biodiversidade tropical, especialmente a perda e fragmentação de habitat, o continuado crescimento populacional humano e a expansão de infraestrutura, como estradas e rodovias. Embora seja esperado que as ameaças antrópicas interajam e criem mosaicos de manchas de habitat de diferentes qualidades, há ainda poucos estudos sobre os efeitos aditivos e interativos de diferentes ameaças sobre a biodiversidade ou sobre a capacidade de espécies nativas de usar remanescentes de diferentes qualidades. De fato, a maioria dos estudos focaram em apenas uma ou poucas ameaças isoladas, na escala do fragmento em vez da escala da paisagem e não consideraram as variações na qualidade dos remanescentes. Mamíferos de maior porte são um bom modelo de estudo porque possuem um conjunto de características que os tornam particularmente vulneráveis a várias ameaças antrópicas. Dada a dificuldade de obter dados sobre estas espécies elusivas em escalas espaciais adequadas, entrevistas com moradores locais vêm sendo cada vez mais usadas para acessar a distribuição de mamíferos de maior porte, e podem fornecer informações confiáveis. Através da estimativa da ocorrência de 15 espécies de mamíferos de maior porte por meio de entrevistas com o chefe de 12 unidades domésticas em cada uma de 20 paisagens em uma região de pós-fronteira de 1 milhão ha na Amazônia, investigamos: (i) que tipo de habitat e em qual escala espacial está associado com a ocorrência das espécies, e (ii) os efeitos, a importância relativa e as interações de quatro ameaças antrópicas – cobertura de habitat, fragmentação de habitat, densidade populacional humana e densidade de estrada – sobre a persistência das espécies. Dados de presença/ ausência nos arredores de 227 unidades domésticas foram analisados usando modelos lineares generalizados mistos e seleção de modelos baseada no Critério de Informação de Akaike em duas etapas. A persistência das espécies maiores e ameaçadas não foi necessariamente afetada pela qualidade do habitat, mas elas responderam majoritariamente a cobertura de habitat em escalas maiores. A chance de persistência de todas as espécies - mesmo das duas menores, que não responderam à perda de habitat isoladamente – foi afetada por alguma combinação das quatro ameaças antrópicas. Efeitos aditivos entre as ameaças antrópicas foram mais importantes do que as interações entre elas na determinação da ocorrência de mamíferos de maior porte. Enquanto os efeitos da perda de habitat foram mais fortes do que os efeitos da fragmentação de habitat *per se*, a densidade de estradas foi tão importante quanto a perda de habitat para a ocorrência das espécies. Por último, não houve um padrão claro em termos do grau de ameaça e do tamanho corpóreo por trás da reposta dos mamíferos de maior porte a ameaças antrópicas combinadas. Nosso estudo sugere que áreas protegidas em terras públicas ou privadas na Amazônia devem ser grandes para assegurar a persistência de mamíferos de maior porte, mas podem incluir mosaicos de florestas primárias e secundárias. Os resultados também ressaltam a necessidade de considerar os impactos acumulados de múltiplas ameaças simultaneamente – em especial, as consequências da expansão da malha viária – em planejamentos e manejos, de maneira a evitar subestimar a chance de extinções. Evitar que paisagens na Amazônia se tornem muito desmatadas e alteradas é fundamental, dado que a persistência até mesmo das espécies mais comuns pode ser prejudicada, afetando um dos serviços ecossistêmicos mais importantes para moradores locais – a carne de caça – e potencialmente erodindo o valor que estes atribuem às florestas.

3. INTRODUCTION

Human activities, such as agriculture (LAURANCE *et al*., 2014), cattle ranching (ASNER *et al*., 2004), logging (ASNER *et al*., 2009) and urbanization (BONAN, 2002), have profoundly modified ecosystems on Earth (STEFFEN *et al*., 2015). These human activities lead to changes in land use with the widespread loss of biodiversity (NEWBOLD *et al*., 2015), changes in community structure (DORNELAS *et al*., 2014), biogeochemical and hydrological flows (BONAN, 2002; ASNER *et al*., 2004), as well as loss of ecosystems services (CARPENTER *et al*., 2009; FOLEY *et al*., 2005), endangering human well-being in the long term. About 43% of terrestrial surface has already been explored and modified (BARNOSKY *et al*., 2012), and in tropical regions, as Amazonia, the expansion of human activities can be easily noticed along deforestation frontiers (FEARNSIDE, 2005).

The expansion of human activities in the tropics is associated to a myriad of anthropogenic threats, operating in different temporal and spatial scales, which collectively imperil tropical biodiversity. Tropical countries are still experiencing a pronounced deforestation (KEENAN *et al*., 2015), leading to the reduction and isolation of forest remnants and of plant and animal populations (FAHRIG, 2003; LAURANCE, 2008; KEENAN *et al*., 2015). Africa and South America had the highest annual loss of forest area in 2010-2015, with 2.8 and 2 million hectares, respectively, even though the rate of forest loss in some countries (e.g. Brazil) has significantly declined (FAO, 2015). Correspondingly, an extensive literature has demonstrated that the ongoing and massive habitat loss and fragmentation are the main causes of the current biodiversity crisis and extinction of species (FOLEY *et al*., 2005; HADDAD *et al*., 2015).

However, other anthropogenic threats that come along with habitat loss and fragmentation also affect tropical biodiversity. On one hand, the continued human population growth (GERLAND *et al*., 2014) favors overexploitation of natural resources, including bushmeat hunting (MILNER-GULLAND *et al*., 2003), as well as wildlife persecution and retaliation (DICKMAN *et al*., 2011; TREVES *et al*., 2006) due to human-wildlife conflicts (MARSHALL *et al*., 2007) leading to what has been call defaunation (DIRZO *et al*., 2014). On the other hand, the expansion of infrastructure, especially roads and highways, facilitate the access of people to habitat remnants and natural resources and the spread of exotic species, and are a massive cause of mortality via road kills besides strengthening the subdivision of wildlife populations (COFFIN, 2007; LAURANCE & USECHE, 2009). Given the accumulated evidence on the effects of these anthropogenic threats, it is becoming clear that in a rapid changing environment with an ever increasing pressure on natural resources the impact of one anthropogenic threat can be strongly dependent on the effects of others acting at the same time (e.g. BROOK *et al*., 2008; THOMAS *et al*., 2006). However, despite recent progress, we still lack information about whether and when one threat will amplify or attenuate the effects of other threats (TURNER, 2010) and which will be the effects of these interactions on biodiversity in the future (SALA *et al*., 2000; TURNER, 2010). Hence, to better support biodiversity conservation and management, researchers should incorporate in their studies multiple-threats operating simultaneously (BROOK *et al*., 2008).

Together the anthropogenic threats associated with the expansion of human activities lead not only to deforestation and defaunation, but also to the alteration of the remaining native vegetation (NEPSTAD *et al*., 1999; GARDNER *et al*., 2009; TURNER, 2010). Besides being reduced and isolated, remnants vary extensively in quality, forming a mosaic of more pristine primary patches, secondary patches at different stages of regeneration and patches degraded by edge effects, fire and logging (GARDNER *et al*., 2009; LAURANCE, 2015). Although habitat disturbance and degradation can cause as much an impact on biodiversity as that caused by deforestation (BARLOW *et al*., 2016), we still lack information on what extent native species can use the remnants of differing quality as habitat. Hence, to consider both the interaction of different threats and the quality of remaining forest remnants is important to reveal a more complete picture of the conservation value of human-modified landscapes and thus support management.

Large mammals possess a set of traits that make them particularly vulnerable to anthropogenic threats such as habitat loss and fragmentation, human population growth and road expansion (GONZÁLEZ-SUÁREZ *et al*., 2013). Their naturally low population densities make them susceptible to habitat loss (e.g. MICHALSKI & PERES, 2007) while their wide-ranging behavior is associated to a higher risk imposed by road kills (FAHRIG & RYTWINSKI, 2009) and by conflicts with humans in fragmented landscapes (WOODROFFE & GINSBERG, 1998). Moreover, their slow reproduction and long life cycles make them more susceptible to hunting (GONZÁLEZ-SUÁREZ *et al*., 2013), intensified by high human population densities (CEBALLOS & ERLICH, 2002). As a consequence, few areas in the world still harbor a complete large mammal fauna (MORRISON *et al*., 2007). The loss of these large mammals is expected to have long-term implications to the integrity of tropical forests as they play key ecological roles, including seed predation (SILMAN *et al*., 2003) and seed dispersal (PERES *et al*., 2016), and many are top predators (ROEMER *et al*., 2009) whose absence may lead to cascading effects in ecological systems (ESTES *et al*., 2011). Although several studies have shown the persistence of large mammals is negatively affected by anthropogenic threats, most focused on one or few threats in isolation, such as habitat loss and fragmentation (e.g. CHIARELLO, 2000; MICHALSKI & PERES, 2007), hunting (e.g. (CULLEN *et al*., 2000; MELO *et al*., 2015), or road kills (e.g. CARVALHO *et al*., 2014), on the patch rather than the ladscape scale (but see PRIST *et al*., 2012), and did not considered the varying quality of remaining habitats. This limits our understanding of additive and interaction effects of different threats at suitable scales and of the conservation value of distinct types of remants to the persistence of large mammals.

The small number of studies at the landscape scale considering several anthropogenic threats simultaneously is probably related to the difficulty of gathering data on these elusive species with nocturnal habits (BENNIE *et al*., 2014) and low densities (MCKINNEY, 1997). The intensive survey effort that traditional field methods require implies limitations for the temporal and/or spatial scope of studies (MEIJAARD *et al*., 2011). However, as most large mammals are well-known to local residents living close to tropical forests, as they are important resources for people through both subsistence and commercial hunting (MILNER-GULLAND *et al*., 2003), interviews have increasingly being used to get data on their occurrence and distribution (MICHALSKI & PERES, 2005; PRIST *et al*., 2012; SAMPAIO *et al*., 2010). If well-planned and structured (TROCHIM, 2006), interviews can provide a reliable estimate of the occurrence of large mammals across landscapes (MEIJAARD *et al*., 2011).

4. OBJECTIVES

Aiming at contributing to support management strategies and land use planning, we here focus on two related issues: the importance of remnants of differing quality for the occurrence of large mammals, and the relative importance and interactions of four distinct anthropogenic threats for the persistence of these animals in human-modified landscapes. To do so, we used a hierarchical sampling design to estimate the distribution of 15 large mammal species across 20 landscapes within a 1 million-ha area in a post-frontier region in eastern Brazilian Amazonia. Within each landscape, we interviewed the head of 12 households using a structured questionnaire and a color plate with illustrations of large mammals (15 species known to occur, and two species that do not occur, in the region), to estimate their occurrence in the surroundings of each household. Using a time-series satellite images and a classification of remnants into four categories (non-degraded primary forest, degraded primary forest, secondary forest and native vegetation in initial stages of regeneration), we first investigated which habitat type at which spatial scale (1, 2, 4, 6 and 8 km radius buffer) is associated with the occurrence of the 15 large mammals. We then investigated the effects, relative importance and interactions of four anthropogenic threats – habitat cover, habitat fragmentation, human population density and road density on the persistence of large mammals across the region. Each of the four anthropogenic threats was calculated at different spatial scales, and the best metric in each case was chosen prior to the final analysis.

5. MATERIAL AND METHODS

5.1. Study region

We carried out our study in a recent post-frontier region in eastern Brazilian Amazonia, Pará State, within an area of approximately 1 million ha bordered by the Amazon, Tapajós and Curuá-Una Rivers (Figure 1). The study region encompasses the rural areas of the municipalities of Santarém, Belterra and Mojuí dos Campos.

The region has an old human occupation history since pre-Colombian times, and received different migratory waves due to various economic cycles (SÁ *et al*., 2006). At the end of the nineteenth century, the rubber cycle promoted migration of workers from northeastern Brazil (TAVARES, 2008). In the 1970s, the construction of state and interstate highways (especially the interstate highway BR-163 – Santarém-Cuiabá in 1976) had an important role in integrating the study region to the rest of the country, as it happened in other Amazonian regions (MARGARIT, 2013). Road construction fostered human settlement and agricultural activities, as well as the expansion of smaller, side roads and the urbanization of some areas (CASTRO, 2008; CÔRTES, 2012; MARGARIT, 2013). Simultaneously to road construction, government colonization programs, land reform initiatives and fiscal incentive for large-scale cattle ranching, mining and timber extraction promoted a new influx of migrants from northeastern and southern Brazil (CASTRO *et al*., 2004; NEPSTAD *et al*., 2006). In the 1990s, the international demand for soy triggered mechanized agriculture and, indirectly, the expansion of cattle ranching in the Amazon, with another influx of migrants (capitalized farmers) from south and mid-western Brazil (CASTRO *et al*., 2004; NEPSTAD *et al*., 2006). This dynamic process of migratory events coupled with the expansion of the network of roads and increased human population density recently led to people moving towards either more distant rural areas or urban centers, as their land was converted to mechanized agriculture (TAVARES, 2008; CÔRTES, 2012).

Today the rural population in the study region is distributed in government settlements, and in small and large rural properties, and is organized in rural agglomerations (communities) of various sizes (CASTRO *et al*., 2004; CASTRO, 2008). It encompasses different generations of immigrants from diverse regions of Brazil, which implies different ways of land use, ranging from small-scale farms based on subsistence agriculture to large-scale soy farms and cattle ranches (CASTRO, 2008; CÔRTES, 2012). Even though road construction, government colonization programs and expansion of agroindustry increased the deforestation in the region (CASTRO *et al*., 2004; NEPSTAD *et al*., 2006), more than half of its area is still covered by primary and secondary forests, with larger tracks of forest mostly found further from urban centers where human population and road density are lower (Figure 1).

5.2. Sampling design

The sampling design was hierarchical. First, we selected 20 landscapes (5-km radius circumferences; 7.850 ha), which captured the variability in forest cover (from 33% to 93%), human population density (from 0.01 to 25 households/ km^2) and road density (from 0.08 to 1 km/km^2) within the study region (Figure 1).

We then randomly selected 12 households within each landscape, resulting in 240 sampled households. Roads, rivers and households were mapped using Google Earth images and checked in the field, identifying stretches of roads and rivers with at least one household. We then established in ArcGIS 10 a set of points 10 m apart in each stretch, from which we randomly selected 12 points per landscape at least 400 m apart (maximum possible distance for all landscapes) to ensure a good spatial distribution of households in each landscape. The sampled households were those nearest to each of the 12 points. When two points were nearest to the same household, we excluded the furthest point and randomly selected another one. When a point was at the same distance of more than one household, we randomly selected one of these households. We excluded a household if no resident was encountered in three visits (n= 4) or if the household head declined to take part of the study (n= 3). In those cases, we sampled the nearest household.

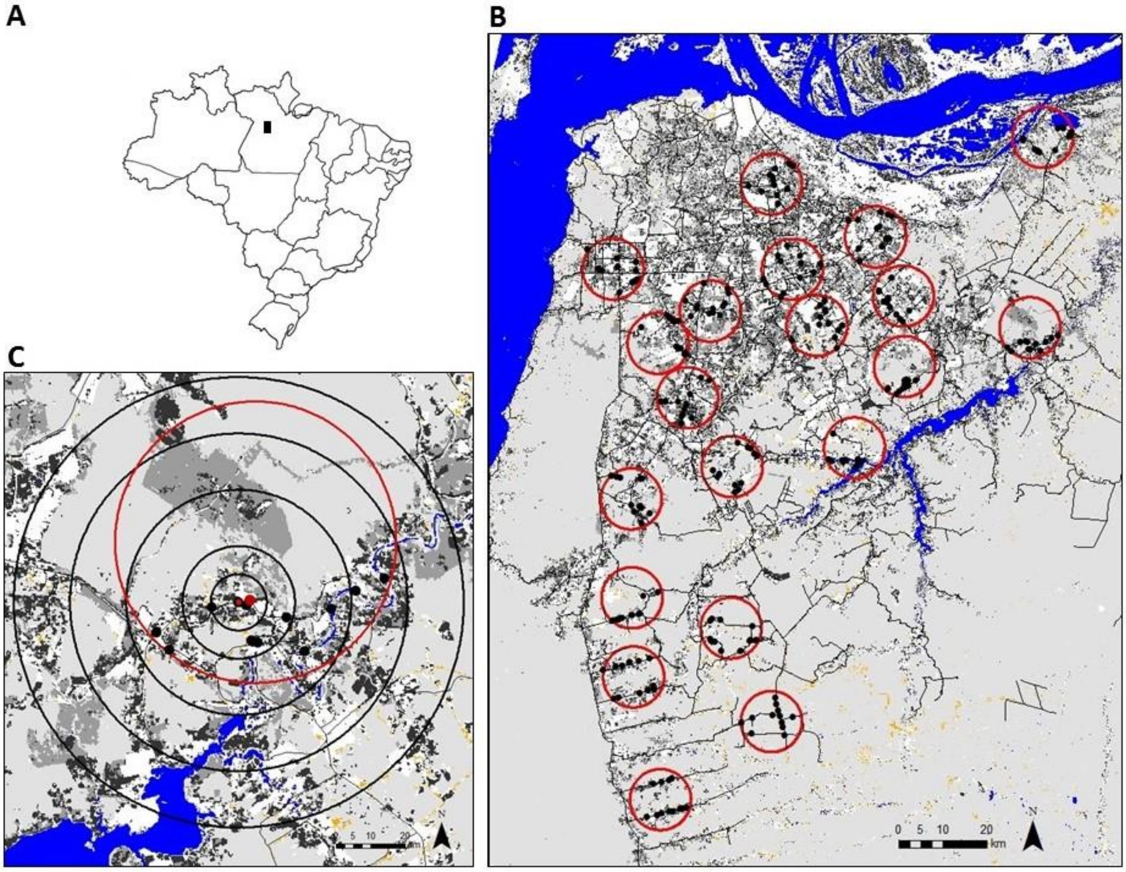

Figure 1. Land cover map of the study region. (A) Location of the study region in Pará State, Brazil. (B) The distribution of the 240 sampled households (black dots) within the 20 landscapes (red circles). (C) The five radius buffers (black circles: 1, 2, 4, 6 and 8 km) around a sampled household (red dot) in one of the landscapes (red circle). Non-degraded primary forest in light grey, degraded primary forest in orange, secondary forest older than 10 years in medium grey, secondary vegetation younger than 10 years in dark grey, non-forest areas in white, water bodies in blue and roads in black line.

5.3 Data collection

5.3.1. Occurrence of large mammals

We obtained occurrence data from an interviewed-based survey aided by a color plate (Figure S1) conducted with the household head (171 men and 69 women) of the 240 sampled households between August and December of 2013. We asked interviewees which species, among 17 mammal species present in a color plate, occurred in the surroundings of his/her house (i.e. within the area assessable from the house by foot within one hour period). To evaluate interviewee´s knowledge on which are the mammal species that occur in the region, the color plate included two species whose geographical range did not encompass the study region (wooly monkey – *Lagotrix lagothricha*, and pampas deer – *Ozotoceros bezoarticus*). We chose the 15 large mammals that do occur in the region to represent a range of vulnerability to anthropogenic threats and body size among those that are commonly known to local people and are easily distinguishable, including different taxonomic groups (i.e. ungulates, primates, rodents, carnivores and edentates) (Table S1). From the interviews, we calculated the occurrence (presence/ absence) of the 15 species across the surroundings of the 227 sampled households, excluding the data from 11 interviewees (4.6 %) that wrongly stated the presence of those two species known to be absent from the study region and two interviewees (0.8%) that stated not knowing about species occurrence.

Interviews were conducted by Patricia Carignano Torres and Paula Elias Moraes with the help of two previously trained assistants. We tested the interviewed-based survey in a pilot study to adjust the language and verify if the 15 chosen species were indeed sufficiently known to local residents. After data collection, we reviewed all surveys to verify fill-in errors and missing data, and if necessary, we returned to the field to complete/ correct data.

5.3.2. Habitat cover and fragmentation

We extracted habitat cover and fragmentation variables from a land cover map produced from time-series Landsat images (from 1990 to 2010) and a decision tree classification procedure (GARDNER *et al.*, 2013). We quantified habitat cover and fragmentation considering: (a) only non-degraded primary forest, (b) non-degraded primary forest plus degraded primary forest (total primary forest), (c) total primary forest plus secondary forest older than 10 years (total forest), and (d) total forest plus secondary vegetation younger than 10 years (total native vegetation). For each of these four habitat types, we measured both habitat cover and habitat fragmentation (Coefficient of Variation of Disjunct Core Area Distribution) around each sampled household in five different spatial scales (1, 2, 4, 6 and 8 km radius buffers; Figure 1), using ArcGIS 10 and Fragstats 4.2.1 (MCGARIGAL & MARKS, 1995). The habitat fragmentation metric was chosen among those proposed in WANG *et al*. (2014), as that presenting the lowest correlation with habitat cover within our dataset.

5.3.3. Human population and road density

We estimated the human population density by the number of households around each sampled household, obtained from the 2010 census data from the Brazilian Institute of Geography and Statistics (IBGE, 2010). In this database, each municipality is divided into census sectors and IBGE provides the coordinates of all households for most sectors. For those census sectors with incomplete household coordinates, we estimated the number of households with no coordinates by assuming a regular distribution of those in the census sector. We estimated road density as the extension of roads around sampled households, considering: (a) only high traffic roads (i.e. interstate and state highways, BR-163 – Santarém-Cuiabá, PA-370 – Santarém-Curuá-Una, PA-433 – Santarém-Juruti, PA-431 and PA-445), and (b) all roads, including also low traffic, smaller, side roads.

We calculated human population density and road density (high traffic roads and total roads) considering four spatial scales (2, 4, 6 and 8 km radius buffers) around each sampled households. We did not considered the smallest spatial scale used for habitat cover and fragmentation because there was little variation of these variables across sampled households at the 1 km radius buffer.

5.4. Data analysis

We considered each household as a sampling unit, the occurrence (presence/ absence) of each of the 15 mammal species across the surroundings of sampled households as the dependent variables, and the following four predictors: (1) habitat cover (four different habitat types at five spatial scales), (2) habitat fragmentation (four different habitat types at five spatial scales), (3) human population density (density of households at four spatial scales), and (4) road density (high traffic roads and total roads at four spatial scales each). For each one of the 15 species, we carried out a two-step model selection based on Akaike´s Information Criteria modified for small samples (AICc; BURNHAM & ANDERSON, 2002). To account for the hierarchical nature of the sampling design, we used generalized linear mixed-effects models (GLMMs), with occurrence modeled as a binomial variable, using logit as the link function, and the 20 landscapes as a random factor. In order to improve model convergence (ZUUR *et al.*, 2009), we standardized all predictor variables before running the analyses, so each variable had mean of 0 and standard deviation of 1.

The first step aimed at selecting the best measure of each of the four predictors for explaining species occurrence as well as to address our first question concerning which habitat type at which spatial scale are associated with the occurrence of the 15 large mammal species. For each of the four predictors, we compared a set of simple candidate models, each containing a different measure for that predictor as the fixed factor plus the intercept-only model for reference (that does not include any fixed factors), summing 21 candidate models for both habitat cover and habitat fragmentation, five models for human population density and nine models for road density. We selected the measure present in the first-ranked model (or in the second-ranked model, in cases in which the intercept-only model was the first-ranked) for the second step (see below). For the habitat cover predictor, we also added up the weight of evidence (ωi) of (1) candidate models including each of the four habitat type variables, and (2) of candidate models including variables measured in each of the five spatial scales (BURNHAM & ANDERSON, 2002). We used these values to evaluate which habitat type at which spatial scale are associated with species occurrence.

The second step aimed at addressing our second question on the effects, relative importance and interactions of four anthropogenic threats on the persistence of large mammals. We considered the best measure of each predictor and compared a set of 40 candidate models: (1) an intercept-only model for reference (that does not include any fixed factors), (2) simple models containing each of the four predictors alone as fixed factors, and (3) models containing all possible combinations between the four predictors as fixed factors, but including only the pairwise interactions between them. To evaluate the relative importance of different predictors and pairwise interactions, we then added up the weight of evidence of models containing each one of the four predictors and each of the six pairwise interactions (BURNHAM & ANDERSON, 2002). For all 15 species, there was no collinearity among predictor variables as indicated by VIF (VIF ≤ 2; Table S2).

We compared alternative models in each step and candidate set by using the difference in their AICc values in relation to the first-ranked model (ΔAICc; BURNHAM & ANDERSON, 2002). A value of ΔAICc ≤ 2 indicates equally plausible models. We carried out the analyses in R environment 3.2.1 (R DEVELOPMENT CORE TEAM, 2012) and *lme4*, *bbmle* and *usdm* packages.

6. RESULTS

Nine-banded armadillos (*Dasypus novemcinctus*), howler monkeys (*Alouatta discolor*), paca (*Cuniculus paca*) and agoutis (*Dasyprocta leporina*) were the most widely distributed species, occurring in the surroundings of at least 77% of the 227 households (Figure 2). In contrast, white-cheeked spider monkeys (*Ateles marginatus*), lowland tapirs (*Tapirus terrestris*), cougars (*Puma concolor*), white-lipped peccaries (*Tayassu pecari*) and greater long-nosed armadillos (*Dasypus kappleri*) were the species with the most restricted distribution, occurring in the surroundings of less than 30% of the 227 households (Figure 2).

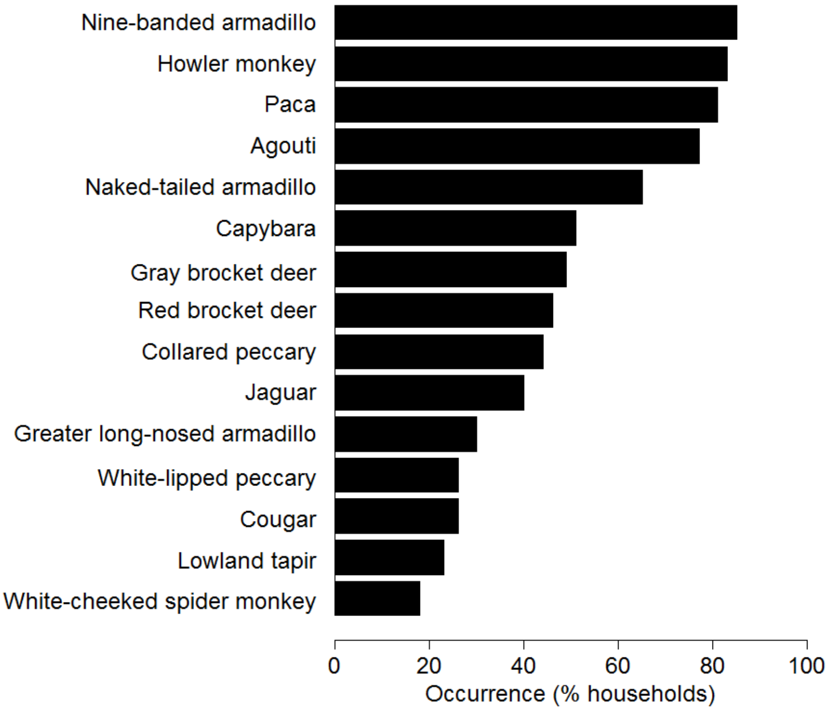

Figure 2. Occurrence of the 15 large mammals across the study region, as estimated by the percentage of 227 interviewees reporting the presence of the species in the surroundings of their households.

6.1. Habitat and scale of response of large mammals

For the majority of large mammals (13 out of 15 species), occurrence was positively associated with the cover of some type of native vegetation at some spatial scale (Table 1, Figure 3). The reference model was included among the selected models only for the nine-banded armadillo and the naked-tailed armadillo (*Cabassous unicinctus*) (Table 1, Figure 3).

Table 1. Habitat cover variables included in the selected models (in the first step model selection) for the occurrence of the 15 large mammal species. 1: variable present. A: non-degraded primary forest, B: total primary forest, C: total forest, and D: total native vegetation. Numbers represent the five spatial scales (1, 2, 4, 6 and 8 km). Complete results of model selection in Table S3.

Species	**Habitats**				**Scales**					**Reference model**
	A	**B**	**C**	**D**	**1**	**2**	**4**	**6**	**8**	
Red brocket deer	1	1							1	
Collared peccary	1	1							1	
Lowland tapir	1	1							1	
White-lipped peccary	1	1							1	
Jaguar	1	1						1	1	
Howler monkey	1	1	1		1	1	1	1		
Capybara	1	1	1						1	
Cougar	1	1	1					1	1	
White-cheeked spider monkey	1	1	1	1					1	
Greater long-nosed armadillo	1	1	1	1					1	
Agouti	1	1	1	1		1	1			
Gray brocket deer	1	1	1	1	1	1	1			
Paca	1	1	1	1	1	1	1	1	1	
Naked-tailed armadillo	1	1	1	1	1	1	1	1	1	1
Nine-banded armadillo	1	1	1	1	1	1	1	1	1	1

The occurrence of five of these 13 species – red brocket deer (*Mazama Americana*), collared peccary (*Pecari tajacu*), lowland tapir, white-lipped peccary and jaguar (*Panthera onca*) – was associated with primary forest cover (either non-degraded, or both degraded and non-degraded; Table 1, Figure 4I), and the occurrence of three – howler monkey, capybara (*Hydrochoerus hydrochaeris*) and cougar – was associated with forest cover (non-degraded primary forest, total primary forest or total forest; Table 1, Figure 4II). However, the occurrence of five of the 13 species – white-cheeked spider monkey, greater long-nosed armadillo, agouti, gray brocket deer (*Mazama gouazoubira*) and paca – was not associated with the cover of any particular type of native vegetation cover, with selected models including all the four variables from the most pristine forest (non-degraded primary forest) to all native vegetation (total native vegetation) (Table 1, Figure 4III).

Among these 13 species that responded to some type of native vegetation cover, the occurrence of nine species – greater long-nosed armadillo, white-cheeked spider monkey, red brocket deer, collared peccary, cougar, lowland tapir, white-lipped peccary, jaguar and capybara – was associated with habitat cover at larger spatial scale (either 6 or 8 km; Table 1, Figure 5I), and the occurrence of only two species – agouti and gray brocket deer – was associated with habitat cover at smaller scales (1, 2 or 4 km; Table 1, Figure 5II). Only the occurrence of howler monkey and paca was not associated with habitat cover at any particular spatial scales, with selected models including habitat cover at four (1, 2, 4 and 6 km) or all the five spatial scales (Table 1, Figure 5III).

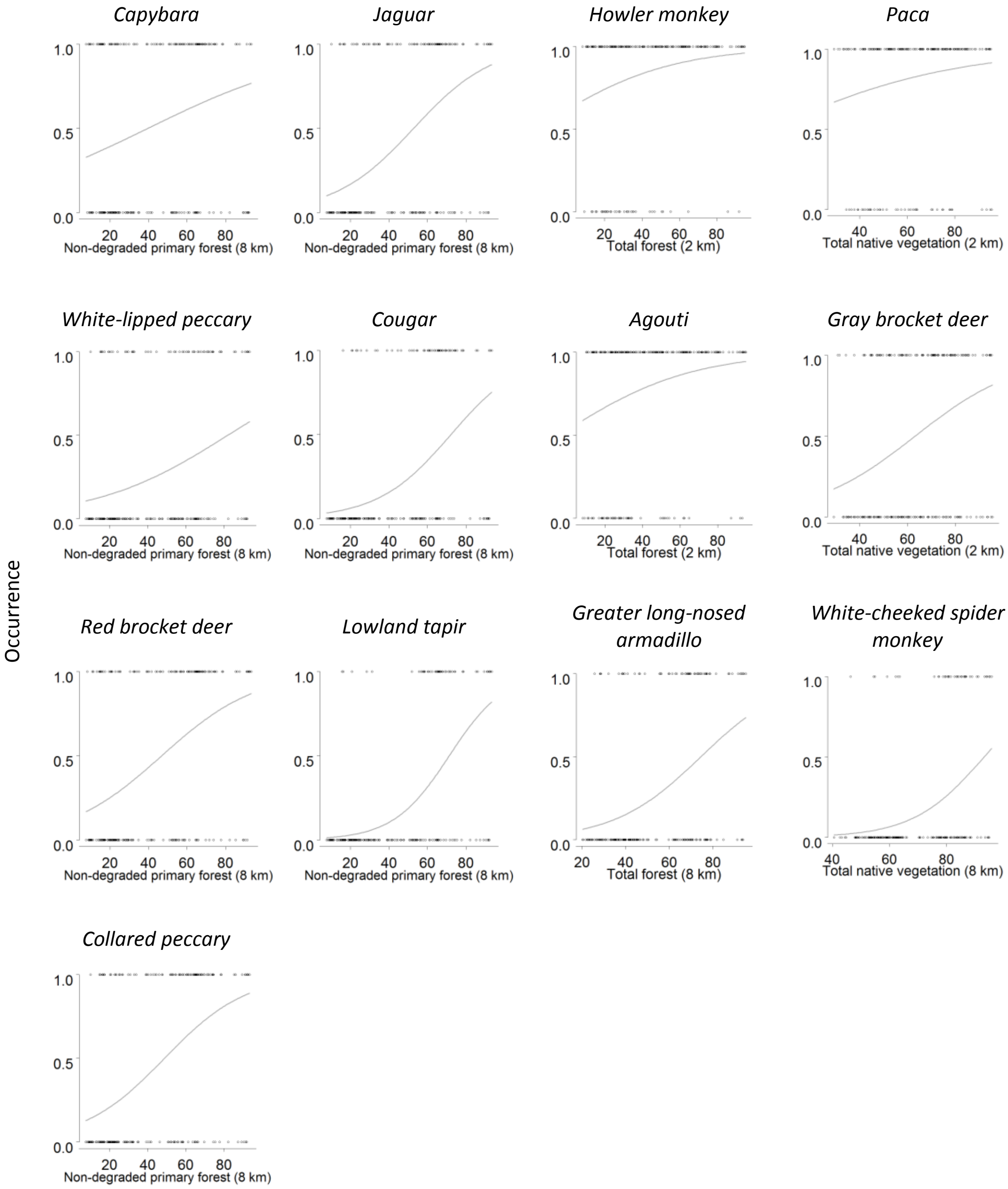

Figure 3. Positive relationship between habitat cover and the occurrence of 13 out of the 15 large mammal species according to the first-ranked models.

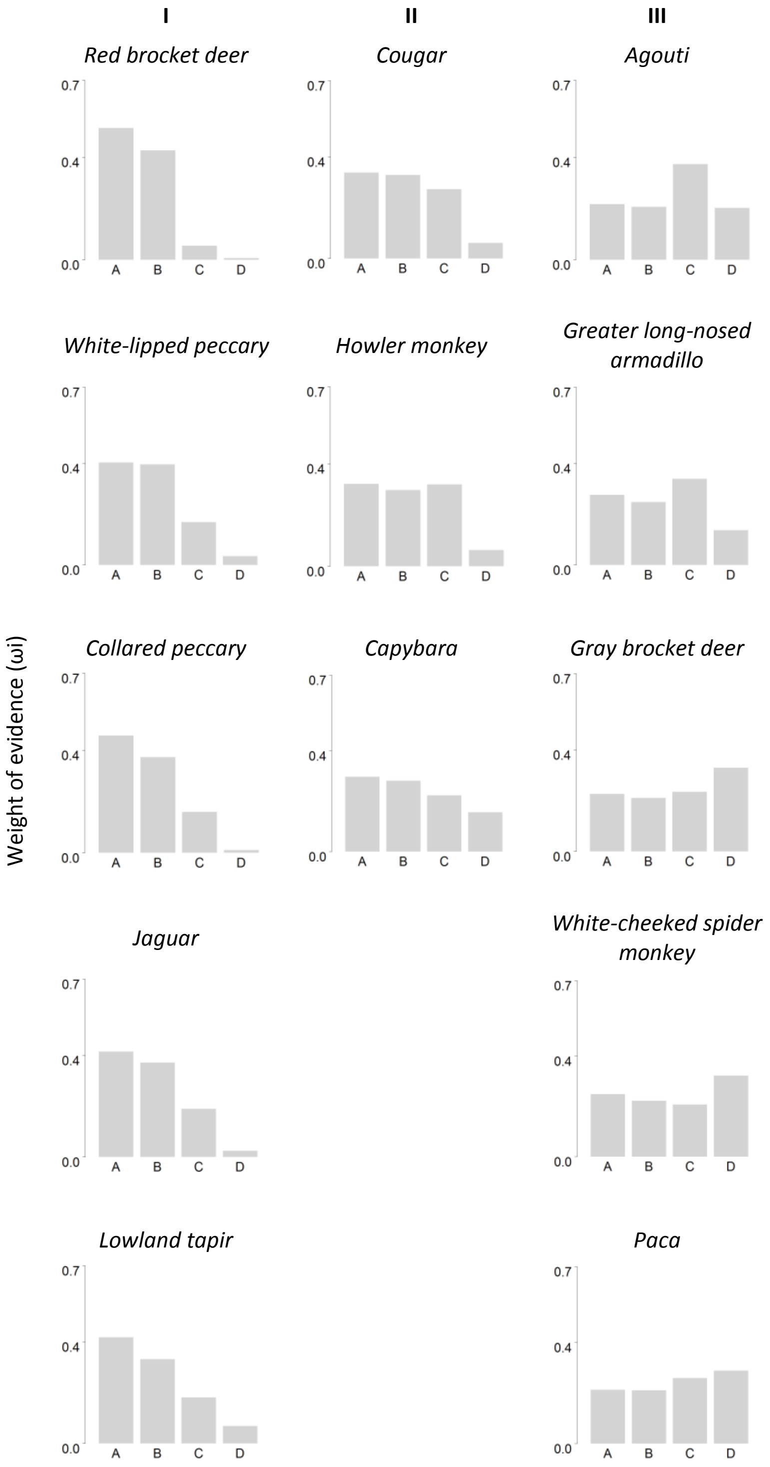

Figure 4. Weight of evidence (ωi) of models - from the first step model selection for habitat cover measures – containing a given habitat type variable for 13 out of the 15 large mammal species. A: non-degraded primary forest, B: total primary forest, C: total forest, D: total native vegetation. I: species whose occurrence was associated with primary forest cover (either non-degraded, or both degraded and non-degraded), II: species whose occurrence was associated with forest cover (non-degraded primary forest, total primary forest or total forest), and III: species whose occurrence was associated with the cover of all types of native vegetation cover (non-degraded primary forest, total primary forest, total forest or total native vegetation).

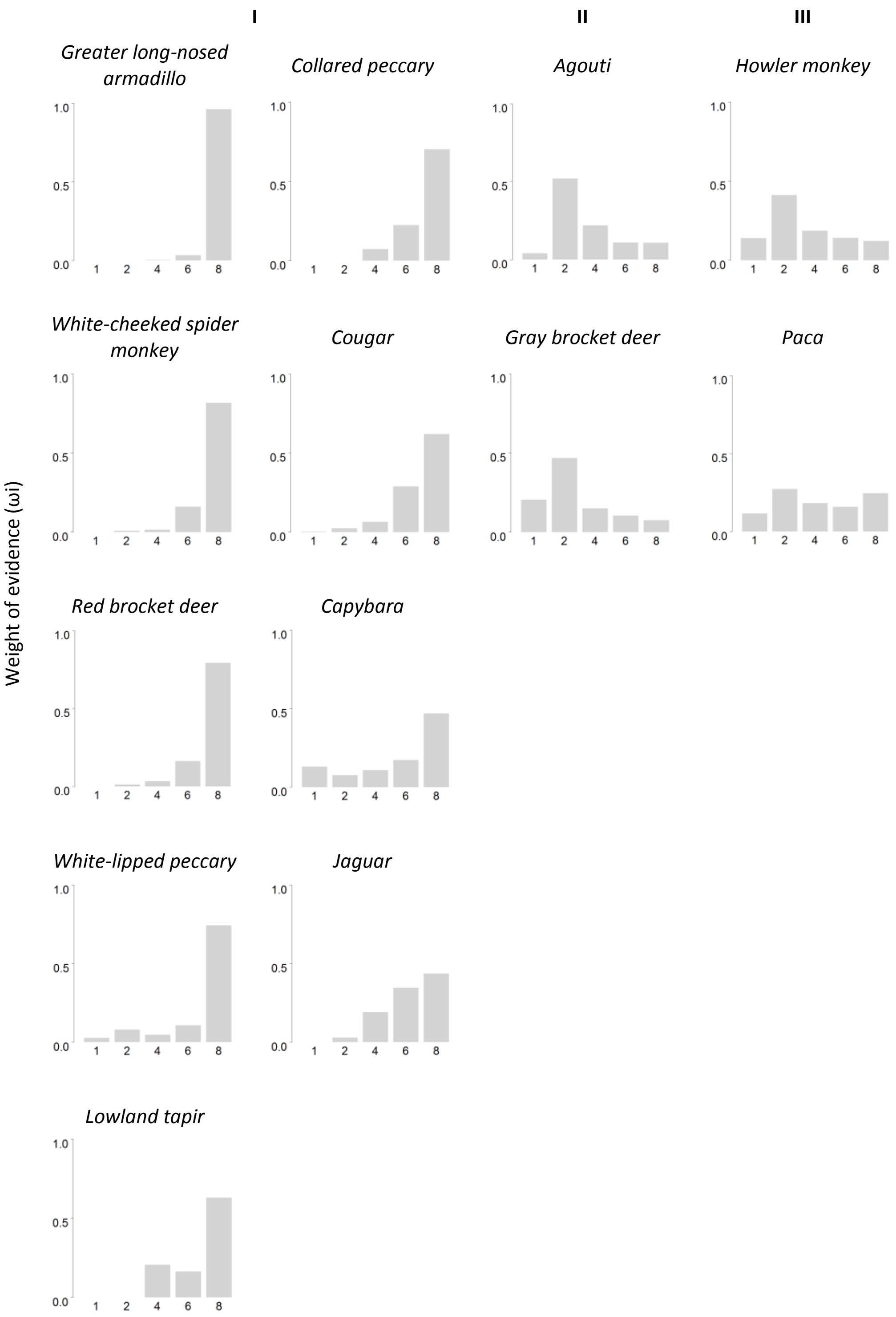

Figure 5. Weight of evidence (ωi) of models - from the first step model selection for habitat cover measures - containing habitat type variables at a given spatial scale (1, 2, 4, 6, and 8-km buffers) for 13 out of the 15 large mammal species. I: species whose occurrence was associated with habitat cover at larger spatial scale (either 6 or 8 km), II: species whose occurrence was associated with habitat cover at smaller scales (1, 2 or 4 km), and III: species whose occurrence was not associated with habitat cover at all spatial scales.

6.2. Relative importance and interactions of anthropogenic threats

Results of the first step model selection for each of the four predictors (habitat cover, habitat fragmentation, road density and human population density) and each of the 15 large mammals are in Tables S3-S6, and selected variables in each case are synthetized in Table S7. From the second step model selection comparing the effects, relative importance and interactions among the four predictors, there is no evidence of strong interactions among predictors for any of the 15 species, since no pairwise interaction was present in all, not even in most, selected models (Table S8) and the summed weight of evidence of all pairwise interactions were low (Figure 6). However, the reference model was not among selected models for any species (Table S8), suggesting their occurrence can be explained by some combination of the four anthropogenic threats (Table 2, Figure 6).

For four species – agouti, howler monkey, nine-banded armadillo and cougar, we could not disentangle the importance of the four predictors, since none of the four predictors was present in all the selected models and all predictors were present in at least one selected model (Table 2). However, the occurrence of the 11 remaining species was associated with at least one predictor (i.e. the predictor was present in all selected models) (Table 2). Among these 11 species, the occurrence of only one (white-lipped peccary) was associated with three predictors (habitat cover, habitat fragmentation and road density) (Table 2, Figure 6I). The occurrence of six species was associated with two predictors, habitat cover and road density in the case of four species (red brocket deer, gray brocket deer, jaguar and collared peccary) and habitat fragmentation and road density in the case of two species (naked-tailed armadillo and paca) (Table 2, Figure 6II). Finally, the occurrence of four species was associated with only one predictor – habitat cover in the case of three species (white cheeked spider monkey, greater long-nosed armadillo and lowland tapir) and road density in the case of one species (capybara) (Table 2, Figure 6III).

Habitat cover and road density were consistent predictors of the occurrence of eight species, while habitat fragmentation was a consistent predictor of the occurrence of only three species and population density did not consistently explained the occurrence of any species (Table 2). Habitat cover and road density jointly explained the occurrence of four species (red brocket deer, gray brocket deer, jaguar and collared peccary), habitat cover alone explained the occurrence of three species (white cheeked spider monkey, greater long-nosed armadillo and lowland tapir), and road density alone explained the occurrence of one species (capybara) (Table 2). Habitat fragmentation explained the occurrence of three species either together with habitat cover and road density (white-lipped peccary) or with road density only (naked-tailed armadillo and paca) (Table 2). For the species for which habitat cover and/or road density were consistent predictors, their effect was, as expected, positive and negative, respectively (Table 2). In contrast, for the three species for which habitat fragmentation was a consistent predictor, its effect was negative, as expected, for two species (white-lipped peccary and naked-tailed armadillo), but positive for one species (paca) (Table 2).

Table 2. Predictors included in the selected models (in the second step model selection) for the occurrence of 15 large mammal species. HC: habitat cover, HF: habitat fragmentation, R: roads, PD: human population density, + variable with positive effect in all selected models, - variable with negative effect in all selected models, +/- variable with both positive and negative effects among selected models. Dark grey to white: variable present in all, most, a few or none of the selected models. The species are ordered based on the number of predictors that are included in all selected models. Estimated coefficients (with standard errors) from the first-ranked models are shown for those variables present in all selected models. Complete results of model selection in Table S8.

					Estimated coefficients of variables in the first-ranked model		
Species	**HC**	**HF**	**R**	**PD**	**HC**	**HF**	**R**
White-lipped peccary	+	-	-	+	1.44 (0.45)	-0.46 (0.18)	-0.48 (0.24)
Red brocket deer	+	-	-	-	0.76 (0.17)		-0.62 (0.20)
Gray brocket deer	+	+	-	-	0.43 (0.20)		-0.49 (0.18)
Jaguar	+	+	-	-	0.60 (0.26)		-0.79 (0.25)
Collared peccary	+		-	+	0.83 (0.19)		-0.63 (0.20)
Naked-tailed armadillo	-	-	-	+		-0.33 (0.15)	-0.42 (0.15)
Paca	+	+	-	-		0.45 (0.21)	-0.35 (0.21)
White-cheeked spider monkey	+	+	-	+	1.42 (0.30)		
Greater long-nosed armadillo	+	+	-	+/-	1.03 (0.18)		
Lowland tapir	+	+	-	-	1.44 (0.34)		
Capybara	+	+	-	+/-			-0.62 (0.22)
Agouti	+	+	-	-			
Howler monkey	+	+	-	-			
Nine-banded armadillo	+/-	-	-	-			
Cougar	+	+/-	-	-			

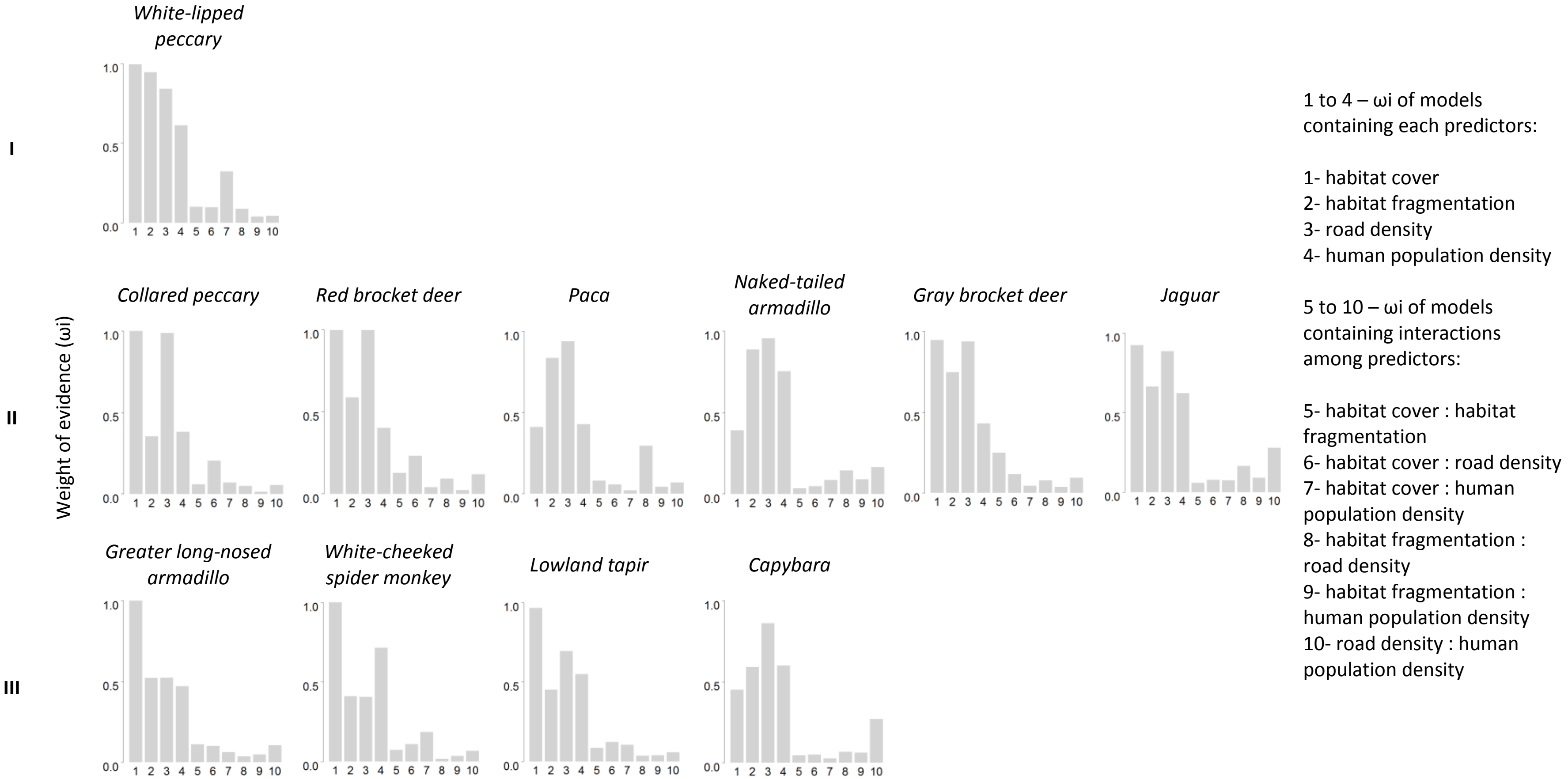

Figure 6. Weight of evidence (ωi) of models - from the second model selection - containing each of the four anthropogenic predictors and each of the six pairwise interactions among them for 11 out of the 15 large mammal species. I: species whose occurrence was associated with three predictors (habitat cover habitat fragmentation and road density), II: species whose occurrence was associated with two predictors (habitat cover and road density/ habitat fragmentation and road density), III: species whose occurrence was associated with one predictor (habitat cover or road density).

7. DISCUSSION

The occurrence of the great majority of the large mammals was positively associated with some type of native vegetation cover at some spatial scale. However, while most of these species responded to the variation in habitat quality, with the probability of occurrence increasing with the cover of either primary forest or total forest (but not total native vegetation), the occurrence of five species was positively associated with all types of native vegetation cover indistinctly. As expected by their large body size and vagility, most species responded to habitat cover at large spatial scales. More importantly, the chance of persistence of all large mammals is determined by some combination of the four anthropogenic threats, and despite the lack of evidence of interactions among these threats, the occurrence of most species was affected by the additive effects of more than one anthropogenic threat. Habitat cover and road density were the most important threats in terms of the number of species they affected, while habitat fragmentation affected fewer species and human population density was not related to the occurrence of any of the large mammals. As expected, species had greater chance of persistence where habitat cover is higher and the density of roads is lower; conversely, the effect of habitat fragmentation was either negative or positive. Habitat loss, habitat fragmentation and/or road density negatively affected the persistence not only of the endangered and largest species but also of some of the non-endangered and smaller species.

In the following paragraphs, we first argue that the response of the larger and endangered species to habitat cover is more dependent on the spatial scale than to the quality of the vegetation, which is consistent with their large geographical range and their distribution across different biomes as well as their high vagility. We then discuss the importance of considering distinct anthropogenic threats simultaneously in ecological studies, as their relative importance vary widely among the species and additive effects are pervasive. We end up by synthetizing our conclusions, and discussing the implications for managing for the persistence of large mammals in human-modified landscapes.

Although many studies have shown that native vegetation cover is important for the occurrence, abundance and richness of large mammals (KINNAIRD *et al*., 2003; AHUMADA *et al*., 2011), few have addressed issues related to vegetation quality and spatial scales simultaneously and for several species. Our results suggest that only two species – the smallest (nine-banded armadillo and naked-tailed armadillo) – do not respond to any type of native vegetation cover at any spatial scale. The probability of occurrence of the 13 remaining species

– including a range of body size, risk of extinction and taxonomic group – increased with some type of native vegetation cover at some spatial scale. However, although eight species responded to the variation in habitat quality (i.e. their probability of occurrence was positively associated with the cover of primary forest or total forest but not total vegetation cover), these included both larger (e.g. lowland tapir and cougar) and smaller (e.g. howler monkey) species, endangered (e.g. jaguar and white-lipped peccary) and not endangered species (e.g. capybara and collared peccary), and distinct taxonomic groups (e.g. ungulates, primates, rodents and carnivores). In contrast, the nine species that responded to habitat cover at larger spatial scales are all larger and the majority endangered (e.g. lowland tapir, cougar and jaguar), whereas the four species that responded to habitat cover at smaller spatial scales (or did not respond to the variation in spatial scale) are mostly smaller and not endangered (agouti, paca, howler monkey and gray brocket deer). These findings indicate that while the persistence of larger and endangered mammals is not necessarily affected by habitat quality, they respond to habitat cover mostly at larger spatial scales. This is consistent with the fact that these larger endangered species have wide geographical distributions, ranging across different biomes and occupying distinct types of habitats (DESBIEZ *et al*., 2009), as well as with the large home range size and vagility of these species (TUCKER *et al*., 2014).

By analyzing four anthropogenic threats simultaneously, our study reveals that the persistence of all 15 large mammals is affected by some combination of these threats, even the persistence of the relatively smaller, very common species that did not respond to habitat cover (i.e. the two species of armadillo – the nine-banded armadillo and naked-tailed armadillo). Both armadillos had higher chance of persistence in less fragmented areas with lower density of roads. Even though these armadillos are not as vulnerable to habitat cover or quality as larger species, yet their persistence may be disrupted by other threats, which are frequently overlooked by most studies. Hence, it is important to consider multiple threats, since different threats may enhance, impair or be neutral to the persistence of different species (SODHI *et al*., 2010).

Considering multiple threats is also needed to evaluate and test for the existence of additive effects and synergies between different human activities and disturbances, and has been considered very important as combined effects may impose serious threats to biodiversity (LAURANCE, 2015). Although several studies have proposed the existence and importance of synergistic interactions between different threats such as subsistence hunting and habitat fragmentation (PERES, 2001), fire and habitat fragmentation (COCHRANE, 2001), pasture burning and selective timber harvesting (UHL & BUSCHBACHER, 1985), species invasion and livestock grazing (HOBBS, 2001), few empirical studies in fact included several threats and tested for interactions (e.g. SAMPAIO *et al*., 2010). We found no evidence of synergy or other type of interactions between the four anthropogenic threats we studied; however, our results strongly suggest that additive effects of different anthropogenic threats that are commonly found together in human-modified landscapes are pervasive. The combined, additive effects of at least two anthropogenic threats were important in determining the persistence of seven out of the 11 large mammal species for which we could disentangle the relative importance of the four studied threats. Although other studies in other regions with different group of species and considering different threats are still needed to explore the potential of synergies, our study indicates a higher importance of additive than interaction effects between habitat loss and other anthropogenic threats that usually come along with it.

We also found that habitat loss and road density were by far the most important threats, affecting the occurrence of a larger number of large mammal species (eight) than habitat fragmentation (three), and especially than human population density that did not affect any of the studied species. Indeed, the effects of habitat loss have been shown to be much stronger than the effects of habitat fragmentation *per se* on biodiversity (FAHRIG, 2003). However, despite the recent expansion of the road network in the Amazon (AHMED *et al*., 2013) and elsewhere in the tropics, there has been little attempt to accurately examine the relation between roads and species occurrence or abundance, especially considering multiple spatial scales. A review by FAHRIG & RYTWINSKI (2009) has shown that most of the existing studies on road effects is not accurate, as there frequently is a high correlation between road density and other variables. As in our study the four anthropogenic threats were not strongly correlated, our results do suggest that the expansion of the road network – besides fostering future deforestation by stimulating a continued influx of people (LAURENCE *et al*., 2014) – can be very important and even as important as habitat loss to local extinctions of large mammals. On the other hand, despite previous evidence that human population density negatively impact the chance of persistence of large mammals (e.g. BRASHARES *et al*., 2001; CEBALLOS & ERLICH, 2002; WOODROFFE, 2000), when accounting for the effects of other threats, the direct effects of human population density may be much weaker or inexistent, as we found here.

For the species for which habitat cover and/or road density were consistent predictors, the probability of occurrence was always higher where habitat cover was higher and the density of road was lower, meaning that their effects were the same across species. In contrast, when habitat fragmentation was a consistent anthropogenic threat, species occurrence was either positively or negatively affected. In fact there is growing recognition that habitat fragmentation *per se*, besides resulting in weaker effects than habitat loss, may yield both negative or positive effects (FAHRIG, 2003). The negative effects of fragmentation *per se* is expected when the greater number of smaller patches results in smaller and less viable populations and detrimental edge effects (BENDER *et al*., 1998). In contrast, positive effects of habitat fragmentation *per se* may occur when species have greater dispersal success (PÜTTKER *et al*., 2011), are favored by edges (LAURANCE *et al*., 2002) or depend on habitat heterogeneity (LAW & DICKMAN, 1998).

We could not find any clear pattern related to body size, endangerment or taxonomic group with respect to the identity or combination of threats that affected species persistence among the 15 studied large mammals. Although most larger and endangered species were affected by habitat loss as previously suggested (WWF, 2016), our results indicates that some of them are likely to suffer from combinations of threats, especially between habitat loss and road expansion**.** It also noteworthy that for some endangered species – howler monkey and cougar – we were not able to distinguish which were the most important threats, suggesting that correlated factors other than those we considered may be more important to determine their persistence. In particular, both hunting and retaliation that are difficult to estimate at adequate scales should be considered in future studies (GONZÁLEZ-SUÁREZ *et al*., 2013). Finally, we also observed that even the common and not endangered species are likely to suffer from some combination between habitat loss, habitat fragmentation and road expansion. Hence, even though habitat requirements and tolerance to human-modified landscapes vary widely among species, in heavily deforested and degraded landscapes common species may become locally endangered (LAW & DICKMAN, 1998; PIMM *et al*., 1995).

8. CONCLUSIONS AND IMPLICATIONS TO CONSERVATION

In conclusion, our findings indicate that while the persistence of larger and endangered mammals is not necessarily affected by habitat quality, they respond to habitat cover mostly at larger spatial scales. Although not all species are affected by habitat loss, the chance of persistence of all large mammals is disrupted by other anthropogenic threats acting in concert, including smaller species relatively resilient to forest loss. More importantly, we present evidence that additive effects between distinct anthropogenic threats that commonly act simultaneously in human-modified landscapes are more important than their interaction in determining local extinctions of large mammals. Adding evidence to a growing literature, we also show that the effects of habitat loss are stronger than the effects of habitat fragmentation *per se* on biodiversity (FAHRIG, 2003), and highlight that the expansion of the network of roads can be as important as habitat loss for disrupting the persistence of large mammals. Finally, threat status and body size do not explain the response of large mammals to multiple threats in human-modified landscapes, an even smaller and common species may become locally endangered in heavily deforested and degraded landscapes.

As larger, wide-ranging, endangered mammals are vulnerable to deforestation at large spatial scales, but are not necessarily affected by forest quality, protected areas in public or private lands in Amazonia should be large to secure the persistence of these species (PERES, 2005), but may include mosaics of primary and secondary forest. Because additive effects among different threats are pervasive, and large mammals vary in their response to combinations of these threats, making predictions about species persistence based on one or few anthropogenic threats is risky and probably underestimates the chance of extinction of most species (BROOK *et al*., 2008). Management planning of human-modified landscapes in the Amazon should then take into account the accumulated impacts of multiple threats simultaneously and consider relatively large areas. Particularly important is to consider the consequences of the expansion of the road network in long-term planning and policies (LAURANCE *et al*., 2014). Pro-active measures to prevent Amazonian landscapes to became heavily deforested and altered are critical, as even common and relatively resilient species that are important as bushmeat may become locally endangered in these areas, affecting one of the most important ecosystem services provided to local residents and potentially eroding the value people attribute to forests (TORRES, 2014).

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10. APPENDICES

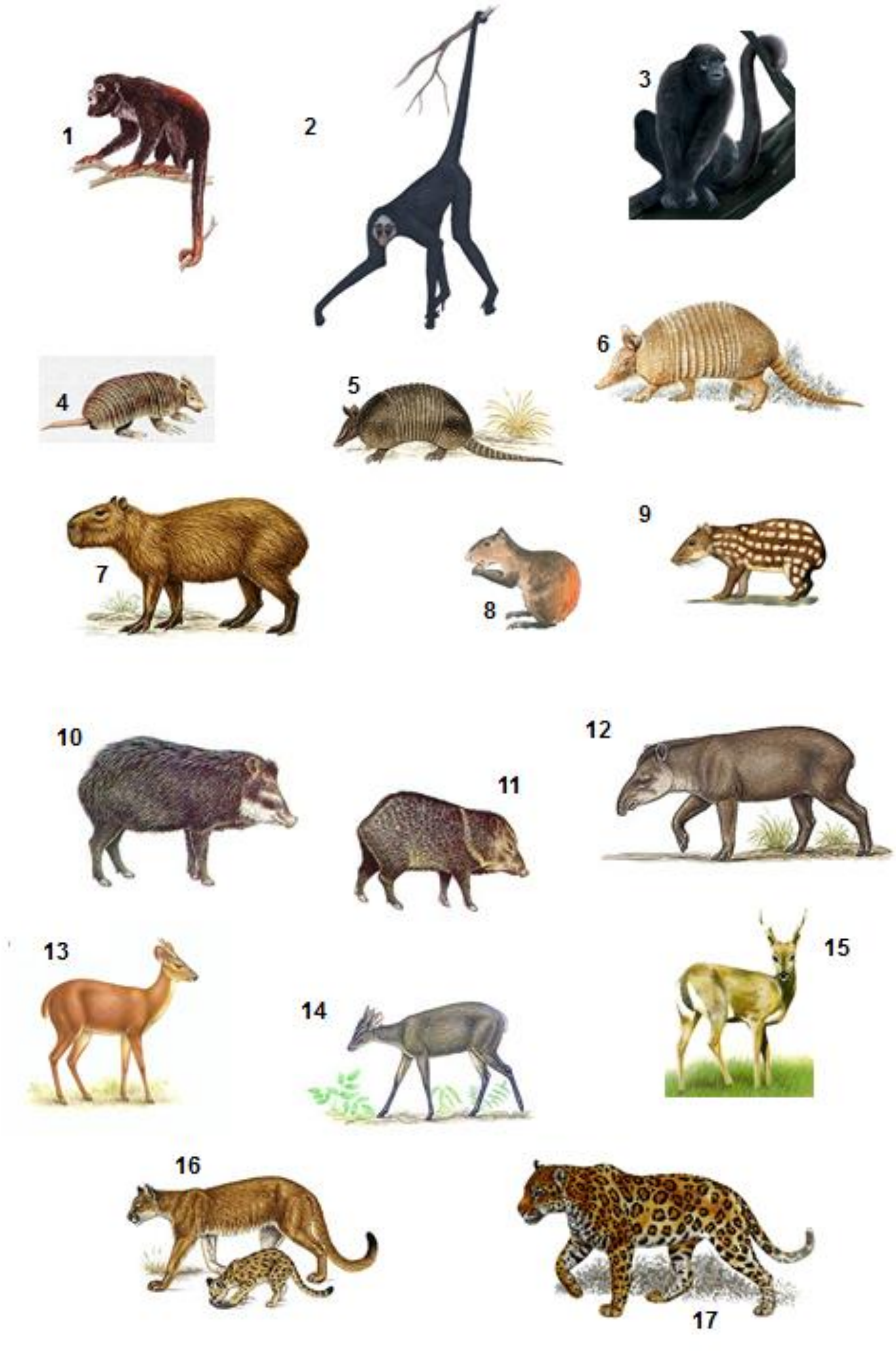

Figure S1. Color plate used in the interview-based surveys with images of 17 large mammal species (1: howler monkey, 2: white-cheeked spider monkey, 3: common woolly monkey, 4: naked-tailed armadillo, 5: nine-banded armadillo, 6: greater long-nosed armadillo, 7: capybara, 8: agouti, 9: paca, 10: white-lipped peccary, 11: collared peccary, 12; lowland tapir, 13: red brocket deer, 14: gray brocket deer, 15: pampas deer, 16: cougar, 17: jaguar). The geographical ranges of common woolly monkey and pampas deer do not encompass the study region.

Table S1. List of the 15 species of large mammals included in this study, indicating body weight, categories of threat, justification of categories of threat and main threats.

Species	**Body weight (kg)**[a]	**Endangerment status**[b]	**Endangerment status**[c]	**Justification of threat categories and main threats**[d]
Naked-tailed armadillo (*Cabassous unicinctus*)	3.2	least concern	least concern	Wide distribution, large population, occurrence in protected areas and its decline is not fast enough to qualify this species in any threat category. No major threats.
Nine-banded armadillo (*Dasypus novemcinctus*)	3.65	least concern	least concern	Wide distribution, large population, tolerant to habitat changes and no evidences of decline of its population. No major threats.
Agouti (*Dasyprocta leporina*)	3-8	least concern	least concern	Wide distribution, large population, occurrence in protected areas, tolerant to habitat changes at some extent and no evidences of decline of its population. No major threats.
White-cheeked spider monkey (*Ateles marginatus*)	5-6	endangered	endangered	Globally, at least 50% of its population declined over the past 45 years (three generations) due to habitat loss and hunting. Nationally, over the coming 45 years, this decline may continue due to the expansion of soy bean agriculture, rural settlements, dams and the paving of major highways as Santarém-Cuiabá and Transamazon.
Howler monkey (*Alouatta discolor*)	6.4	vulnerable	vulnerable	Globally, at least 30% of its population declined over the past 36 years (three generations) due to massive and ongoing habitat loss. Nationally, over the coming 36 years, this decline may continue due to the ongoing deforestation, expansion of agriculture, dams, rural settlements, hunting and paving of major highways, as Santarém-Cuiabá and Transamazon.
Paca (*Cuniculus paca*)	9.3	least concern	least concern	Wide distribution, large population, occurrence in protected areas and its decline is not fast enough to qualify this species in any threat category. However, local extinctions have occurred in the southeast of its range due to habitat changes, and it is frequently taken as bushmeat.
Greater long-nosed armadillo (*Dasypus kappleri*)	9.5	least concern	least concern	Wide distribution, occurrence in protected areas and its decline is not fast enough to qualify this species in any threat category. However, it cannot survive in open areas or savannas.
Gray brocket deer (*Mazama gouazoubira*)	17-25	least concern	least concern	Wide distribution, large population, occurrence in protected areas and although its population shows decline in areas of higher human contact, its distribution and abundance do not warrant a threatened status. Its major threats are habitat loss and hunting pressure.
Collared peccary (*Pecari tajacu*)	17-35	least concern	least concern	Wide distribution and occurrence in various habitats (e.g. tropical dry and rainforests, deserts, woodland and savanna). However, the ongoing habitat destruction and overhunting require a better monitoring of the threatened status of its population.
Red brocket deer (*Mazama Americana*)	24-48	least concern	data deficient	It has wide distribution and occur in high number in Amazonia. In addition, although it is highly hunted, its high reproductive rate make this species tolerable to exploitation activities.
White-lipped peccary (*Tayassu pecari*)	25-45	vulnerable	vulnerable	Globally, at least 30% of its population declined over the past 18 years (three generations) due to habitat loss, hunting, competition with livestock and epidemics. Nationally, over the coming 18 years, this decline may continue due to the ongoing deforestation, habitat alterations and hunting. In addition, it requires for a great diversity of continuous habitats and quickly disappear

				due to anthropic pressures.
Cougar (*Puma concolor*)	22-70	vulnerable	least concern	The most widely-distributed mammal in the Western Hemisphere, but its population is experiencing a decline in the south of its range. Nationally, 10% of its population may decline over the coming 21 years (three generations) due to the habitat loss and fragmentation, hunting, retaliation, road kills and expansion of agriculture. In addition, the upcoming decrease of forest remnants due to changes in the Brazilian Forest Code is likely a threat.
Capybara (*Hydrochoerus hydrochaeris*)	35-65	least concern	least concern	Wide distribution, large population, occurrence in protected areas and its decline is not fast enough to qualify this species in any threat category. Its major threats is hunting pressure.
Jaguar (*Panthera onca*)	61-158	vulnerable	near threatened	Nationally, 30% of its population declined over the past 27 years (three generations). Over the coming 27 years, this decline may continue. It is threaten by the habitat loss and fragmentation associated to the expansion of agriculture, road network, persecution, hunting and retaliation. In addition, the upcoming decrease of forest remnants due to changes in the Brazilian Forest Code is likely a threat.
Lowland tapir (*Tapirus terrestres*)	260	vulnerable	vulnerable	Globally, at least 30% of its population declined over the past 33 years (three generations) due to habitat loss, hunting and competition with livestock. Nationally, over the coming 33 years, this decline may continue due to ongoing deforestation and hunting. In addition, its persistence in high dense-populated areas is unlikely and it has low ability to repopulate impacted areas.

Data from:
[a]PAGLIA *et al*. (2012)
[b]Brazilian´s Red List – ICMBIO (2014)
[c]IUCN´s Red List – IUCN (2015)
[d]Brazilian and IUCN´s Red Lists

Table S2. Variance inflation factor (VIF) for each of the four predictors in relation to all the others for the 15 large mammal species.

Species	**Habitat cover**	**Habitat fragmentation**	**Road density**	**Human population density**
Howler monkey	1.69	1.12	1.35	1.41
White-cheeked spider monkey	1.95	1.22	1.80	1.81
Naked-tailed armadillo	1.21	1.02	1.21	1.13
Paca	1.23	1.15	1.37	1.39
Agouti	1.65	1.48	1.72	1.39
Greater long-nosed armadillo	1.75	1.04	1.99	2.04
Nine-banded armadillo	1.08	1.02	1.55	1.64
Capybara	1.65	1.18	2.03	2.03
Red brocket deer	1.81	1.06	1.35	1.57
Gray brocket deer	1.44	1.24	1.16	1.38
Jaguar	1.52	1.41	1.69	1.19
Collared peccary	1.57	1.42	1.92	1.70
Cougar	1.77	1.41	2.10	1.94
Lowland tapir	1.84	1.21	1.51	1.59
White-lipped peccary	1.80	1.09	1.30	1.62

Table S3. First-step model selection results comparing different measures of habitat cover for the occurrence of the 15 large mammal species, showing the selected models in bold. K: number of parameters. AICc: AICc value, ΔAICc: difference in AICc value in relation to the first-ranked model, ωi: Akaike weight. A: non-degraded primary forest, B: total primary forest, C: total forest, and D: total native vegetation. Numbers after letters represent the five spatial scales (1, 2, 4, 6 and 8 km).

Howler monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat cover	**C2**	**200.2**	**0**	**3**	**0.140**	**0.670**	**0.220**
	A2	**200.2**	**0**	**3**	**0.137**	**0.689**	**0.231**
	B2	**200.6**	**0.4**	**3**	**0.114**	**0.673**	**0.229**
	C1	**201.2**	**1**	**3**	**0.086**	**0.679**	**0.241**
	B4	**201.6**	**1.4**	**3**	**0.070**	**0.610**	**0.212**
	A4	**201.6**	**1.4**	**3**	**0.069**	**0.610**	**0.212**
	B6	**202.2**	**2.0**	**3**	**0.050**	**0.584**	**0.208**
	A6	202.3	2.1	3	0.048	0.581	0.208
	B8	202.5	2.4	3	0.043	0.571	0.207
	A8	202.6	2.4	3	0.041	0.568	0.206
	C4	202.8	2.6	3	0.038	0.559	0.205
	C6	203.3	3.2	3	0.029	0.537	0.202
	C8	203.6	3.4	3	0.025	0.524	0.200
	A1	203.6	3.4	3	0.025	0.606	0.251
	D2	204.0	3.9	3	0.020	0.493	0.190
	B1	204.1	3.9	3	0.020	0.577	0.244
	D6	204.9	4.7	3	0.013	0.469	0.194
	D8	205.1	4.9	3	0.012	0.458	0.192
	D4	205.7	5.6	3	0.009	0.434	0.192
	D1	205.7	5.6	3	0.009	0.426	0.186
	reference	208.8	8.6	2	0.002		

White-cheeked spider monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat cover	**D8**	**184.2**	**0**	**3**	**0.256**	**1.125**	**0.222**
	A8	**184.7**	**0.4**	**3**	**0.204**	**1.069**	**0.208**
	B8	**184.9**	**0.7**	**3**	**0.184**	**1.062**	**0.207**
	C8	**185**	**0.8**	**3**	**0.173**	**1.080**	**0.212**
	D6	187.1	2.9	3	0.060	1.059	0.216
	A6	188	3.8	3	0.039	1.001	0.203
	B6	188.3	4.1	3	0.033	0.994	0.202
	C6	188.6	4.4	3	0.028	1.002	0.206
	D4	192.3	8	3	0.005	0.942	0.205
	A4	192.6	8.3	3	0.004	0.902	0.194
	B4	192.9	8.6	3	0.003	0.896	0.194
	C4	193.2	9	3	0.003	0.899	0.197
	C2	193.5	9.3	3	0.003	0.862	0.186
	A2	194.1	9.9	3	0.002	0.833	0.180
	B2	194.3	10	3	0.002	0.830	0.180
	D2	194.6	10.3	3	0.002	0.910	0.207
	D1	198.3	14	3	<0.001	0.816	0.221
	A1	198.3	14	3	<0.001	0.700	0.161
	B1	198.5	14.2	3	<0.001	0.699	0.162
	C1	199.3	15.1	3	<0.001	0.704	0.168
	reference	207.6	23.4	2	<0.001		

Naked-tailed armadillo

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat cover	**reference**	**297.4**	**0**	**2**	**0.119**		
	D1	**299.1**	**1.7**	**3**	**0.052**	**0.088**	**0.140**
	C1	**299.3**	**1.9**	**3**	**0.047**	**0.058**	**0.141**
	D4	**299.3**	**1.9**	**3**	**0.046**	**-0.055**	**0.140**
	C4	**299.4**	**2**	**3**	**0.045**	**-0.040**	**0.139**
	A8	**299.4**	**2**	**3**	**0.044**	**0.033**	**0.140**
	B8	**299.4**	**2**	**3**	**0.044**	**0.032**	**0.140**
	D2	**299.5**	**2**	**3**	**0.043**	**-0.025**	**0.140**
	A1	**299.5**	**2**	**3**	**0.043**	**0.021**	**0.140**
	C6	**299.5**	**2**	**3**	**0.043**	**-0.021**	**0.140**
	B2	**299.5**	**2**	**3**	**0.043**	**-0.020**	**0.139**
	B4	**299.5**	**2**	**3**	**0.043**	**-0.019**	**0.140**
	A2	**299.5**	**2**	**3**	**0.043**	**-0.017**	**0.139**
	B1	**299.5**	**2**	**3**	**0.043**	**0.016**	**0.140**
	A4	**299.5**	**2**	**3**	**0.043**	**-0.016**	**0.140**
	C8	**299.5**	**2**	**3**	**0.043**	**0.014**	**0.140**
	C2	**299.5**	**2**	**3**	**0.043**	**-0.010**	**0.140**
	A6	299.5	2.1	3	0.043	0.008	0.140
	D6	299.5	2.1	3	0.043	-0.008	0.140
	B6	299.5	2.1	3	0.043	0.005	0.140
	D8	299.5	2.1	3	0.043	0.002	0.140

Paca

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**D2**	**223.1**	**0**	**3**	**0.104**	**0.425**	**0.212**
	C2	**223.6**	**0.5**	**3**	**0.081**	**0.422**	**0.229**
	A8	**224**	**0.9**	**3**	**0.068**	**0.391**	**0.210**
	B8	**224**	**0.9**	**3**	**0.067**	**0.391**	**0.210**
	C8	**224.3**	**1.2**	**3**	**0.057**	**0.372**	**0.210**
	D4	**224.5**	**1.4**	**3**	**0.053**	**0.361**	**0.212**
	D8	**224.5**	**1.4**	**3**	**0.052**	**0.363**	**0.215**
	C4	**224.7**	**1.6**	**3**	**0.047**	**0.348**	**0.213**
	D6	**224.8**	**1.7**	**3**	**0.044**	**0.342**	**0.212**
	A2	**224.9**	**1.7**	**3**	**0.043**	**0.349**	**0.225**
	B2	**224.9**	**1.8**	**3**	**0.043**	**0.347**	**0.224**
	B4	**225**	**1.9**	**3**	**0.041**	**0.334**	**0.214**
	A4	**225**	**1.9**	**3**	**0.041**	**0.334**	**0.214**
	B6	**225.1**	**1.9**	**3**	**0.039**	**0.326**	**0.208**
	C1	**225.1**	**2**	**3**	**0.039**	**0.326**	**0.217**
	A6	**225.1**	**2**	**3**	**0.039**	**0.324**	**0.208**
	D1	225.3	2.2	3	0.035	0.287	0.192
	C6	225.3	2.2	3	0.035	0.308	0.206
	reference	225.5	2.4	2	0.032		
	A1	226.3	3.2	3	0.021	0.238	0.219
	B1	226.4	3.3	3	0.020	0.227	0.218

Agouti

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**C2**	**235.8**	**0**	**3**	**0.206**	**0.662**	**0.212**
	A2	**237**	**1.2**	**3**	**0.114**	**0.645**	**0.224**
	B2	**237.2**	**1.4**	**3**	**0.104**	**0.639**	**0.223**
	D2	**237.3**	**1.5**	**3**	**0.096**	**0.577**	**0.193**
	C4	**237.7**	**1.9**	**3**	**0.081**	**0.593**	**0.200**
	D4	238.3	2.4	3	0.061	0.563	0.196
	B4	239.2	3.3	3	0.039	0.551	0.207
	A4	239.2	3.4	3	0.039	0.550	0.206
	C6	239.3	3.5	3	0.035	0.538	0.197
	C8	239.5	3.7	3	0.032	0.532	0.197
	A8	239.5	3.7	3	0.032	0.536	0.200
	B8	239.6	3.8	3	0.031	0.535	0.200
	B6	240	4.2	3	0.025	0.518	0.201
	A6	240	4.2	3	0.025	0.517	0.201
	D6	240.1	4.3	3	0.024	0.503	0.196
	C1	240.6	4.8	3	0.018	0.482	0.210
	D8	241.3	5.5	3	0.013	0.454	0.198
	D1	242.3	6.5	3	0.008	0.367	0.187
	A1	242.5	6.7	3	0.007	0.408	0.219
	B1	242.7	6.9	3	0.007	0.396	0.217
	reference	244	8.2	2	0.004		

Greater long-nosed armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**C8**	**239.6**	**0**	**3**	**0.331**	**1.025**	**0.175**
	A8	**240**	**0.5**	**3**	**0.264**	**1.007**	**0.171**
	B8	**240.2**	**0.7**	**3**	**0.236**	**1.003**	**0.171**
	D8	**241.4**	**1.9**	**3**	**0.131**	**1.009**	**0.175**
	A6	246.5	7	3	0.010	0.917	0.178
	B6	246.6	7	3	0.010	0.916	0.178
	C6	247.1	7.6	3	0.008	0.913	0.179
	D6	247.7	8.1	3	0.006	0.910	0.179
	A4	250.4	10.9	3	0.002	0.851	0.182
	B4	250.5	10.9	3	0.001	0.850	0.183
	C4	251.3	11.8	3	<0.001	0.835	0.180
	D4	253.3	13.8	3	<0.001	0.803	0.183
	A2	254.1	14.5	3	<0.001	0.759	0.179
	B2	254.2	14.6	3	<0.001	0.757	0.180
	C2	256.1	16.6	3	<0.001	0.716	0.183
	D2	261.1	21.5	3	<0.001	0.554	0.224
	B1	261.1	21.5	3	<0.001	0.507	0.208
	A1	261.2	21.6	3	<0.001	0.501	0.208
	reference	263.1	23.6	2	<0.001		
	C1	263.4	23.8	3	<0.001	0.349	0.236
	D1	265.2	25.6	3	<0.001	0.000	0.237

Nine-banded armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**reference**	**195**	**0**	**2**	**0.113**		
	D1	**196.3**	**1.3**	**3**	**0.058**	**0.172**	**0.203**
	C1	**196.5**	**1.6**	**3**	**0.052**	**0.149**	**0.216**
	C4	**196.7**	**1.8**	**3**	**0.046**	**0.111**	**0.215**
	D2	**196.8**	**1.8**	**3**	**0.045**	**0.100**	**0.206**
	C2	**196.8**	**1.8**	**3**	**0.045**	**0.097**	**0.213**
	B8	**196.8**	**1.8**	**3**	**0.045**	**0.099**	**0.218**
	A8	**196.8**	**1.9**	**3**	**0.045**	**0.099**	**0.218**
	A6	**196.8**	**1.9**	**3**	**0.045**	**0.096**	**0.218**
	B6	**196.8**	**1.9**	**3**	**0.045**	**0.096**	**0.218**
	A4	**196.8**	**1.9**	**3**	**0.044**	**0.088**	**0.217**
	B4	**196.8**	**1.9**	**3**	**0.044**	**0.088**	**0.217**
	C6	**196.9**	**1.9**	**3**	**0.043**	**0.082**	**0.216**
	C8	**196.9**	**1.9**	**3**	**0.043**	**0.080**	**0.217**
	A2	**197**	**2**	**3**	**0.042**	**0.052**	**0.216**
	B2	**197**	**2**	**3**	**0.042**	**0.050**	**0.216**
	D4	**197**	**2**	**3**	**0.041**	**0.038**	**0.213**
	D6	**197**	**2**	**3**	**0.041**	**0.030**	**0.215**
	D8	**197**	**2**	**3**	**0.041**	**0.027**	**0.217**
	A1	197	2.1	3	0.041	0.013	0.214
	B1	197	2.1	3	0.041	-0.005	0.213

Capybara

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**295.5**	**0**	**3**	**0.161**	**0.555**	**0.255**
	B8	**295.6**	**0.1**	**3**	**0.154**	**0.550**	**0.255**
	C8	**296.3**	**0.8**	**3**	**0.109**	**0.506**	**0.255**
	A6	297.6	2.1	3	0.057	0.419	0.251
	B6	297.7	2.1	3	0.055	0.414	0.251
	D1	298.1	2.5	3	0.045	0.288	0.200
	D8	298.1	2.6	3	0.045	0.372	0.248
	reference	298.1	2.6	2	0.044		
	C6	298.5	2.9	3	0.037	0.343	0.251
	C1	298.5	3	3	0.036	0.278	0.216
	A4	298.7	3.2	3	0.033	0.318	0.250
	B4	298.8	3.2	3	0.032	0.315	0.250
	A1	299.1	3.6	3	0.027	0.246	0.234
	D2	299.3	3.8	3	0.024	0.205	0.217
	D6	299.4	3.8	3	0.024	0.236	0.251
	C4	299.4	3.9	3	0.023	0.230	0.249
	B1	299.5	4	3	0.022	0.196	0.234
	D4	299.7	4.2	3	0.020	0.172	0.244
	A2	300	4.4	3	0.017	0.124	0.254
	B2	300	4.5	3	0.017	0.112	0.256
	C2	300	4.5	3	0.017	0.095	0.237

Red brocket deer

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**271.9**	**0**	**3**	**0.414**	**1.013**	**0.168**
	B8	**272.3**	**0.4**	**3**	**0.340**	**1.009**	**0.169**
	A6	275.2	3.3	3	0.080	0.967	0.169
	B6	275.5	3.6	3	0.069	0.964	0.170
	C8	276.7	4.9	3	0.036	0.951	0.173
	A4	278.4	6.5	3	0.016	0.918	0.171
	B4	278.5	6.6	3	0.015	0.917	0.172
	C6	279	7.1	3	0.012	0.911	0.170
	C2	281.1	9.3	3	0.004	0.856	0.190
	A2	281.5	9.6	3	0.003	0.860	0.189
	B2	282	10.2	3	0.003	0.849	0.189
	D8	282.5	10.6	3	0.002	0.856	0.178
	C4	282.5	10.6	3	0.002	0.849	0.171
	D6	282.5	10.7	3	0.002	0.847	0.174
	D2	283	11.1	3	0.002	0.787	0.198
	C1	286.6	14.8	3	<0.001	0.664	0.203
	A1	287	15.1	3	<0.001	0.694	0.213
	D4	287.2	15.3	3	<0.001	0.745	0.185
	D1	288	16.1	3	<0.001	0.572	0.198
	B1	288.2	16.3	3	<0.001	0.655	0.213
	reference	294.1	22.3	2	<0.001		

Gray brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat cover	**D2**	**291.6**	**0**	**3**	**0.173**	**0.779**	**0.206**
	C2	**291.9**	**0.2**	**3**	**0.155**	**0.775**	**0.197**
	D1	**292**	**0.3**	**3**	**0.146**	**0.757**	**0.210**
	A2	**293.4**	**1.7**	**3**	**0.073**	**0.748**	**0.194**
	B2	**293.6**	**1.9**	**3**	**0.066**	**0.742**	**0.194**
	B4	**293.7**	**2**	**3**	**0.064**	**0.733**	**0.177**
	A4	293.7	2.1	3	0.061	0.731	0.178
	A6	294.5	2.8	3	0.042	0.719	0.179
	B6	294.5	2.9	3	0.041	0.718	0.178
	A8	295.1	3.4	3	0.032	0.709	0.181
	B8	295.1	3.5	3	0.031	0.708	0.180
	C1	295.1	3.5	3	0.031	0.685	0.202
	C4	295.8	4.1	3	0.022	0.684	0.179
	A1	296.2	4.6	3	0.018	0.687	0.213
	C6	296.4	4.8	3	0.016	0.674	0.180
	C8	297.3	5.6	3	0.010	0.656	0.184
	B1	297.4	5.8	3	0.010	0.647	0.208
	D6	299.2	7.6	3	0.004	0.598	0.182
	D4	299.3	7.6	3	0.004	0.588	0.184
	D8	300.1	8.4	3	0.003	0.580	0.186
	reference	305.5	13.9	2	<0.001		

Jaguar

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat cover	**A8**	**255.8**	**0**	**3**	**0.198**	**1.214**	**0.252**
	B8	**256**	**0.2**	**3**	**0.176**	**1.210**	**0.252**
	A6	**256.4**	**0.7**	**3**	**0.142**	**1.221**	**0.265**
	B6	**256.6**	**0.9**	**3**	**0.128**	**1.217**	**0.265**
	A4	258	2.2	3	0.065	1.167	0.253
	C6	258	2.2	3	0.065	1.194	0.271
	B4	258.2	2.4	3	0.060	1.164	0.253
	C4	258.2	2.4	3	0.059	1.156	0.254
	C8	258.4	2.6	3	0.055	1.168	0.257
	C2	261.6	5.8	3	0.011	1.016	0.243
	D6	261.6	5.8	3	0.011	1.094	0.267
	A2	261.8	6.1	3	0.010	1.040	0.247
	D8	262.4	6.6	3	0.007	1.026	0.247
	B2	262.4	6.6	3	0.007	1.056	0.255
	D4	262.8	7	3	0.006	1.033	0.256
	D2	266.6	10.8	3	<0.001	0.820	0.237
	C1	272	16.2	3	<0.001	0.574	0.228
	A1	272.5	16.7	3	<0.001	0.601	0.244
	D1	272.6	16.8	3	<0.001	0.502	0.217
	B1	272.9	17.2	3	<0.001	0.577	0.244
	reference	275.9	20.1	2	<0.001		

Collared peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**260**	**0**	**3**	**0.335**	**1.163**	**0.196**
	B8	**260.4**	**0.4**	**3**	**0.276**	**1.158**	**0.196**
	A6	262.5	2.5	3	0.096	1.120	0.192
	C8	262.7	2.7	3	0.087	1.132	0.201
	B6	263	3	3	0.075	1.113	0.192
	C6	263.8	3.8	3	0.051	1.105	0.196
	A4	265.1	5.1	3	0.027	1.076	0.190
	C4	265.5	5.5	3	0.022	1.069	0.193
	B4	265.5	5.5	3	0.022	1.069	0.190
	D8	268.6	8.6	3	0.005	1.027	0.208
	D6	269.2	9.1	3	0.004	1.010	0.202
	D4	270.3	10.2	3	0.002	0.983	0.205
	A2	272.7	12.7	3	<0.001	0.916	0.208
	C2	272.9	12.8	3	<0.001	0.888	0.213
	B2	273	13	3	<0.001	0.909	0.209
	D2	276.4	16.4	3	<0.001	0.740	0.219
	C1	279.6	19.5	3	<0.001	0.589	0.220
	A1	279.9	19.9	3	<0.001	0.623	0.231
	B1	280.7	20.7	3	<0.001	0.588	0.233
	D1	281.7	21.7	3	<0.001	0.444	0.208
	reference	284.1	24.1	2	<0.001		

Cougar

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**207.1**	**0**	**3**	**0.222**	**1.307**	**0.323**
	B8	**207.1**	**0.1**	**3**	**0.211**	**1.305**	**0.323**
	C8	**207.7**	**0.7**	**3**	**0.157**	**1.285**	**0.327**
	C6	**208.7**	**1.7**	**3**	**0.095**	**1.265**	**0.349**
	A6	**209**	**1.9**	**3**	**0.084**	**1.252**	**0.340**
	B6	**209**	**2**	**3**	**0.083**	**1.251**	**0.340**
	D8	211.1	4	3	0.029	1.150	0.321
	D6	211.3	4.3	3	0.026	1.126	0.338
	B4	211.7	4.6	3	0.022	1.110	0.329
	A4	211.8	4.8	3	0.020	1.101	0.328
	C4	212.2	5.1	3	0.017	1.062	0.327
	B2	213.2	6.1	3	0.011	0.942	0.315
	A2	213.2	6.2	3	0.010	0.937	0.314
	D4	214.6	7.5	3	0.005	0.914	0.332
	C2	215.7	8.6	3	0.003	0.745	0.304
	A1	217	10	3	0.002	0.593	0.290
	B1	217.1	10.1	3	0.001	0.585	0.291
	D2	218.7	11.7	3	<0.001	0.463	0.298
	reference	218.9	11.9	2	<0.001		
	C1	219.1	12	3	<0.001	0.380	0.272
	D1	220	13	3	<0.001	0.243	0.246

Lowland tapir

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**179.3**	**0**	**3**	**0.289**	**1.711**	**0.339**
	B8	**179.8**	**0.5**	**3**	**0.226**	**1.703**	**0.341**
	C8	181.5	2.1	3	0.100	1.665	0.336
	A6	182.2	2.8	3	0.070	1.666	0.352
	A4	182.5	3.2	3	0.059	1.632	0.342
	B6	182.6	3.2	3	0.057	1.659	0.354
	C4	182.6	3.2	3	0.057	1.641	0.346
	B4	182.9	3.6	3	0.048	1.628	0.344
	D4	183.2	3.9	3	0.041	1.633	0.348
	C6	184.3	5	3	0.024	1.594	0.321
	D8	185.2	5.9	3	0.015	1.609	0.350
	D6	185.8	6.4	3	0.012	1.565	0.343
	A2	190.8	11.5	3	<0.001	1.268	0.316
	B2	190.8	11.5	3	<0.001	1.268	0.318
	C2	192.6	13.2	3	<0.001	1.171	0.313
	D2	195.5	16.2	3	<0.001	1.048	0.331
	A1	200.4	21.1	3	<0.001	0.600	0.306
	B1	200.6	21.3	3	<0.001	0.584	0.308
	C1	201.5	22.2	3	<0.001	0.465	0.294
	reference	201.8	22.4	2	<0.001		
	D1	201.9	22.6	3	<0.001	0.392	0.283

White-lipped peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat cover	**A8**	**246.9**	**0**	**3**	**0.312**	**0.715**	**0.161**
	B8	**246.9**	**0**	**3**	**0.306**	**0.713**	**0.161**
	C8	249.1	2.3	3	0.101	0.680	0.165
	B6	250.8	3.9	3	0.044	0.642	0.165
	A6	250.8	4	3	0.043	0.642	0.166
	C2	251.4	4.5	3	0.033	0.622	0.166
	A2	252.2	5.3	3	0.022	0.624	0.173
	D8	252.2	5.3	3	0.022	0.599	0.163
	B2	252.4	5.5	3	0.020	0.594	0.164
	A4	252.7	5.8	3	0.018	0.601	0.169
	B4	252.7	5.8	3	0.017	0.599	0.168
	C6	252.9	6	3	0.016	0.601	0.171
	C4	253.9	7	3	0.009	0.573	0.171
	C1	254	7.1	3	0.009	0.538	0.170
	A1	254.2	7.4	3	0.008	0.532	0.168
	B1	254.2	7.4	3	0.008	0.533	0.169
	D2	255.3	8.5	3	0.005	0.531	0.180
	D6	255.7	8.8	3	0.004	0.528	0.179
	D1	257.1	10.2	3	0.002	0.444	0.182
	D4	257.2	10.3	3	0.002	0.477	0.181
	reference	260.7	13.9	2	<0.001		

Table S4. First-step model selection results comparing different measures of habitat fragmentation for the occurrence of the 15 large mammal species, showing the selected models in bold. K: number of parameters. AICc: AICc value, ΔAICc: difference in AICc value in relation to the first-ranked model, ωi: Akaike weight. A: non-degraded primary forest, B: total primary forest, C: total forest, and D: total native vegetation. Numbers after letters represent the five spatial scales (1, 2, 4, 6 and 8 km).

Howler monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat fragmentation	**B2**	**202.5**	**0**	**3**	**0.367**	**0.565**	**0.205**
	A2	**203.4**	**0.9**	**3**	**0.229**	**0.522**	**0.198**
	C8	205	2.5	3	0.105	0.466	0.199
	B1	205.9	3.4	3	0.066	0.428	0.191
	A1	206.3	3.9	3	0.053	0.405	0.188
	C4	208.2	5.8	3	0.020	0.313	0.198
	C1	208.4	5.9	3	0.019	0.289	0.186
	A4	208.5	6.1	3	0.018	0.296	0.198
	B4	208.7	6.2	3	0.016	0.286	0.197
	reference	208.8	6.3	2	0.016		
	C6	208.9	6.5	3	0.015	0.265	0.188
	C2	209.3	6.9	3	0.012	0.228	0.186
	D2	209.8	7.4	3	0.009	0.188	0.191
	D6	210	7.5	3	0.009	0.178	0.194
	D1	210	7.5	3	0.009	-0.171	0.188
	B8	210.1	7.6	3	0.008	0.159	0.190
	A8	210.2	7.7	3	0.008	0.153	0.190
	D4	210.3	7.8	3	0.007	0.143	0.192
	D8	210.8	8.3	3	0.006	0.042	0.195
	A6	210.8	8.3	3	0.006	-0.027	0.182
	B6	210.8	8.4	3	0.006	0.011	0.185

White-cheeked spider monkey

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**C6**	**205.7**	**0**	**3**	**0.137**	**0.463**	**0.238**
	A2	**205.7**	**0**	**3**	**0.136**	**-0.438**	**0.232**
	C8	**206.4**	**0.7**	**3**	**0.098**	**0.441**	**0.245**
	D2	**206.5**	**0.8**	**3**	**0.091**	**-0.360**	**0.208**
	C2	**207.3**	**1.6**	**3**	**0.061**	**-0.314**	**0.208**
	B2	**207.5**	**1.8**	**3**	**0.057**	**-0.325**	**0.227**
	reference	**207.6**	**1.9**	**2**	**0.053**		
	D8	**207.7**	**2**	**3**	**0.051**	**0.339**	**0.242**
	A1	208	2.3	3	0.043	-0.284	0.230
	A8	208.6	2.9	3	0.033	-0.261	0.260
	B1	208.9	3.2	3	0.027	-0.187	0.222
	D4	209	3.3	3	0.026	-0.177	0.217
	D1	209.1	3.4	3	0.025	-0.140	0.188
	A4	209.3	3.6	3	0.023	-0.133	0.225
	B4	209.4	3.7	3	0.022	-0.117	0.225
	C1	209.5	3.8	3	0.021	-0.079	0.194
	B8	209.5	3.8	3	0.020	-0.084	0.240
	B6	209.6	3.9	3	0.020	-0.063	0.227
	A6	209.6	3.9	3	0.020	-0.055	0.229
	C4	209.6	3.9	3	0.019	-0.037	0.216
	D6	209.7	4	3	0.019	-0.001	0.237

Naked-tailed armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**D1**	**292.9**	**0**	**3**	**0.474**	**-0.367**	**0.147**
	A2	296.8	3.8	3	0.070	-0.233	0.142
	reference	297.4	4.5	2	0.050		
	B2	297.7	4.8	3	0.043	-0.185	0.141
	C1	298	5	3	0.039	-0.174	0.142
	B1	298.8	5.8	3	0.026	-0.120	0.140
	D4	299	6.1	3	0.023	-0.095	0.140
	A6	299	6.1	3	0.022	0.093	0.141
	C2	299.1	6.1	3	0.022	-0.091	0.141
	A1	299.1	6.1	3	0.022	0.083	0.141
	B6	299.1	6.2	3	0.021	-0.068	0.139
	D8	299.2	6.3	3	0.020	-0.062	0.139
	D6	299.3	6.3	3	0.020	0.046	0.140
	B8	299.4	6.4	3	0.019	0.032	0.140
	C6	299.4	6.5	3	0.018	-0.028	0.140
	A8	299.4	6.5	3	0.018	-0.088	0.140
	C4	299.5	6.5	3	0.018	-0.014	0.140
	C8	299.5	6.5	3	0.018	-0.013	0.140
	B4	299.5	6.5	3	0.018	0.013	0.140
	D2	299.5	6.5	3	0.018	0.001	0.140
	A4	299.5	6.5	3	0.018	-0.001	0.140

Paca

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**D6**	**219.4**	**0**	**3**	**0.299**	**0.572**	**0.195**
	C6	**219.9**	**0.5**	**3**	**0.232**	**0.536**	**0.180**
	C4	221.7	2.3	3	0.096	0.498	0.188
	B6	223	3.6	3	0.049	0.409	0.193
	C8	223.4	4	3	0.041	0.408	0.187
	D4	223.4	4	3	0.040	0.394	0.190
	B4	223.7	4.3	3	0.035	0.386	0.198
	A6	224.1	4.7	3	0.029	0.353	0.192
	D1	224.3	4.9	3	0.026	-0.337	0.191
	A4	224.6	5.2	3	0.023	0.341	0.198
	A2	224.9	5.5	3	0.019	0.310	0.189
	D8	225.2	5.8	3	0.017	0.318	0.197
	B2	225.2	5.8	3	0.016	0.295	0.192
	C2	225.3	5.9	3	0.016	0.286	0.186
	reference	225.5	6.1	2	0.014		
	B8	226.1	6.7	3	0.011	0.226	0.188
	A1	226.5	7.1	3	0.009	0.193	0.188
	A8	226.6	7.2	3	0.008	0.184	0.188
	C1	226.8	7.4	3	0.007	0.159	0.183
	D2	226.8	7.4	3	0.007	0.162	0.187
	B1	227.1	7.6	3	0.007	0.133	0.189

Agouti

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**C8**	**235.6**	**0**	**3**	**0.280**	**0.635**	**0.183**
	B6	**236.3**	**0.7**	**3**	**0.195**	**0.590**	**0.194**
	D8	**236.8**	**1.2**	**3**	**0.154**	**0.617**	**0.196**
	D6	237.7	2.1	3	0.097	0.588	0.194
	A6	237.7	2.1	3	0.096	0.539	0.193
	B8	238.2	2.6	3	0.076	0.531	0.190
	A8	239.2	3.6	3	0.045	0.497	0.191
	C6	240.5	4.9	3	0.024	0.474	0.187
	D4	243.3	7.7	3	0.006	0.317	0.188
	reference	244	8.4	2	0.004		
	D1	244	8.4	3	0.004	-0.256	0.182
	C1	244.9	9.3	3	0.003	-0.189	0.180
	A2	245.1	9.5	3	0.002	0.178	0.184
	B2	245.2	9.6	3	0.002	0.176	0.187
	B4	245.8	10.2	3	0.002	0.096	0.186
	C4	245.8	10.2	3	0.002	0.105	0.203
	D2	245.9	10.3	3	0.002	0.075	0.186
	A4	245.9	10.3	3	0.002	0.072	0.185
	A1	246	10.4	3	0.002	0.039	0.187
	C2	246	10.4	3	0.002	-0.015	0.187
	B1	246	10.4	3	0.002	0.006	0.189

Greater long-nosed armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	reference	263.1	0	2	0.099		
	B4	263.8	0.7	3	0.07	0.238	0.201
	A4	264.1	1	3	0.061	0.209	0.196
	C8	264.2	1.1	3	0.057	0.226	0.223
	D6	264.3	1.2	3	0.054	-0.228	0.254
	C6	264.5	1.4	3	0.049	0.179	0.219
	D8	264.6	1.4	3	0.048	0.183	0.228
	A1	264.6	1.5	3	0.048	-0.152	0.197
	D1	264.6	1.5	3	0.047	-0.127	0.165
	D2	264.7	1.6	3	0.045	0.128	0.183
	B8	264.8	1.6	3	0.043	0.135	0.207
	C1	264.8	1.7	3	0.042	0.102	0.171
	A2	264.8	1.7	3	0.042	-0.112	0.192
	D4	265	1.9	3	0.039	0.086	0.194
	A8	265	1.9	3	0.038	0.083	0.205
	C2	265.1	1.9	3	0.038	-0.064	0.181
	A6	265.1	2	3	0.037	0.056	0.201
	B2	265.1	2	3	0.037	0.050	0.189
	B1	265.1	2	3	0.036	-0.036	0.192
	C4	265.2	2	3	0.036	-0.024	0.202
	B6	265.2	2	3	0.036	-0.021	0.205

Nine-banded armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	D1	194.9	0	3	0.088	-0.283	0.196
	reference	195	0.1	2	0.086		
	D6	195.2	0.3	3	0.076	0.284	0.213
	C4	195.7	0.8	3	0.059	0.234	0.206
	B6	195.9	0.9	3	0.055	0.224	0.206
	C2	195.9	1	3	0.054	0.210	0.199
	B8	196	1.1	3	0.051	0.211	0.206
	A1	196.1	1.1	3	0.050	0.196	0.200
	B4	196.3	1.4	3	0.044	0.171	0.204
	A6	196.3	1.4	3	0.044	0.174	0.206
	A4	196.3	1.4	3	0.043	0.167	0.203
	B1	196.4	1.5	3	0.042	0.161	0.201
	B2	196.5	1.6	3	0.039	-0.139	0.198
	A8	196.7	1.8	3	0.035	0.111	0.209
	A2	196.7	1.8	3	0.035	-0.102	0.198
	D2	196.8	1.9	3	0.035	0.096	0.196
	D4	196.8	1.9	3	0.034	0.092	0.201
	C6	196.8	1.9	3	0.033	0.086	0.205
	D8	196.9	1.9	3	0.033	0.086	0.213
	C8	196.9	2	3	0.032	0.068	0.207
	C1	197	2.1	3	0.032	0.046	0.194

Capybara

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**A1**	**296.8**	**0**	**3**	**0.122**	**0.321**	**0.173**
	C2	**297.3**	**0.5**	**3**	**0.096**	**0.307**	**0.179**
	A4	**297.6**	**0.8**	**3**	**0.080**	**0.289**	**0.181**
	reference	**298.1**	**1.3**	**2**	**0.062**		
	B8	**298.3**	**1.5**	**3**	**0.058**	**0.256**	**0.184**
	B4	**298.4**	**1.6**	**3**	**0.056**	**0.251**	**0.184**
	B1	**298.5**	**1.7**	**3**	**0.051**	**0.226**	**0.174**
	A2	**298.6**	**1.8**	**3**	**0.049**	**0.231**	**0.181**
	D1	**298.7**	**1.9**	**3**	**0.047**	**-0.196**	**0.160**
	C4	298.9	2.1	3	0.044	0.223	0.189
	C1	299	2.2	3	0.04	0.177	0.162
	D6	299.1	2.3	3	0.039	-0.255	0.245
	B2	299.1	2.3	3	0.039	0.197	0.184
	A8	299.4	2.6	3	0.033	0.164	0.182
	D4	299.4	2.6	3	0.033	0.163	0.183
	B6	299.5	2.7	3	0.032	0.151	0.176
	A6	299.7	2.9	3	0.028	0.120	0.171
	C6	300	3.2	3	0.024	0.092	0.211
	C8	300.2	3.4	3	0.022	0.033	0.218
	A17	300.2	3.4	3	0.022	0.015	0.174
	D8	300.2	3.4	3	0.022	-0.013	0.230

Red brocket deer

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**B6**	**293.1**	**0**	**3**	**0.130**	**-0.354**	**0.206**
	A6	**293.5**	**0.4**	**3**	**0.107**	**-0.322**	**0.199**
	reference	**294.1**	**1.1**	**2**	**0.076**		
	D8	**294.3**	**1.2**	**3**	**0.071**	**0.317**	**0.218**
	A4	**294.9**	**1.8**	**3**	**0.053**	**0.216**	**0.185**
	A1	**294.9**	**1.8**	**3**	**0.053**	**0.205**	**0.176**
	C1	**295**	**1.9**	**3**	**0.050**	**0.177**	**0.161**
	B1	**295**	**2**	**3**	**0.049**	**0.193**	**0.177**
	D1	295.2	2.1	3	0.046	-0.161	0.159
	C8	295.5	2.4	3	0.039	0.213	0.239
	D2	295.8	2.7	3	0.034	-0.113	0.170
	B4	295.8	2.7	3	0.034	0.126	0.189
	D4	295.9	2.8	3	0.032	0.099	0.180
	C6	295.9	2.9	3	0.031	-0.130	0.257
	A2	296	2.9	3	0.030	0.076	0.174
	A8	296.2	3.1	3	0.028	-0.036	0.192
	D6	296.2	3.1	3	0.028	0.032	0.230
	C2	296.2	3.1	3	0.028	-0.023	0.173
	B2	296.2	3.1	3	0.027	-0.016	0.180
	C4	296.2	3.1	3	0.027	0.010	0.191
	B8	296.2	3.1	3	0.027	-0.003	0.193

Gray brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat fragmentation	**A1**	**300**	**0**	**3**	**0.286**	**0.462**	**0.167**
	C8	**300.5**	**0.5**	**3**	**0.224**	**0.512**	**0.189**
	A4	302.9	2.8	3	0.069	0.374	0.173
	B1	303.2	3.2	3	0.058	0.356	0.169
	C6	303.3	3.2	3	0.057	0.401	0.185
	D8	303.7	3.7	3	0.045	0.383	0.189
	B4	303.8	3.7	3	0.045	0.343	0.174
	D6	304.1	4.1	3	0.037	0.355	0.184
	B8	304.6	4.6	3	0.029	0.304	0.181
	D4	305.2	5.2	3	0.021	0.261	0.172
	reference	305.5	5.5	2	0.019		
	A8	305.6	5.6	3	0.017	0.244	0.178
	C4	305.7	5.7	3	0.017	0.245	0.176
	D2	306	6	3	0.014	0.203	0.165
	C1	306.1	6.1	3	0.014	0.187	0.155
	B2	306.9	6.8	3	0.009	0.146	0.173
	B6	307	7	3	0.009	0.128	0.169
	A2	307.2	7.1	3	0.008	0.108	0.169
	A6	307.3	7.2	3	0.008	0.091	0.165
	D1	307.3	7.3	3	0.008	0.075	0.153
	C2	307.4	7.4	3	0.007	-0.071	0.169

Jaguar

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Habitat fragmentation	**C8**	**264.9**	**0**	**3**	**0.584**	**0.885**	**0.254**
	C6	**266.6**	**1.7**	**3**	**0.250**	**0.828**	**0.257**
	A6	271	6.2	3	0.027	0.551	0.216
	B6	271.2	6.3	3	0.025	0.562	0.222
	B8	271.2	6.4	3	0.024	0.581	0.235
	A(8)	271.9	7.1	3	0.017	0.533	0.225
	C1	271.9	7.1	3	0.017	0.426	0.176
	D8	272.8	8	3	0.011	0.559	0.248
	A2	273.2	8.3	3	0.009	0.406	0.188
	B2	273.6	8.7	3	0.008	0.397	0.191
	C4	274.1	9.2	3	0.006	0.410	0.210
	B4	274.7	9.9	3	0.004	0.371	0.208
	A(1)	275.1	10.2	3	0.004	0.315	0.184
	D4	275.1	10.2	3	0.004	0.331	0.197
	A4	275.2	10.4	3	0.003	0.332	0.202
	B1	275.3	10.5	3	0.003	0.304	0.186
	reference	275.9	11	2	0.002		
	C2	277.6	12.8	3	<0.001	0.104	0.185
	D6	277.6	12.8	3	<0.001	0.128	0.231
	D2	277.8	12.9	3	<0.001	0.072	0.179
	D1	277.9	13	3	<0.001	0.043	0.163

Collared peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**C8**	**283.1**	**0**	**3**	**0.128**	**0.424**	**0.229**
	reference	**284.1**	**1.1**	**2**	**0.076**		
	B8	**284.2**	**1.2**	**3**	**0.072**	**0.294**	**0.212**
	D4	**284.4**	**1.3**	**3**	**0.067**	**0.252**	**0.187**
	A1	**284.4**	**1.3**	**3**	**0.067**	**0.250**	**0.184**
	A6	**285.1**	**2**	**3**	**0.048**	**0.212**	**0.197**
	B6	285.1	2.1	3	0.046	0.208	0.201
	A4	285.2	2.1	3	0.044	0.194	0.195
	A8	285.2	2.1	3	0.044	0.202	0.204
	C1	285.3	2.2	3	0.042	0.160	0.169
	C6	285.4	2.3	3	0.041	0.219	0.232
	B4	285.4	2.4	3	0.039	0.174	0.199
	D6	285.6	2.6	3	0.036	0.168	0.223
	B2	285.7	2.6	3	0.035	0.133	0.185
	C2	285.7	2.6	3	0.034	-0.125	0.182
	C4	285.8	2.7	3	0.033	0.122	0.198
	B1	285.8	2.8	3	0.032	0.111	0.187
	A2	285.9	2.8	3	0.032	0.104	0.181
	D8	286	3	3	0.029	0.094	0.247
	D1	286.1	3	3	0.029	-0.057	0.159
	D2	286.1	3	3	0.028	0.043	0.174

Cougar

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**C8**	**212.6**	**0**	**3**	**0.468**	**0.868**	**0.308**
	D1	**214.3**	**1.7**	**3**	**0.204**	**-0.521**	**0.212**
	C6	215.4	2.7	3	0.119	0.709	0.302
	C4	218.2	5.6	3	0.029	0.422	0.248
	reference	218.9	6.3	2	0.020		
	B4	219.1	6.5	3	0.018	0.353	0.251
	A4	219.3	6.7	3	0.017	0.329	0.245
	B6	219.9	7.3	3	0.012	0.270	0.262
	D8	220	7.3	3	0.012	0.307	0.296
	A2	220	7.4	3	0.012	0.222	0.225
	B8	220.2	7.5	3	0.011	0.233	0.251
	B2	220.5	7.9	3	0.009	0.155	0.229
	D4	220.6	8	3	0.009	0.150	0.232
	A6	220.7	8.1	3	0.008	0.134	0.239
	A1	220.9	8.2	3	0.008	0.072	0.223
	D2	220.9	8.3	3	0.008	0.065	0.209
	A8	220.9	8.3	3	0.008	0.067	0.241
	C2	220.9	8.3	3	0.007	0.056	0.216
	D6	220.9	8.3	3	0.007	-0.052	0.299
	B1	221	8.3	3	0.007	0.021	0.219
	C1	221	8.3	3	0.007	-0.009	0.202

Lowland tapir

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**B8**	**200.2**	**0**	**3**	**0.123**	**0.570**	**0.313**
	C6	**200.2**	**0**	**3**	**0.121**	**0.610**	**0.324**
	C2	**201**	**0.8**	**3**	**0.084**	**-0.412**	**0.250**
	A2	**201.2**	**1**	**3**	**0.073**	**-0.409**	**0.263**
	B6	**201.2**	**1**	**3**	**0.073**	**0.474**	**0.303**
	reference	**201.8**	**1.6**	**2**	**0.056**		
	A6	**201.8**	**1.6**	**3**	**0.055**	**0.407**	**0.290**
	C8	**201.9**	**1.7**	**3**	**0.053**	**0.465**	**0.328**
	B2	202.3	2.1	3	0.043	-0.314	0.260
	A8	202.6	2.4	3	0.036	0.304	0.283
	D6	202.8	2.6	3	0.033	0.290	0.288
	D4	202.9	2.7	3	0.032	0.261	0.270
	D8	202.9	2.7	3	0.032	0.309	0.319
	B4	203.2	3	3	0.028	0.232	0.291
	A4	203.2	3	3	0.027	0.218	0.280
	A1	203.5	3.3	3	0.024	-0.145	0.248
	B1	203.6	3.4	3	0.022	-0.115	0.245
	D1	203.7	3.6	3	0.021	0.053	0.194
	C1	203.8	3.6	3	0.021	-0.057	0.225
	D2	203.8	3.6	3	0.021	-0.049	0.229
	C4	203.8	3.6	3	0.021	-0.057	0.276

White-lipped peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Habitat fragmentation	**A2**	**258.4**	**0**	**3**	**0.220**	**-0.376**	**0.185**
	D8	**259.7**	**1.2**	**3**	**0.119**	**0.345**	**0.195**
	reference	260.7	2.3	2	0.069		
	C2	261	2.6	3	0.061	-0.234	0.174
	D1	261.2	2.7	3	0.056	0.208	0.164
	C8	261.2	2.8	3	0.054	0.250	0.193
	B2	262.1	3.7	3	0.034	-0.144	0.178
	C6	262.3	3.8	3	0.032	0.142	0.191
	B8	262.3	3.9	3	0.031	0.130	0.188
	A6	262.5	4	3	0.029	0.104	0.181
	A4	262.5	4.1	3	0.028	-0.094	0.183
	B1	262.5	4.1	3	0.028	0.089	0.173
	B6	262.6	4.1	3	0.028	0.087	0.182
	C1	262.6	4.2	3	0.027	0.073	0.167
	D4	262.6	4.2	3	0.027	-0.076	0.176
	A8	262.6	4.2	3	0.027	0.076	0.185
	A1	262.7	4.2	3	0.026	0.063	0.173
	D2	262.7	4.3	3	0.026	-0.052	0.169
	D6	262.7	4.3	3	0.026	0.057	0.189
	B4	262.7	4.3	3	0.026	-0.052	0.184
	C4	262.8	4.3	3	0.025	-0.036	0.180

Table S5. First-step model selection results comparing different measures of road density for the occurrence of the 15 large mammal species, showing the selected models in bold. K: number of parameters. AICc: AICc value, ΔAICc: difference in AICc value in relation to the first-ranked model, ωi: Akaike weight. HTR: high traffic roads and TR: total roads. Numbers after letters represent the five spatial scales (1, 2, 4, 6 and 8 km).

Howler monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**HTR2**	**200.3**	**0**	**3**	**0.371**	**-0.550**	**0.171**
	TR2	**201.4**	**1.2**	**3**	**0.208**	**-0.535**	**0.172**
	TR8	**201.5**	**1.2**	**3**	**0.202**	**-0.564**	**0.186**
	TR6	203.2	2.9	3	0.085	-0.502	0.181
	HTR4	204.5	4.2	3	0.045	-0.454	0.177
	HTR6	204.9	4.6	3	0.037	-0.442	0.178
	TR4	205.2	4.9	3	0.032	-0.439	0.181
	HTR8	206.6	6.3	3	0.016	-0.376	0.176
	reference	208.8	8.5	2	0.005		

White-cheeked spider monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**HTR6**	**204.3**	**0**	**3**	**0.300**	**-0.596**	**0.243**
	HTR8	**205.1**	**0.8**	**3**	**0.201**	**-0.552**	**0.246**
	HTR2	**205.7**	**1.4**	**3**	**0.148**	**-0.542**	**0.284**
	HTR4	**206.1**	**1.8**	**3**	**0.124**	**-0.489**	**0.249**
	TR8	206.9	2.6	3	0.081	-0.442	0.252
	reference	207.6	3.3	2	0.057		
	TR6	208.2	3.9	3	0.042	-0.321	0.256
	TR2	209.3	5	3	0.025	0.151	0.242
	TR4	209.6	5.3	3	0.021	-0.066	0.262

Naked-tailed armadillo

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**HTR2**	**293.3**	**0**	**3**	**0.634**	**-0.340**	**0.137**
	TR2	297	3.7	3	0.100	-0.218	0.139
	reference	297.4	4.1	2	0.081		
	HTR4	299.1	5.8	3	0.036	-0.089	0.139
	TR6	299.3	6	3	0.031	-0.055	0.139
	TR4	299.4	6.1	3	0.031	-0.045	0.140
	TR8	299.4	6.1	3	0.030	-0.027	0.140
	HTR8	299.5	6.2	3	0.029	-0.002	0.140
	HTR6	299.5	6.2	3	0.029	-0.002	0.140

Paca

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**TR2**	**215**	**0**	**3**	**0.657**	**-0.623**	**0.174**
	HTR2	217	2.1	3	0.233	-0.547	0.164
	HTR4	220.6	5.7	3	0.038	-0.482	0.179
	TR8	221.3	6.4	3	0.027	-0.483	0.187
	TR6	222	7	3	0.020	-0.456	0.189
	TR4	223.1	8.2	3	0.011	-0.410	0.184
	HTR6	224.4	9.5	3	0.006	-0.342	0.183
	HTR8	225	10.1	3	0.004	-0.311	0.186
	reference	225.5	10.5	2	0.003		

Agouti

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**HTR4**	**233.9**	**0**	**3**	**0.334**	**-0.645**	**0.163**
	HTR8	**235**	**1.1**	**3**	**0.191**	**-0.628**	**0.176**
	TR8	**235.2**	**1.3**	**3**	**0.173**	**-0.634**	**0.177**
	HTR6	**235.7**	**1.9**	**3**	**0.131**	**-0.614**	**0.170**
	TR6	236.6	2.7	3	0.085	-0.593	0.183
	HTR2	237.9	4.1	3	0.044	-0.512	0.162
	TR4	239.1	5.2	3	0.025	-0.516	0.184
	TR2	240	6.2	3	0.015	-0.432	0.172
	reference	244	10.1	2	0.002		

Greater long-nosed armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**TR8**	**256.1**	**0**	**3**	**0.493**	**-0.737**	**0.229**
	TR6	**257.7**	**1.6**	**3**	**0.221**	**-0.672**	**0.232**
	HTR2	258.2	2.1	3	0.171	-0.604	0.233
	HTR8	261.1	5	3	0.041	-0.503	0.232
	HTR6	262.1	6	3	0.025	-0.440	0.231
	HTR4	263	6.9	3	0.016	-0.349	0.225
	reference	263.1	7	2	0.015		
	TR2	263.5	7.4	3	0.012	-0.268	0.204
	TR4	264.5	8.4	3	0.008	-0.212	0.241

Nine-banded armadillo

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**TR4**	**190.3**	**0**	**3**	**0.366**	**-0.516**	**0.192**
	TR2	**190.4**	**0.1**	**3**	**0.343**	**-0.486**	**0.180**
	HTR2	193.6	3.3	3	0.069	-0.347	0.176
	HTR4	193.8	3.6	3	0.061	-0.355	0.191
	TR6	194.7	4.4	3	0.04	-0.312	0.197
	reference	195	4.7	2	0.035		
	TR8	195	4.8	3	0.034	-0.292	0.205
	HTR6	195.4	5.1	3	0.028	-0.260	0.198
	HTR8	195.5	5.3	3	0.026	-0.249	0.201

Capybara

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**TR6**	**291.4**	**0**	**3**	**0.391**	**-0.675**	**0.218**
	HTR8	**292.5**	**1.1**	**3**	**0.228**	**-0.631**	**0.232**
	TR8	**292.5**	**1.1**	**3**	**0.225**	**-0.642**	**0.228**
	HTR6	294.8	3.4	3	0.073	-0.507	0.214
	TR4	296.3	4.9	3	0.034	-0.455	0.212
	HTR4	297.9	6.5	3	0.015	-0.302	0.195
	reference	298.1	6.7	2	0.013		
	TR2	298.2	6.8	3	0.013	-0.265	0.185
	HTR2	298.9	7.5	3	0.009	-0.212	0.183

Red brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**HTR2**	**277.3**	**0**	**3**	**0.563**	**-0.900**	**0.213**
	HTR8	**279.3**	**2**	**3**	**0.205**	**-0.930**	**0.216**
	HTR6	279.9	2.6	3	0.153	-0.889	0.193
	TR8	282	4.8	3	0.052	-0.852	0.209
	HTR4	284.7	7.4	3	0.014	-0.730	0.192
	TR6	285.5	8.2	3	0.009	-0.747	0.207
	TR2	287.6	10.3	3	0.003	-0.567	0.194
	TR4	293	15.8	3	<0.001	-0.422	0.218
	reference	294.1	16.9	2	<0.001		

Gray brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Road density	**TR2**	**296.9**	**0**	**3**	**0.553**	**-0.589**	**0.179**
	TR6	299.2	2.3	3	0.173	-0.588	0.182
	TR8	300.1	3.2	3	0.110	-0.560	0.186
	HTR2	300.9	4	3	0.073	-0.452	0.174
	TR4	302.1	5.2	3	0.040	-0.480	0.185
	HTR8	302.5	5.6	3	0.033	-0.468	0.190
	reference	305.5	8.7	2	0.007		
	HTR6	305.6	8.8	3	0.007	-0.311	0.204
	HTR4	307.6	10.7	3	0.003	-0.021	0.220

Jaguar

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficients of fixed factor**	**Standard error of coefficients**
Road density	**TR6**	**259.7**	**0**	**3**	**0.831**	**-1.092**	**0.247**
	TR8	265.8	6.1	3	0.039	-0.919	0.244
	HTR2	266.1	6.5	3	0.033	-0.798	0.240
	HTR6	266.6	7	3	0.026	-0.865	0.235
	TR4	266.7	7	3	0.025	-0.828	0.231
	TR2	267.3	7.6	3	0.018	-0.675	0.212
	HTR4	267.4	7.8	3	0.017	-0.768	0.223
	HTR8	268.3	8.6	3	0.011	-0.836	0.257
	reference	275.9	16.2	2	<0.001		

Collared peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**TR6**	**268.1**	**0**	**3**	**0.385**	**-1.034**	**0.211**
	TR8	**268.2**	**0**	**3**	**0.379**	**-1.036**	**0.210**
	HTR8	**269.4**	**1.3**	**3**	**0.205**	**-1.023**	**0.231**
	TR4	275.4	7.3	3	0.010	-0.795	0.215
	HTR6	275.4	7.3	3	0.010	-0.835	0.217
	TR2	276.7	8.6	3	0.005	-0.620	0.204
	HTR2	277.3	9.2	3	0.004	-0.661	0.221
	HTR4	278.6	10.4	3	0.002	-0.649	0.217
	reference	284.1	16	2	<0.001		

Cougar

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**TR8**	**212.9**	**0**	**3**	**0.591**	**-1.028**	**0.345**
	TR6	215.3	2.4	3	0.180	-0.866	0.337
	HTR2	216.5	3.6	3	0.097	-0.640	0.318
	HTR8	218.7	5.8	3	0.033	-0.534	0.342
	reference	218.9	6	2	0.029		
	TR2	219.4	6.5	3	0.023	-0.321	0.256
	HTR6	219.9	6.9	3	0.018	-0.366	0.334
	TR4	220.1	7.2	3	0.016	-0.322	0.334
	HTR4	220.7	7.8	3	0.012	-0.167	0.316

Lowland tapir

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**HTR2**	**193.5**	**0**	**3**	**0.452**	**-1.322**	**0.514**
	HTR8	**194.8**	**1.2**	**3**	**0.245**	**-1.099**	**0.371**
	TR2	196.5	3	3	0.101	-0.850	0.333
	HTR6	197.4	3.9	3	0.065	-0.903	0.345
	HTR4	197.7	4.2	3	0.056	-0.847	0.340
	TR8	198.7	5.1	3	0.035	-0.903	0.384
	TR6	198.9	5.4	3	0.031	-0.885	0.383
	TR4	201.7	8.2	3	0.008	-0.526	0.351
	reference	201.8	8.2	2	0.007		

White-lipped peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Road density	**HTR2**	**251.5**	**0**	**3**	**0.513**	**-0.710**	**0.230**
	HTR8	**253.4**	**1.9**	**3**	**0.200**	**-0.620**	**0.202**
	HTR4	253.8	2.3	3	0.163	-0.590	0.191
	HTR6	254.8	3.3	3	0.101	-0.569	0.190
	TR8	260.3	8.8	3	0.006	-0.326	0.206
	TR6	260.6	9	3	0.006	-0.308	0.205
	reference	260.7	9.2	2	0.005		
	TR4	261.1	9.6	3	0.004	-0.256	0.197
	TR2	262.2	10.6	3	0.003	-0.146	0.181

Table S6. First-step model selection results comparing different measures of human population density for the occurrence of the 15 large mammal species, showing the selected models in bold. K: number of parameters. AICc: AICc value, ΔAICc: difference in AICc value in relation to the first-ranked model, ωi: Akaike weight. 1, 2, 4, 6 and 8 km are the five spatial scales.

Howler monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**8km**	**206.5**	**0**	**3**	**0.320**	**-0.356**	**0.175**
	4km	**206.9**	**0.4**	**3**	**0.260**	**-0.328**	**0.164**
	6km	**207.6**	**1.1**	**3**	**0.190**	**-0.314**	**0.175**
	2km	**208.4**	**1.9**	**3**	**0.130**	**-0.026**	**0.016**
	reference	208.8	2.3	2	0.100		

White-cheeked spider monkey

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**8km**	**206.7**	**0**	**3**	**0.318**	**-0.520**	**0.314**
	6km	**207.1**	**0.4**	**3**	**0.261**	**-0.510**	**0.329**
	reference	**207.6**	**0.9**	**2**	**0.201**		
	4km	**208.2**	**1.5**	**3**	**0.149**	**-0.398**	**0.345**
	2km	209.7	3	3	0.072	0.001	0.027

Naked-tailed armadillo

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**reference**	**297.4**	**0**	**2**	**0.310**		
	4km	**298**	**0.6**	**3**	**0.240**	**0.183**	**0.157**
	6km	**298.4**	**0.9**	**3**	**0.200**	**0.154**	**0.149**
	8km	**299.1**	**1.6**	**3**	**0.140**	**0.092**	**0.145**
	2km	**299.4**	**2**	**3**	**0.120**	**0.004**	**0.016**

Paca

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**2km**	**221**	**0**	**3**	**0.647**	**-0.048**	**0.021**
	4km	224.2	3.2	3	0.131	-0.321	0.160
	6km	224.6	3.6	3	0.105	-0.315	0.168
	reference	225.5	4.5	2	0.067		
	8km	226.1	5.1	3	0.050	-0.231	0.181

Agouti

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**4km**	**237.6**	**0**	**3**	**0.520**	**-0.512**	**0.166**
	6km	**238.9**	**1.2**	**3**	**0.278**	**-0.484**	**0.159**
	8km	240.3	2.7	3	0.135	-0.441	0.171
	2km	242.5	4.9	3	0.046	-0.036	0.021
	reference	244	6.4	2	0.021		

Greater long-nosed armadillo

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**6km**	**254**	**0**	**3**	**0.468**	**-1.217**	**0.417**
	8km	**254.3**	**0.3**	**3**	**0.397**	**-1.065**	**0.350**
	4km	256.6	2.6	3	0.128	-1.196	0.452
	reference	263.1	9.2	2	0.005		
	2km	264.3	10.3	3	0.003	-0.031	0.035

Nine-banded armadillo

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**4km**	**191.5**	**0**	**3**	**0.435**	**-0.390**	**0.149**
	6km	**192.5**	**1**	**3**	**0.265**	**-0.375**	**0.162**
	8km	**193.3**	**1.8**	**3**	**0.174**	**-0.353**	**0.179**
	reference	195	3.5	2	0.077		
	2km	195.9	4.4	3	0.049	-0.020	0.018

Capybara

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**6km**	**294.5**	**0**	**3**	**0.549**	**-0.618**	**0.251**
	4km	**296.2**	**1.7**	**3**	**0.233**	**-0.493**	**0.247**
	8km	297.9	3.4	3	0.100	-0.417	0.251
	reference	298.1	3.7	2	0.087		
	2km	300.2	5.7	3	0.031	-0.001	0.018

Red brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**8km**	**289.9**	**0**	**3**	**0.544**	**-0.671**	**0.258**
	6km	**291.5**	**1.6**	**3**	**0.250**	**-0.632**	**0.265**
	4km	293.1	3.2	3	0.109	-0.534	0.296
	reference	294.1	4.2	2	0.066		
	2km	295.7	5.8	3	0.030	-0.018	0.027

Gray brocket deer

	Models	**AICc**	**ΔAICc**	**K**	**ωi**	**Estimated coefficient of fixed factor**	**Standard error of coefficients**
Human population density	**8km**	**301.3**	**0**	**3**	**0.675**	**-0.556**	**0.216**
	6km	304.4	3.1	3	0.146	-0.397	0.213
	reference	305.5	4.2	2	0.084		
	4km	306.5	5.1	3	0.052	-0.224	0.209
	2km	306.8	5.5	3	0.044	-0.016	0.020

Jaguar

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Human population density	**2km**	**270.8**	**0**	**3**	**0.464**	**-0.095**	**0.042**
	4km	**272.2**	**1.4**	**3**	**0.228**	**-0.828**	**0.003**
	6km	272.9	2.1	3	0.163	-0.743	0.318
	8km	273.7	2.9	3	0.108	-0.671	0.313
	reference	275.9	5.1	2	0.037		

Collared peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Human population density	**4km**	**277.7**	**0**	**3**	**0.372**	**-0.959**	**0.355**
	6km	**278.1**	**0.4**	**3**	**0.297**	**-0.883**	**0.004**
	8km	**278.9**	**1.3**	**3**	**0.198**	**-0.865**	**0.293**
	2km	280	2.3	3	0.118	-0.083	0.038
	reference	284.1	6.5	2	0.015		

Cougar

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Human population density	**8km**	**204.6**	**0**	**3**	**0.823**	**-3.561**	**1.426**
	6km	208	3.4	3	0.153	-2.804	1.099
	4km	211.7	7.1	3	0.023	-1.980	0.775
	reference	218.9	14.3	2	<0.001		
	2km	219.7	15.1	3	<0.001	-0.040	0.039

Lowland tapir

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Human population density	**8km**	**187.4**	**0**	**3**	**0.621**	**-4.298**	**1.555**
	6km	189.5	2.1	3	0.214	-3.792	1.368
	4km	190.2	2.8	3	0.152	-3.883	1.448
	2km	195.2	7.8	3	0.013	-0.333	0.151
	reference	201.8	14.4	2	<0.001		

White-lipped peccary

	Models	AICc	ΔAICc	K	ωi	Estimated coefficient of fixed factor	Standard error of coefficients
Human population density	**reference**	**260.7**	**0**	**2**	**0.290**		
	8km	**261.2**	**0.5**	**3**	**0.230**	**-0.285**	**0.231**
	6km	**261.8**	**1.1**	**3**	**0.170**	**-0.222**	**0.224**
	2km	**261.9**	**1.2**	**3**	**0.160**	**-0.023**	**0.026**
	4km	**262.2**	**1.5**	**3**	**0.140**	**-0.163**	**0.222**

Table S7. Best measure of each of the four predictors for explaining the occurrence of the 15 large mammal species obtained from the first step model selection. A: non-degraded primary forest, B: total primary forest, C: total forest, D: total native vegetation, HTR: high traffic roads density and TR: total roads density.

Habitat cover			**Habitat fragmentation**			**Road density**			**Human population density**	
Species	**Habitat type**	**Radius buffer**	**Species**	**Habitat type**	**Radius buffer**	**Species**	**Road type**	**Radius buffer**	**Species**	**Radius buffer**
Capybara	A	8	Capybara	A	1	Howler monkey	HRT	2	Paca	2
Red brocket deer	A	8	Gray brocket deer	A	1	Naked-tailed armadillo	HRT	2	Jaguar	2
Jaguar	A	8	White-lipped peccary	A	2	Red brocket deer	HRT	2	Collared peccary	2
Collared peccary	A	8	Howler monkey	B	2	Lowland tapir	HRT	2	Naked-tailed armadillo	4
Cougar	A	8	Greater long-nosed armadillo	B	4	White-lipped peccary	HRT	2	Agouti	4
Lowland tapir	A	8	Red brocket deer	B	6	Agouti	HRT	4	Nine-banded armadillo	4
White-lipped peccary	A	8	Lowland tapir	B	8	White-cheeked spider monkey	HRT	6	Greater long-nosed armadillo	6
Howler monkey	C	2	White-cheeked spider monkey	C	6	Paca	TR	2	Capybara	6
Agouti	C	2	Agouti	C	8	Gray brocket deer	TR	2	Howler monkey	8
Greater long-nosed armadillo	C	8	Jaguar	C	8	Nine-banded armadillo	TR	4	White-cheeked spider monkey	8
Naked-tailed armadillo	D	1	Collared peccary	C	8	Capybara	TR	6	Red brocket deer	8
Nine-banded armadillo	D	1	Cougar	C	8	Jaguar	TR	6	Gray brocket deer	8
Paca	D	2	Naked-tailed armadillo	D	1	Collared peccary	TR	6	Cougar	8
Gray brocket deer	D	2	Nine-banded armadillo	D	1	Greater long-nosed armadillo	TR	8	Lowland tapir	8
White-cheeked spider monkey	D	8	Paca	D	6	Cougar	TR	8	White-lipped peccary	8

Table S8. Second-step model selection results considering the four anthropogenic threats for occurrence of the 15 large mammal species, showing the selected models in bold. K: number of parameters, AICc: AICc value, ΔAICc: difference in AICc value in relation to the first-ranked model, ωi: Akaike weight. In parenthesis: standard errors for the coefficients. ":" represents the interaction between two variables. HC: habitat cover, HF: habitat fragmentation, HPD: human population density, HTR: high traffic roads density, TR: total roads density, A: non-degraded primary forest, B: total primary forest, C: total forest, and D: total native vegetation. Numbers after letters represent the five spatial scales (1, 2, 4, 6 and 8 km). Only models with ωi ≥ 0.02 are shown.

Howler monkey

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC2C**	**HF2B**	**HTR2**	**HPD8**	**HC2C:HF2B**	**HC2C:HTR2**	**HC2C:HPD8**	**HF2B:HTR2**	**HF2B:HPD8**	**HTR2:HPD8**
HF2B + HTR2	**196.8**	**0**	**0.105**	**4**		**0.492 (0.214)**	**-0.471 (0.173)**							
HC2C + HF2B + HTR2	**196.9**	**0.2**	**0.097**	**5**	**0.32 (0.236)**	**0.432 (0.219)**	**-0.336 (0.185)**							
HF2B + HTR2 + HF2B:HTR2	**197.2**	**0.5**	**0.084**	**5**		**0.457 (0.218)**	**-0.599 (0.198)**					**-0.303 (0.236)**		
HC2C + HF2B + HTR2 + HF2B:HTR2	**197.3**	**0.6**	**0.079**	**6**	**0.318 (0.231)**	**0.406 (0.218)**	**-0.47 (0.208)**					**-0.309 (0.236)**		
HC2C + HF2B	**198.1**	**1.4**	**0.054**	**4**	**0.506 (0.216)**	**0.437 (0.217)**								
HF2B + HTR2 + HPD8	**198.2**	**1.5**	**0.050**	**5**		**0.461 (0.216)**	**-0.439 (0.178)**	**-0.141 (0.178)**						
HC2C + HF2B + HTR2 + HC2C:HTR2	**198.6**	**1.9**	**0.042**	**6**	**0.273 (0.249)**	**0.439 (0.222)**	**-0.459 (0.259)**			**-0.178 (0.275)**				
HC2C + HTR2	**198.8**	**2.0**	**0.039**	**4**	**0.456 (0.246)**		**-0.349 (0.186)**							
HC2C + HF2B + HTR2 + HC2C:HF2B	**198.8**	**2.0**	**0.038**	**6**	**0.388 (0.275)**	**0.43 (0.218)**	**-0.325 (0.186)**		**0.1 (0.207)**					
HC2C + HF2B + HTR2 + HPD8	199.0	2.2	0.035	6	0.297 (0.257)	0.425 (0.22)	-0.336 (0.185)	-0.042 (0.189)						
HF2B + HTR2 + HPD8 + HF2B:HTR2	199.0	2.3	0.034	6		0.439 (0.219)	-0.565 (0.208)	-0.097 (0.179)				-0.276 (0.241)		
HC2C + HF2B + HTR2+ HPD8 + HF2B:HTR2	199.5	2.7	0.027	7	0.328 (0.255)	0.408 (0.22)	-0.472 (0.21)	0.018 (0.194)				-0.315 (0.244)		
HC2C + HF2B + HC2C:HF2B	199.7	3.0	0.024	5	0.594 (0.252)	0.439 (0.214)			0.144 (0.207)					

White-cheeked spider monkey

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8D**	**HF6C**	**HTR6**	**HPD8**	**HC8D:HF6C**	**HC8D:HTR6**	**HC8D:HPD8**	**HF6C:HTR6**	**HF6C:HPD8**	**HTR6:HPD8**
HC8D + HPD8	**183.6**	**0**	**0.143**	**4**	**1.423 (0.297)**			**0.498 (0.281)**						
HC8D	**184.2**	**0.6**	**0.107**	**3**	**1.125 (0.222)**									
HC8D + HPD8 + HC8D:HPD8	**184.5**	**0.8**	**0.094**	**5**	**1.9 (0.528)**			**1.214 (0.681)**			**0.671 (0.604)**			
HC8D + HF6C + HPD8	**184.9**	**1.3**	**0.075**	**5**	**1.414 (0.302)**	**0.168 (0.187)**		**0.514 (0.28)**						
HC8D + HTR6 + HPD8 + HC8D:HTR6	**185.4**	**1.7**	**0.060**	**6**	**1.619 (0.352)**		**-0.173 (0.292)**	**0.728 (0.32)**		**0.432 (0.284)**				
HC8D + HF6C	185.7	2.1	0.051	4	1.105 (0.227)	0.145 (0.188)								
HC8D + HTR6 + HPD8	185.7	2.1	0.050	5	1.418 (0.329)		-0.01 (0.277)	0.5 (0.287)						
HC8D + HTR6 + HPD8 + HTR6:HPD8	186	2.4	0.044	6	1.558 (0.346)		-0.067 (0.278)	0.85 (0.372)						-0.356 (0.269)
HC8D + HF6C + HPD8 + HC8D:HPD8	186.1	2.4	0.043	6	1.857 (0.543)	0.141 (0.19)		1.17 (0.697)			0.614 (0.617)			
HC8D + HTR6	186.2	2.6	0.039	4	1.169 (0.277)		0.071 (0.269)							
HC8D + HTR6 + HPD8 + HC8D:HPD8	186.6	3	0.033	6	1.907 (0.558)		0.011 (0.277)	1.214 (0.681)			0.673 (0.606)			
HC8D + HF6C + HPD8 + HC8D:HF6C	186.8	3.2	0.030	6	1.366 (0.314)	0.26 (0.272)		0.483 (0.285)	-0.103 (0.215)					
HC8D + HF6C + HTR6 + HPD8	187	3.4	0.026	6	1.43 (0.332)	0.172 (0.19)	0.033 (0.281)	0.507 (0.286)						
HC8D + HF6C + HPD8 + HF6C:HPD8	187	3.4	0.026	6	1.409 (0.314)	0.171 (0.197)		0.507 (0.302)					0.012 (0.216)	
HC8D + HF6C + HC8D:HF6C	187.2	3.6	0.024	5	1.06 (0.231)	0.303 (0.289)			-0.167 (0.225)					
HC8D + HF6C + HTR6+ HPD8 + HTR6:HPD8	187.3	3.6	0.023	7	1.576 (0.352)	0.178 (0.192)	-0.028 (0.281)	0.872 (0.375)						-0.362 (0.268)
HC8D + HF6C + HTR6+ HPD8 + HC8D:HTR6	187.3	3.7	0.023	7	1.606 (0.355)	0.086 (0.202)	-0.141 (0.303)	0.714 (0.323)		0.395 (0.298)				
HC8D + HF6C + HTR6	187.6	4	0.020	5	1.173 (0.28)	0.16 (0.191)	0.115 (0.274)							

Naked-tailed armadillo

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC1D**	**HF1D**	**HTR2**	**HPD4**	**HC1D:HF1D**	**HC1D:HTR2**	**HC1D:HPD4**	**HF1D:HTR2**	**HF1D:HPD4**	**HTR2:HPD4**
HF1D + HTR2 + HPD4	**288.1**	**0**	**0.159**	**5**		**-0.334 (0.148)**	**-0.421 (0.15)**	**0.305 (0.183)**						
HF1D + HTR2 + HPD4 + HTR2:HPD4	**288.9**	**0.9**	**0.102**	**6**		**-0.339 (0.149)**	**-0.437 (0.15)**	**0.223 (0.188)**						**0.151 (0.151)**
HF1D + HTR2	**289.2**	**1.1**	**0.090**	**4**		**-0.362 (0.149)**	**-0.335 (0.139)**							
HF1D + HTR2 + HPD4 + HF1D:HTR2	**289.8**	**1.7**	**0.068**	**6**		**-0.331 (0.149)**	**-0.431 (0.15)**	**0.308 (0.183)**				**0.09 (0.142)**		
HC1D + HF1D + HTR2+ HPD4+ HC1D:HPD4	**289.8**	**1.7**	**0.067**	**7**	**-0.078 (0.167)**	**-0.33 (0.149)**	**-0.463 (0.162)**	**0.243 (0.18)**			**-0.333 (0.211)**			
HF1D +HTR2 + HPD4 + HF1D:HPD4	**289.9**	**1.8**	**0.064**	**6**		**-0.296 (0.164)**	**-0.436 (0.153)**	**0.35 (0.202)**					**0.128 (0.238)**	
HC1D + HF1D + HTR2 + HPD4	290.2	2.1	0.055	6	-0.014 (0.162)	-0.334 (0.148)	-0.426 (0.158)	0.302 (0.186)						
HF1D + HTR2 + HF1D:HTR2	290.9	2.9	0.038	5		-0.359 (0.148)	-0.344 (0.139)					0.083 (0.142)		
HC1D + HF1D + HTR2+ HPD4 + HTR2:HPD4	291.0	3.0	0.036	7	-0.03 (0.164)	-0.34 (0.149)	-0.447 (0.159)	0.215 (0.192)						0.153 (0.151)
HC1D + HF1D + HTR2	291.1	3.0	0.035	5	-0.066 (0.159)	-0.363 (0.148)	-0.358 (0.15)							
HTR2 + HPD4	291.3	3.2	0.032	4			-0.434 (0.148)	0.334 (0.178)						
HC1D + HF1D + HTR2+ HPD4 + HF1D:HTR2	291.9	3.8	0.024	7	-0.03 (0.164)	-0.331 (0.149)	-0.441 (0.159)	0.302 (0.185)				0.094 (0.143)		
HC1D + HF1D + HTR2+ HPD4 + HC1D:HTR2	291.9	3.9	0.023	7	-0.02 (0.163)	-0.321 (0.15)	-0.464 (0.171)	0.293 (0.184)		-0.105 (0.171)				
HC1D + HF1D + HTR2+ HPD4 + HF1D:HPD4	292.0	4.0	0.022	7	-0.011 (0.162)	-0.296 (0.164)	-0.439 (0.161)	0.347 (0.205)					0.127 (0.237)	
HTR2 + HPD4 + HTR2:HPD4	292.2	4.1	0.020	5			-0.449 (0.148)	0.26 (0.182)						0.145 (0.15)

Paca

Models	AICc	dAICc	weight	df	Estimated coefficients of fixed factor in candidate models									
					HC2D	HF6D	TR2	HPD2	HC2D:HF6D	HC2D:TR2	HC2D:HPD2	HF6D:TR2	HF6D:HPD2	TR2:HPD2
HF6D + TR2 + HF6D:TR2	**212.5**	**0**	**0.153**	**5**		**0.446 (0.208)**	**-0.349 (0.207)**					**0.329 (0.209)**		
HF6D + TR2	**212.8**	**0.3**	**0.131**	**4**		**0.416 (0.204)**	**-0.505 (0.175)**							
HF6D + TR2 + HPD2	**214.1**	**1.6**	**0.069**	**5**		**0.399 (0.204)**	**-0.425 (0.196)**	**-0.154 (0.18)**						
HF6D + TR2 + HPD2 + HF6D:TR2	**214.3**	**1.8**	**0.062**	**6**		**0.432 (0.208)**	**-0.311 (0.217)**	**-0.106 (0.195)**				**0.298 (0.215)**		
HC2D + HF6D + TR2 + HF6D:TR2	**214.4**	**1.9**	**0.058**	**6**	**0.079 (0.187)**	**0.431 (0.212)**	**-0.333 (0.209)**					**0.315 (0.211)**		
HC2D + HF6D + TR2	**214.5**	**2.0**	**0.056**	**5**	**0.114 (0.185)**	**0.393 (0.209)**	**-0.475 (0.181)**							
HC2D + HF6D + TR2 + HC2D:HF6D	214.9	2.4	0.047	6	0.262 (0.211)	0.373 (0.2)	-0.494 (0.182)		0.25 (0.185)					
TR2	215.0	2.4	0.045	3			-0.623 (0.174)							
HF6D + TR2 + HPD2 + TR2:HPD2	215.5	3.0	0.035	6		0.418 (0.206)	-0.415 (0.2)	0.132 (0.403)						-0.164 (0.199)
HC2D + TR2	215.9	3.4	0.028	4	0.206 (0.201)		-0.563 (0.183)							
TR2 + HPD2	216.0	3.5	0.027	4			-0.523 (0.197)	-0.179 (0.183)						
HC2D + HF6D + TR2 + HC2D:TR2	216.0	3.5	0.027	6	0.089 (0.19)	0.385 (0.209)	-0.409 (0.201)			0.158 (0.201)				
HC2D + HF6D + TR2 + HPD2	216.1	3.5	0.026	6	0.075 (0.193)	0.385 (0.208)	-0.416 (0.196)	-0.134 (0.183)						
HF6D +TR2 + HPD2 + HF6D:HPD2	216.2	3.7	0.024	6		0.399 (0.204)	-0.425 (0.198)	-0.155 (0.243)					0 (0.177)	
HC2D + HF6D + TR2+ HPD2 + HC2D:HF6D	216.3	3.7	0.024	7	0.222 (0.216)	0.364 (0.198)	-0.428 (0.197)	-0.15 (0.183)	0.259 (0.183)					
HC2D + HF6D + TR2+ HPD2 + HF6D:TR2	216.4	3.8	0.022	7	0.055 (0.194)	0.423 (0.211)	-0.306 (0.217)	-0.09 (0.198)				0.292 (0.215)		

Agouti

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC2C**	**HF8C**	**HTR4**	**HPD4**	**HC2C:HF8C**	**HC2C:HTR4**	**HC2C:HPD4**	**HF8C:HTR4**	**HF8C:HPD4**	**HTR4:HPD4**
HF8C + HTR4 + HPD4	**231.3**	**0**	**0.070**	**5**		**0.314 (0.211)**	**-0.397 (0.189)**	**-0.259 (0.175)**						
HF8C + HTR4	**231.5**	**0.1**	**0.065**	**4**		**0.417 (0.199)**	**-0.455 (0.184)**							
HTR4 + HPD4	**231.5**	**0.2**	**0.065**	**4**			**-0.508 (0.176)**	**-0.344 (0.166)**						
HC2C + HTR4 + HPD4 + HC2C:HTR4	**231.7**	**0.4**	**0.057**	**6**	**0.363 (0.254)**		**-0.219 (0.253)**	**-0.279 (0.173)**		**0.4 (0.256)**				
HC2C + HF8C + HTR4 + HC2C:HTR4	**232.0**	**0.7**	**0.050**	**6**	**0.363 (0.246)**	**0.323 (0.208)**	**-0.189 (0.252)**			**0.367 (0.25)**				
HC2C + HF8C + HTR4	**232.3**	**0.9**	**0.044**	**5**	**0.246 (0.22)**	**0.365 (0.207)**	**-0.348 (0.206)**							
HC2C + HTR4 + HC2C:HTR4	**232.3**	**1.0**	**0.043**	**5**	**0.454 (0.246)**		**-0.274 (0.248)**			**0.421 (0.252)**				
HC2C + HTR4 + HPD4	**232.3**	**1.0**	**0.042**	**5**	**0.254 (0.23)**		**-0.399 (0.2)**	**-0.288 (0.168)**						
HC2C + HF8C + HTR4+ HPD4 + HC2C:HTR4	**232.6**	**1.2**	**0.038**	**7**	**0.31 (0.253)**	**0.247 (0.216)**	**-0.165 (0.255)**	**-0.222 (0.18)**		**0.363 (0.253)**				
HC2C + HF8C + HTR4 + HPD4	**232.7**	**1.4**	**0.035**	**6**	**0.191 (0.227)**	**0.284 (0.216)**	**-0.323 (0.208)**	**-0.224 (0.175)**						
HC2C + HF8C	**233.0**	**1.7**	**0.030**	**4**	**0.414 (0.208)**	**0.467 (0.202)**								
HC2C + HF8C + HPD4	**233.0**	**1.7**	**0.029**	**5**	**0.331 (0.207)**	**0.375 (0.207)**		**-0.243 (0.169)**						
HF8C +HTR4 + HPD4 + HF8C:HPD4	**233.1**	**1.8**	**0.029**	**6**		**0.325 (0.211)**	**-0.398 (0.191)**	**-0.137 (0.286)**					**0.108 (0.194)**	
HC2C + HTR4	**233.3**	**2.0**	**0.026**	**4**	**0.358 (0.233)**		**-0.46 (0.207)**							
HF8C + HTR4 + HF8C:HTR4	**233.3**	**2.0**	**0.026**	**5**		**0.406 (0.201)**	**-0.417 (0.201)**					**0.09 (0.176)**		
HF8C + HTR4 + HPD4 + HTR4:HPD4	**233.3**	**2.0**	**0.026**	**6**		**0.317 (0.21)**	**-0.39 (0.191)**	**-0.218 (0.213)**						**-0.048 (0.135)**
HF8C + HTR4 + HPD4 + HF8C:HTR4	233.4	2.1	0.024	6		0.314 (0.211)	-0.395 (0.2)	-0.257 (0.182)				0.007 (0.189)		
HTR4 + HPD4 + HTR4:HPD4	233.5	2.2	0.024	5			-0.503 (0.177)	-0.312 (0.2)						-0.04 (0.134)
HF8C + HPD4	233.7	2.4	0.021	4		0.473 (0.193)		-0.326 (0.165)						
HTR4	233.9	2.5	0.020	3			-0.645 (0.163)							

Greater long-nosed armadillo

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8C**	**HF4B**	**TR8**	**HPD6**	**HC8C:HF4B**	**HC8C:TR8**	**HC8C:HPD6**	**HF4B:TR8**	**HF4B:HPD6**	**TR8:HPD6**
HC8C	**239.6**	**0**	**0.112**	**3**	**1.025 (0.175)**									
HC8C + HF4B	**239.9**	**0.3**	**0.096**	**4**	**1.025 (0.175)**	**0.22 (0.166)**								
HC8C + TR8	**240.1**	**0.5**	**0.086**	**4**	**0.904 (0.198)**		**-0.258 (0.208)**							
HC8C + TR8 + HPD6 + TR8:HPD6	**240.3**	**0.8**	**0.075**	**6**	**1.143 (0.275)**		**-0.468 (0.269)**	**0.949 (0.656)**						**-0.849 (0.462)**
HC8C + HPD6	**240.6**	**1.0**	**0.067**	**4**	**0.89 (0.217)**			**-0.307 (0.323)**						
HC8C + HF4B + TR8	**240.7**	**1.2**	**0.062**	**5**	**0.919 (0.198)**	**0.199 (0.166)**	**-0.23 (0.209)**							
HC8C + HF4B + HPD6	**241.1**	**1.6**	**0.051**	**5**	**0.9 (0.22)**	**0.21 (0.169)**		**-0.284 (0.333)**						
HC8C + TR8 + HC8C:TR8	**241.2**	**1.7**	**0.048**	**5**	**0.966 (0.208)**		**-0.21 (0.213)**			**0.232 (0.239)**				
HC8C + HF4B + HC8C:HF4B	**241.3**	**1.7**	**0.048**	**5**	**1.023 (0.177)**	**0.263 (0.172)**			**-0.126 (0.151)**					
HC8C + TR8 + HPD6	241.9	2.3	0.035	5	0.846 (0.222)		-0.205 (0.228)	-0.192 (0.35)						
HC8C + HF4B + HPD6 + HF4B:HPD6	242.0	2.4	0.034	6	0.896 (0.227)	0.258 (0.179)		-0.351 (0.4)					0.253 (0.242)	
HC8C + HF4B + TR8+ HPD6 + TR8:HPD6	242.2	2.6	0.030	7	1.114 (0.279)	0.097 (0.181)	-0.426 (0.278)	0.821 (0.698)						-0.753 (0.49)
HC8C + HF4B + TR8 + HF4B:TR8	242.4	2.9	0.027	6	0.862 (0.213)	0.228 (0.173)	-0.293 (0.235)					0.125 (0.19)		
HC8C + HF4B + HPD6 + HC8C:HF4B	242.4	2.9	0.027	6	0.886 (0.224)	0.268 (0.179)		-0.312 (0.347)	-0.142 (0.158)					
HC8C + HF4B + TR8 + HC8C:HF4B	242.5	3.0	0.026	6	0.93 (0.201)	0.237 (0.177)	-0.199 (0.214)		-0.092 (0.157)					
HC8C + HF4B + TR8 + HC8C:TR8	242.5	3.0	0.025	6	0.954 (0.208)	0.162 (0.179)	-0.204 (0.213)			0.146 (0.255)				
HC8C + HF4B + TR8 + HPD6	242.6	3.0	0.025	6	0.861 (0.225)	0.198 (0.168)	-0.183 (0.226)	-0.182 (0.358)						
HC8C + HPD6 + HC8C:HPD6	242.6	3.1	0.024	5	0.964 (0.387)			-0.189 (0.595)			0.121 (0.532)			

Nine-banded armadillo

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC1D**	**HF1D**	**TR4**	**HPD4**	**HC1D:HF1D**	**HC1D:TR4**	**HC1D:HPD4**	**HF1D:TR4**	**HF1D:HPD4**	**TR4:HPD4**
HF1D + TR4	**189.6**	**0**	**0.087**	**4**		**-0.323 (0.198)**	**-0.556 (0.2)**							
HF1D + TR4 + HPD4	**190.2**	**0.6**	**0.064**	**5**		**-0.356 (0.201)**	**-0.365 (0.244)**	**-0.252 (0.201)**						
TR4	**190.3**	**0.7**	**0.063**	**3**			**-0.516 (0.192)**							
HF1D + TR4 + HF1D:TR4	**190.3**	**0.7**	**0.062**	**5**		**-0.348 (0.194)**	**-0.587 (0.201)**					**0.255 (0.208)**		
HF1D + HPD4	**190.4**	**0.8**	**0.058**	**4**		**-0.355 (0.2)**		**-0.447 (0.156)**						
HC1D + HF1D + TR4 + HC1D:TR4	**190.9**	**1.3**	**0.044**	**6**	**-0.04 (0.224)**	**-0.333 (0.198)**	**-0.458 (0.211)**			**0.373 (0.226)**				
TR4 + HPD4	**191.3**	**1.7**	**0.037**	**4**			**-0.36 (0.241)**	**-0.201 (0.194)**						
HF1D + TR4 + HPD4 + HF1D:TR4	**191.5**	**1.9**	**0.034**	**6**		**-0.366 (0.198)**	**-0.427 (0.257)**	**-0.2 (0.207)**				**0.199 (0.215)**		
HPD4	**191.5**	**1.9**	**0.033**	**3**				**-0.39 (0.149)**						
HC1D + HF1D + TR4	**191.6**	**2.0**	**0.032**	**5**	**0.073 (0.208)**	**-0.322 (0.199)**	**-0.541 (0.203)**							
HC1D + TR4 + HC1D:TR4	191.7	2.1	0.031	5	-0.003 (0.209)		-0.415 (0.206)			0.339 (0.213)				
HC1D + HF1D + TR4 + HC1D:HF1D	191.7	2.1	0.030	6	0.024 (0.215)	-0.252 (0.203)	-0.545 (0.198)		-0.299 (0.217)					
HC1D + HF1D + HPD4 + HC1D:HPD4	191.9	2.3	0.028	6	0.031 (0.208)	-0.354 (0.198)		-0.353 (0.195)			0.349 (0.233)			
HC1D + HF1D + TR4+ HPD4 + HC1D:TR4	191.9	2.3	0.027	7	-0.066 (0.226)	-0.362 (0.202)	-0.298 (0.254)	-0.234 (0.211)		0.35 (0.222)				
HC1D + TR4	192.1	2.5	0.024	4	0.086 (0.195)		-0.499 (0.194)							
HC1D + HF1D + TR4 + HF1D:TR4	192.2	2.6	0.023	6	0.074 (0.208)	-0.346 (0.196)	-0.57 (0.205)					0.256 (0.208)		
HC1D + HF1D + TR4+ HPD4+ HC1D:HPD4	192.2	2.7	0.023	7	0.014 (0.211)	-0.356 (0.199)	-0.33 (0.252)	-0.175 (0.24)			0.317 (0.234)			
HC1D + HF1D + TR4 + HPD4	192.3	2.7	0.023	6	0.033 (0.211)	-0.355 (0.201)	-0.362 (0.245)	-0.247 (0.204)						
HF1D + HPD4 + HF1D:HPD4	192.3	2.7	0.022	5		-0.367 (0.202)		-0.488 (0.182)					-0.09 (0.206)	
HF1D + TR4 + HPD4 + TR4:HPD4	192.3	2.7	0.022	6		-0.356 (0.201)	-0.364 (0.245)	-0.265 (0.391)						0.009 (0.235)

Capybara

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF1A**	**TR6**	**HPD6**	**HC8A:HF1A**	**HC8A:TR6**	**HC8A:HPD6**	**HF1A:TR6**	**HF1A:HPD6**	**TR6:HPD6**
HF1A + TR6	**291.3**	**0**	**0.091**	**4**		**0.256 (0.173)**	**-0.618 (0.222)**							
TR6	**291.4**	**0.1**	**0.085**	**3**			**-0.675 (0.218)**							
HF1A + TR6 + HPD6 + TR6:HPD6	**291.6**	**0.3**	**0.079**	**6**		**0.283 (0.177)**	**-0.661 (0.29)**	**0.524 (0.523)**						**-0.638 (0.376)**
HC8A + TR6 + HPD6 + TR6:HPD6	**291.9**	**0.7**	**0.065**	**6**	**0.463 (0.315)**		**-0.646 (0.29)**	**0.92 (0.625)**						**-0.834 (0.422)**
HC8A + HF1A + TR6+ HPD6 + TR6:HPD6	**292**	**0.7**	**0.063**	**7**	**0.409 (0.316)**	**0.253 (0.177)**	**-0.625 (0.291)**	**0.97 (0.629)**						**-0.862 (0.421)**
TR6 + HPD6 + TR6:HPD6	**292**	**0.8**	**0.062**	**5**			**-0.686 (0.287)**	**0.399 (0.511)**						**-0.57 (0.372)**
TR6 + HPD6	**292.6**	**1.3**	**0.047**	**4**			**-0.529 (0.265)**	**-0.272 (0.29)**						
HC8A + TR6	**292.6**	**1.4**	**0.046**	**4**	**0.237 (0.263)**		**-0.565 (0.248)**							
HF1A + TR6 + HPD6	**292.7**	**1.4**	**0.045**	**5**		**0.243 (0.173)**	**-0.49 (0.268)**	**-0.24 (0.292)**						
HC8A + HF1A + TR6	**292.9**	**1.7**	**0.039**	**5**	**0.174 (0.267)**	**0.234 (0.175)**	**-0.542 (0.249)**							
HF1A + TR6 + HF1A:TR6	293.4	2.1	0.032	5		0.255 (0.175)	-0.619 (0.225)					-0.008 (0.19)		
HF1A +TR6 + HPD6 + HF1A:HPD6	293.6	2.4	0.028	6		0.202 (0.181)	-0.487 (0.272)	-0.342 (0.321)					-0.26 (0.247)	
HC8A + HF1A + TR6 + HC8A:HF1A	294	2.7	0.024	6	0.178 (0.266)	0.224 (0.176)	-0.565 (0.25)		0.182 (0.177)					
HF1A + HPD6	294	2.7	0.023	4		0.273 (0.171)		-0.554 (0.249)						
HC8A + TR6 + HPD6	294.3	3	0.020	5	0.166 (0.281)		-0.489 (0.274)	-0.2 (0.313)						

Red brocket deer

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF6B**	**HTR2**	**HPD8**	**HC8A:HF6B**	**HC8A:HTR2**	**HC8A:HPD8**	**HF6B:HTR2**	**HF6B:HPD8**	**HTR2:HPD8**
HC8A + HTR2	**262.8**	**0**	**0.137**	**4**	**0.764 (0.172)**		**-0.617 (0.198)**							
HC8A + HF6B + HTR2	**263.0**	**0.2**	**0.126**	**5**	**0.781 (0.18)**	**-0.233 (0.183)**	**-0.676 (0.206)**							
HC8A + HTR2 + HC8A:HTR2	**263.5**	**0.7**	**0.095**	**5**	**0.965 (0.244)**		**-0.389 (0.271)**			**0.408 (0.354)**				
HC8A + HF6B + HTR2 + HC8A:HF6B	**263.6**	**0.8**	**0.092**	**6**	**0.799 (0.182)**	**-0.173 (0.189)**	**-0.669 (0.206)**		**0.194 (0.159)**					
HC8A + HF6B + HTR2 + HC8A:HTR2	**264.0**	**1.1**	**0.077**	**6**	**0.963 (0.248)**	**-0.216 (0.184)**	**-0.46 (0.279)**			**0.378 (0.356)**				
HC8A + HTR2 + HPD8 + HTR2:HPD8	**264.0**	**1.2**	**0.074**	**6**	**0.835 (0.221)**		**-0.578 (0.204)**	**-0.039 (0.25)**						**-0.413 (0.28)**
HC8A + HF6B + HTR2 + HF6B:HTR2	**264.2**	**1.4**	**0.068**	**6**	**0.776 (0.181)**	**-0.327 (0.22)**	**-0.804 (0.265)**					**-0.24 (0.263)**		
HC8A + HTR2 + HPD8	264.9	2.1	0.049	5	0.741 (0.21)		-0.617 (0.198)	-0.04 (0.213)						
HC8A + HF6B + HTR2 + HPD8	264.9	2.1	0.047	6	0.731 (0.22)	-0.242 (0.184)	-0.68 (0.207)	-0.088 (0.231)						
HC8A + HF6B + HTR2+ HPD8 + HTR2:HPD8	265.0	2.2	0.045	7	0.806 (0.224)	-0.186 (0.175)	-0.636 (0.211)	-0.094 (0.26)						-0.365 (0.288)
HC8A + HF6B + HTR2+ HPD8 + HC8A:HF6B	265.5	2.7	0.035	7	0.74 (0.221)	-0.184 (0.189)	-0.675 (0.207)	-0.104 (0.238)	0.197 (0.159)					
HC8A + HTR2 + HPD8 + HC8A:HTR2	265.6	2.8	0.033	6	0.975 (0.293)		-0.386 (0.275)	0.014 (0.222)		0.413 (0.361)				
HC8A + HF6B + HTR2+ HPD8 + HC8A:HTR2	266.1	3.2	0.027	7	0.935 (0.298)	-0.221 (0.187)	-0.469 (0.285)	-0.039 (0.237)		0.366 (0.363)				
HC8A + HF6B + HTR2+ HPD8 + HF6B:HTR2	266.3	3.5	0.024	7	0.741 (0.224)	-0.334 (0.224)	-0.806 (0.268)	-0.062 (0.243)				-0.237 (0.269)		
HC8A + HF6B + HTR2+ HPD8 + HF6B:HPD8	266.5	3.7	0.022	7	0.717 (0.216)	-0.271 (0.186)	-0.713 (0.212)	-0.089 (0.218)					0.111 (0.142)	
HC8A + HTR2 + HPD8 + HC8A:HPD8	266.6	3.8	0.021	6	0.923 (0.359)		-0.615 (0.198)	0.261 (0.525)			0.298 (0.478)			
HC8A + HF6B + HTR2+ HPD8+ HC8A:HPD8	266.7	3.9	0.020	7	0.904 (0.358)	-0.235 (0.169)	-0.677 (0.204)	0.206 (0.53)			0.291 (0.476)			

Gray brocket deer

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC2D**	**HF1A**	**TR2**	**HPD8**	**HC2D:HF1A**	**HC2D:TR2**	**HC2D:HPD8**	**HF1A:TR2**	**HF1A:HPD8**	**TR2:HPD8**
HC2D + HF1A + TR2 + HC2D:HF1A	**286.0**	**0**	**0.165**	**6**	**0.426 (0.201)**	**0.345 (0.18)**	**-0.492 (0.183)**		**-0.277 (0.178)**					
HC2D + HF1A + TR2	**286.4**	**0.4**	**0.135**	**5**	**0.47 (0.189)**	**0.292 (0.17)**	**-0.483 (0.177)**							
HC2D + TR2	**287.2**	**1.2**	**0.092**	**4**	**0.606 (0.188)**		**-0.471 (0.181)**							
HC2D + HF1A + TR2+ HPD8 + HC2D:HF1A	**287.9**	**1.9**	**0.064**	**7**	**0.392 (0.212)**	**0.336 (0.18)**	**-0.476 (0.185)**	**-0.102 (0.215)**	**-0.269 (0.178)**					
HC2D + HF1A + TR2 + HPD8	288.1	2.2	0.056	6	0.427 (0.199)	0.281 (0.17)	-0.464 (0.179)	-0.119 (0.198)						
HC2D + HF1A + TR2+ HPD8 + TR2:HPD8	288.4	2.4	0.050	7	0.421 (0.197)	0.305 (0.171)	-0.493 (0.178)	-0.179 (0.199)						0.239 (0.171)
HC2D + HF1A + TR2 + HC2D:TR2	288.5	2.5	0.048	6	0.47 (0.188)	0.295 (0.17)	-0.473 (0.183)			0.042 (0.202)				
HC2D + HF1A + TR2 + HF1A:TR2	288.5	2.5	0.048	6	0.469 (0.189)	0.29 (0.171)	-0.486 (0.177)					-0.031 (0.164)		
HC2D + TR2 + HPD8	288.7	2.7	0.043	5	0.544 (0.202)		-0.447 (0.181)	-0.154 (0.207)						
HC2D + TR2 + HC2D:TR2	289.3	3.3	0.032	5	0.606 (0.188)		-0.47 (0.187)			0.006 (0.203)				
HC2D + TR2 + HPD8 + TR2:HPD8	289.4	3.4	0.031	6	0.546 (0.201)		-0.478 (0.182)	-0.212 (0.209)						0.209 (0.171)
HC2D + HF1A + TR2+ HPD8 + HF1A:HPD8	289.6	3.6	0.027	7	0.443 (0.204)	0.307 (0.175)	-0.447 (0.181)	-0.054 (0.22)					0.176 (0.218)	
HC2D + HF1A + TR2+ HPD8+ HC2D:HPD8	290.2	4.2	0.020	7	0.461 (0.224)	0.276 (0.171)	-0.455 (0.18)	-0.072 (0.247)			0.084 (0.262)			
HC2D + HF1A + TR2+ HPD8 + HF1A:TR2	290.2	4.2	0.020	7	0.42 (0.2)	0.277 (0.171)	-0.467 (0.178)	-0.13 (0.201)				-0.051 (0.167)		
HC2D + HF1A + TR2+ HPD8 + HC2D:TR2	290.3	4.3	0.020	7	0.428 (0.199)	0.283 (0.171)	-0.458 (0.185)	-0.115 (0.2)		0.026 (0.202)				

Jaguar

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF8C**	**TR6**	**HPD2**	**HC8A:HF8C**	**HC8A:TR6**	**HC8A:HPD2**	**HF8C:TR6**	**HF8C:HPD2**	**TR6:HPD2**
HC8A + TR6 + HPD2 + TR6:HPD2	**248.4**	**0**	**0.130**	**6**	**0.597 (0.264)**		**-0.794 (0.254)**	**-0.863 (0.419)**						**0.649 (0.296)**
HC8A + HF8C + TR6 + HF8C:TR6	**248.8**	**0.4**	**0.108**	**6**	**0.716 (0.267)**	**0.483 (0.258)**	**-0.611 (0.27)**					**0.386 (0.238)**		
HC8A + HF8C + TR6+ HPD2 + TR6:HPD2	**249.1**	**0.7**	**0.094**	**7**	**0.587 (0.275)**	**0.289 (0.247)**	**-0.69 (0.276)**	**-0.82 (0.433)**						**0.616 (0.301)**
HC8A + HF8C + TR6	**249.5**	**1.1**	**0.074**	**5**	**0.822 (0.254)**	**0.346 (0.242)**	**-0.558 (0.258)**							
HC8A + TR6	**249.7**	**1.3**	**0.069**	**4**	**0.854 (0.243)**		**-0.676 (0.24)**							
HC8A + HF8C + TR6+ HPD2 + HF8C:HPD2	**250.0**	**1.6**	**0.059**	**7**	**0.813 (0.271)**	**0.423 (0.256)**	**-0.529 (0.272)**	**-0.138 (0.39)**					**0.623 (0.383)**	
HC8A + HF8C + TR6+ HPD2 + HF8C:TR6	250.7	2.2	0.042	7	0.691 (0.275)	0.474 (0.261)	-0.587 (0.277)	-0.166 (0.337)				0.377 (0.241)		
HC8A + TR6 + HPD2	251.1	2.7	0.034	5	0.805 (0.255)		-0.648 (0.245)	-0.252 (0.332)						
HC8A + HF8C + TR6 + HPD2	251.1	2.7	0.033	6	0.783 (0.264)	0.337 (0.246)	-0.534 (0.265)	-0.22 (0.333)						
HC8A + HF8C + HPD2 + HF8C:HPD2	251.5	3.1	0.028	6	1 (0.28)	0.599 (0.253)		-0.276 (0.4)					0.649 (0.393)	
TR6 + HPD2 + TR6:HPD2	251.5	3.1	0.028	5			-1.049 (0.241)	-1.297 (0.413)						0.919 (0.287)
HC8A + HF8C + TR6 + HC8A:HF8C	251.5	3.1	0.028	6	0.822 (0.256)	0.369 (0.247)	-0.532 (0.267)		-0.091 (0.226)					
HC8A + HF8C + TR6 + HC8A:TR6	251.5	3.1	0.028	6	0.795 (0.261)	0.367 (0.248)	-0.587 (0.268)			-0.125 (0.31)				
HF8C + TR6 + HPD2 + TR6:HPD2	251.5	3.1	0.028	6		0.357 (0.003)	-0.908 (0.003)	-1.221 (0.003)						0.86 (0.003)
HC8A + TR6 + HPD2 + HC8A:HPD2	251.7	3.3	0.025	6	1.224 (0.439)		-0.565 (0.26)	0.285 (0.536)			1.039 (0.886)			
HC8A + TR6 + HC8A:TR6	251.8	3.4	0.024	5	0.851 (0.25)		-0.681 (0.254)			-0.018 (0.294)				
HC8A + HF8C + TR6+ HPD2+ HC8A:HPD2	251.9	3.4	0.023	7	1.185 (0.44)	0.336 (0.248)	-0.456 (0.277)	0.28 (0.523)			1.022 (0.892)			
HC8A + HF8C	252.0	3.6	0.022	4	1.057 (0.263)	0.547 (0.239)								

Collared peccary

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF8C**	**TR6**	**HPD4**	**HC8A:HF8C**	**HC8A:TR6**	**HC8A:HPD4**	**HF8C:TR6**	**HF8C:HPD4**	**TR6:HPD4**
HC8A + TR6	**251.4**	**0**	**0.285**	**4**	**0.828 (0.186)**		**-0.633 (0.195)**							
HC8A + TR6 + HPD4	**253.2**	**1.9**	**0.113**	**5**	**0.863 (0.2)**		**-0.673 (0.212)**	**0.12 (0.241)**						
HC8A + TR6 + HC8A:TR6	**253.3**	**1.9**	**0.110**	**5**	**0.81 (0.189)**		**-0.669 (0.211)**			**-0.112 (0.255)**				
HC8A + HF8C + TR6	253.5	2.1	0.100	5	0.825 (0.19)	0.011 (0.187)	-0.628 (0.207)							
HC8A + TR6 + HPD4 + HC8A:HPD4	254.8	3.4	0.051	6	1.033 (0.303)		-0.681 (0.214)	0.435 (0.48)			0.309 (0.427)			
HC8A + HF8C + TR6 + HC8A:HF8C	255.2	3.8	0.043	6	0.827 (0.187)	-0.018 (0.192)	-0.673 (0.221)		0.119 (0.187)					
HC8A + TR6 + HPD4 + HC8A:TR6	255.2	3.9	0.041	6	0.843 (0.208)		-0.693 (0.22)	0.097 (0.251)		-0.085 (0.265)				
HC8A + TR6 + HPD4 + TR6:HPD4	255.3	3.9	0.040	6	0.831 (0.242)		-0.664 (0.215)	0 (0.576)						0.083 (0.354)
HC8A + HF8C + TR6 + HPD4	255.3	3.9	0.040	6	0.859 (0.201)	0.026 (0.189)	-0.666 (0.219)	0.126 (0.245)						
HC8A + HF8C + TR6 + HC8A:TR6	255.4	4	0.039	6	0.802 (0.195)	0.031 (0.193)	-0.661 (0.217)			-0.122 (0.263)				
HC8A + HF8C + TR6 + HF8C:TR6	255.6	4.2	0.035	6	0.823 (0.2)	0.014 (0.199)	-0.629 (0.207)					0.006 (0.179)		

Cougar

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF8C**	**TR8**	**HPD8**	**HC8A:HF8C**	**HC8A:TR8**	**HC8A:HPD8**	**HF8C:TR8**	**HF8C:HPD8**	**TR8:HPD8**
HC8A + HF8C + HPD8	**202.9**	**0**	**0.090**	**5**	**0.696 (0.415)**	**0.515 (0.286)**		**-1.444 (1.097)**						
HF8C + HPD8	**203.2**	**0.3**	**0.077**	**4**		**0.539 (0.298)**		**-2.967 (1.373)**						
HF8C + HPD8 + HF8C:HPD8	**203.6**	**0.7**	**0.064**	**5**		**-0.08 (0.533)**		**-3.711 (1.47)**					**-1.309 (0.928)**	
HC8A + HF8C + HPD8 + HF8C:HPD8	**204.1**	**1.2**	**0.050**	**6**	**0.604 (0.445)**	**0.146 (0.486)**		**-2.102 (1.517)**					**-0.801 (0.844)**	
HC8A + HF8C	**204.2**	**1.2**	**0.049**	**4**	**1.149 (0.328)**	**0.611 (0.285)**								
HC8A + HPD8	**204.3**	**1.3**	**0.046**	**4**	**0.719 (0.424)**			**-1.772 (1.206)**						
HC8A + HF8C + HPD8 + HC8A:HF8C	**204.5**	**1.6**	**0.042**	**6**	**0.689 (0.406)**	**0.429 (0.304)**		**-1.494 (1.08)**	**0.218 (0.29)**					
HPD8	**204.6**	**1.7**	**0.039**	**3**				**-3.561 (1.426)**						
HC8A + HF8C + HPD8 + HC8A:HPD8	**204.6**	**1.7**	**0.039**	**6**	**1.467 (1.241)**	**0.478 (0.288)**		**-0.526 (1.612)**			**1.223 (1.921)**			
HC8A + HF8C + TR8 + HPD8	**204.7**	**1.8**	**0.037**	**6**	**0.666 (0.413)**	**0.467 (0.294)**	**-0.218 (0.392)**	**-1.294 (1.115)**						
HF8C + TR8 + HPD8	**204.9**	**1.9**	**0.034**	**5**		**0.474 (0.307)**	**-0.283 (0.407)**	**-2.706 (1.383)**						
HF8C +TR8 + HPD8 + HF8C:HPD8	**204.9**	**1.9**	**0.034**	**6**		**-0.232 (0.545)**	**-0.382 (0.404)**	**-3.501 (1.438)**					**-1.414 (0.895)**	
HC8A + HF8C + TR8	205.0	2.1	0.032	5	0.997 (0.337)	0.499 (0.292)	-0.407 (0.358)							
HC8A + TR8 + HPD8	205.3	2.4	0.028	5	0.655 (0.417)		-0.388 (0.369)	-1.461 (1.202)						
TR8 + HPD8	205.3	2.4	0.028	4			-0.458 (0.381)	-3.011 (1.411)						
HC8A + HPD8 + HC8A:HPD8	205.4	2.5	0.026	5	1.898 (1.28)			-0.348 (1.633)			1.874 (2.014)			
HC8A + HF8C + TR8+ HPD8 + HF8C:HPD8	205.7	2.8	0.022	7	0.54 (0.454)	0.031 (0.521)	-0.288 (0.4)	-2.052 (1.583)					-0.894 (0.866)	
HC8A + HF8C + TR8+ HPD8 + HF8C:TR8	205.9	3.0	0.020	7	0.752 (0.426)	0.316 (0.334)	-0.139 (0.399)	-1.427 (1.127)				-0.313 (0.321)		
HC8A + HF8C + TR8+ HPD8 + HC8A:HF8C	205.9	3.0	0.020	7	0.644 (0.394)	0.31 (0.332)	-0.337 (0.395)	-1.285 (1.073)	0.298 (0.301)					

Lowland tapir

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF8B**	**HTR2**	**HPD8**	**HC8A:HF8B**	**HC8A:HTR2**	**HC8A:HPD8**	**HF8B:HTR2**	**HF8B:HPD8**	**HTR2:HPD8**
HC8A + HTR2	**177.9**	**0**	**0.128**	**4**	**1.439 (0.342)**		**-0.805 (0.496)**							
HC8A + HTR2 + HPD8	**178.3**	**0.5**	**0.102**	**5**	**1.091 (0.426)**		**-0.831 (0.503)**	**-0.967 (0.931)**						
HC8A	**179.3**	**1.5**	**0.061**	**3**	**1.711 (0.339)**									
HC8A + HF8B + HTR2	**179.4**	**1.5**	**0.060**	**5**	**1.489 (0.362)**	**0.228 (0.31)**	**-0.696 (0.521)**							
HC8A + HF8B	**179.5**	**1.6**	**0.057**	**4**	**1.733 (0.357)**	**0.402 (0.299)**								
HC8A + HTR2 + HC8A:HTR2	**179.9**	**2.0**	**0.047**	**5**	**1.328 (0.557)**		**-0.891 (0.62)**			**-0.202 (0.793)**				
HC8A + HTR2 + HPD8 + HC8A:HPD8	**179.9**	**2.0**	**0.047**	**6**	**0.264 (1.294)**		**-0.824 (0.501)**	**-2.246 (2.273)**			**-1.203 (1.73)**			
HC8A + HPD8	179.9	2.1	0.045	4	1.38 (0.421)			-0.917 (0.936)						
HC8A + HF8B + HTR2 + HPD8	180.2	2.3	0.040	6	1.151 (0.453)	0.16 (0.318)	-0.743 (0.533)	-0.91 (0.954)						
HC8A + HTR2 + HPD8 + HC8A:HTR2	180.2	2.4	0.039	6	0.875 (0.66)		-0.972 (0.632)	-1.003 (0.937)		-0.368 (0.853)				
HC8A + HTR2 + HPD8 + HTR2:HPD8	180.4	2.5	0.036	6	1.102 (0.43)		-0.909 (0.694)	-1.081 (1.188)						-0.275 (1.507)
HC8A + HF8B + HPD8	180.5	2.6	0.035	5	1.434 (0.442)	0.364 (0.299)		-0.832 (0.961)						
HC8A + HF8B + HC8A:HF8B	180.8	2.9	0.030	5	1.774 (0.362)	0.473 (0.311)			-0.245 (0.276)					
HC8A + HF8B + HTR2 + HC8A:HF8B	181.2	3.3	0.024	6	1.532 (0.375)	0.293 (0.334)	-0.636 (0.53)		-0.159 (0.282)					
HC8A + HF8B + HTR2 + HC8A:HTR2	181.4	3.6	0.022	6	1.372 (0.565)	0.23 (0.31)	-0.788 (0.641)			-0.214 (0.79)				
HC8A + HPD8 + HC8A:HPD8	181.5	3.6	0.021	5	0.453 (1.381)			-2.369 (2.407)			-1.325 (1.844)			
HC8A + HF8B + HTR2 + HF8B:HTR2	181.5	3.6	0.021	6	1.49 (0.363)	0.197 (0.439)	-0.733 (0.647)					-0.063 (0.616)		

White-lipped peccary

					Estimated coefficients of fixed factor in candidate models									
Models	**AICc**	**dAICc**	**weight**	**df**	**HC8A**	**HF2A**	**HTR2**	**HPD8**	**HC8A:HF2A**	**HC8A:HTR2**	**HC8A:HPD8**	**HF2A:HTR2**	**HF2A:HPD8**	**HTR2:HPD8**
HC8A + HF2A + HTR2+ HPD8+ HC8A:HPD8	**237.1**	**0**	**0.223**	**7**	**1.442 (0.451)**	**-0.455 (0.183)**	**-0.48 (0.241)**	**1.324 (0.649)**			**1.113 (0.597)**			
HC8A + HF2A + HTR2	**237.8**	**0.7**	**0.160**	**5**	**0.618 (0.183)**	**-0.513 (0.176)**	**-0.506 (0.236)**							
HC8A + HF2A + HTR2 + HPD8	**239.1**	**2.0**	**0.081**	**6**	**0.729 (0.225)**	**-0.466 (0.182)**	**-0.505 (0.237)**	**0.211 (0.238)**						
HC8A + HF2A + HPD8 + HC8A:HPD8	239.4	2.3	0.069	6	1.67 (0.434)	-0.414 (0.179)		1.382 (0.616)			1.177 (0.578)			
HC8A + HF2A + HTR2 + HC8A:HTR2	239.7	2.6	0.060	6	0.706 (0.28)	-0.519 (0.176)	-0.407 (0.328)			0.166 (0.403)				
HC8A + HF2A + HTR2 + HF2A:HTR2	239.8	2.7	0.059	6	0.618 (0.183)	-0.466 (0.223)	-0.46 (0.267)					0.109 (0.321)		
HC8A + HF2A + HTR2 + HC8A:HF2A	239.9	2.8	0.056	6	0.622 (0.195)	-0.516 (0.183)	-0.506 (0.236)		0.01 (0.177)					
HC8A + HF2A + HTR2+ HPD8 + HTR2:HPD8	240.7	3.6	0.038	7	0.795 (0.245)	-0.428 (0.187)	-0.437 (0.248)	0.265 (0.259)						-0.171 (0.228)
HC8A + HF2A + HTR2+ HPD8 + HC8A:HTR2	240.9	3.8	0.033	7	0.881 (0.333)	-0.466 (0.181)	-0.352 (0.33)	0.248 (0.248)		0.25 (0.405)				
HC8A + HF2A	241.0	3.9	0.032	4	0.804 (0.17)	-0.479 (0.177)								
HC8A + HF2A + HTR2+ HPD8 + HF2A:HPD8	241.1	4.0	0.030	7	0.73 (0.227)	-0.459 (0.182)	-0.487 (0.242)	0.178 (0.268)					-0.062 (0.175)	
HC8A + HF2A + HTR2+ HPD8 + HF2A:HTR2	241.2	4.1	0.028	7	0.724 (0.226)	-0.443 (0.219)	-0.48 (0.269)	0.202 (0.242)				0.06 (0.318)		
HC8A + HF2A + HTR2+ HPD8 + HC8A:HF2A	241.3	4.2	0.028	7	0.725 (0.23)	-0.462 (0.189)	-0.505 (0.237)	0.213 (0.239)	-0.014 (0.177)					
HC8A + HTR2 + HPD8 + HC8A:HPD8	241.9	4.8	0.020	6	1.477 (0.429)		-0.425 (0.243)	1.469 (0.586)			1.096 (0.547)			