BioOne COMPLETE

Power Lines and Howler Monkey Conservation in Porto Alegre, Rio Grande do Sul, Brazil

Authors: Lokschin, Luisa Xavier, Rodrigo, Cambará Printes, Hallal Cabral, Juliane Nunes, and Buss, Gerson

Source: Neotropical Primates, 14(2) : 76-80

Published By: Conservation International

URL: https://doi.org/10.1896/044.014.0206

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

libidinosus) use anvils and stone pounding tools. *Am. J. Primatol.* 64: 359–366.

Moura, A. C. A. and Lee, P. 2004. Capuchin stone tool use in Caatinga dry forest. *Science* 306: 1909.

Ottoni, E. B. and Mannu, M. 2001. Semifree-ranging tufted capuchins (*Cebus apella*) spontaneously use tools to crack open nuts. *Int. J. Primatol.* 22: 347–358.

Schick, K. D., Toth, N., Garufi, G., Savage-Rumbaugh, E. S., Rumbaugh, D. and Sevcik, R. 1999. Continuing investigations into the stone tool-making and tool-using capabilities of a bonobo (*Pan paniscus*). *J. Archaeol. Sci.* 26: 821–832.

Tomasello, M. and Call, J. 1997. *Primate Cognition*. Oxford University Press, New York.

Urbani, B. 1999. Spontaneous use of tools by wedge-capped capuchin monkeys (*Cebus olivaceus*). *Folia Primatol.* 70: 172–174.

Urbani, B. and Garber, P. A. 2002. A stone in their hands… Are monkeys tool users? *Anthropologie* 40: 183–191.

van Schaik, C. P., Deanes, R. O. and Merrill, M. Y. 1999. The conditions for tool use in primates: Implications for the evolution of material culture. *J. Hum. Evol.* 36: 719–741.

van Schaik, C. P., Ancrenaz, M., Borgen, G., Galdikas, B., Knott, C. D., Singleton, I., Suzuki, A., Utami, S. S. and Merrill, M. 2003. Orangutan cultures and the evolution of material culture. *Science* 299: 102–105.

Visalberghi, E. 1990. Tool use in *Cebus. Folia Primatol.* 54: 146–154.

Visalberghi, E. 1997. Success and understanding in cognitive tasks: A comparison between *Cebus apella* and *Pan troglodytes*. *Int. J. Primatol.* 18: 811–830.

Waga, I. C., Dacier, A. K., Pinha, P. S. and Tavares, M. C. H. 2006. Spontaneous tool use by wild capuchin monkeys (*Cebus libidinosus*) in the Cerrado. *Folia Primatol.* 77: 337–344.

Westergaard, G. C. and Suomi, S. J. 1994. The use and modification of bone tools by capuchin monkeys. *Curr. Anthropol.* 35: 75–77.

Westergaard, G. C. and Suomi, S. J. 1995. The manufacture and use of bamboo tools by monkeys: Possible implications for the development of material culture among east Asian hominids. *J. Archaeol. Sci.* 22: 677–681.

Westergaard, G. C., Greene, J. A., Babitz, M. A. and Suomi, S. J. 1995. Pestle use and modification by tufted capuchins (*Cebus apella*). *Int. J. Primatol.* 16: 643–651.

Power Lines and Howler Monkey conservation in Porto Alegre, Rio Grande do Sul, Brazil

Luisa Xavier Lokschin
Rodrigo Cambará Printes
Juliane Nunes Hallal Cabral
Gerson Buss

Introduction

Urban growth affects ecosystems in several ways**,** leaving them more vulnerable (Alberti and Marzluff, 2004). In Porto Alegre, the combined effects of human presence including deforestation, hunting and other indirect effects are reducing howler's area distribution with consequences still unknown (Lokschin *et al.*, 2005). Human density within a primates' geographical area should be considered by the World Conservation Union (IUCN) in the evaluation of species status (Harcourt and Parks, 2003). The southern brown howler monkey (*Alouatta guariba clamitans*, Cabrera 1940) is considered an endangered species in Rio Grande do Sul (Marques, 2003); in Brazil and globally it is considered near threatened (Machado *et al.*, 2005; Rylands *et al.*, 2006).

There are many species of Neotropical primates living close to urban areas, including: *Alouatta clamitans* (Buss, 1996), *Alouatta caraya* (Codenotti *et al.*, 2002), *Callicebus nigrifrons* (Oliveira *et al.*, 2003), *Saguinus leucopus* (Poveda and Sánchez-Palomino, 2004) and *Saguinus bicolor* (Vasconcelos *et al.*, 2005). Problems and threats linked to urbanization, such as danger from vehicles when crossing roads, predation by dogs and electric hazard, are already documented for *A. clamitans* (Printes, 1999; Alonso *et al.*, 2005)*, C. jacchus* (Menezes, 2005) and *S. bicolor* (Vasconcelos *et al.*, 2005). Ecosystems close to urban areas are important for wildlife (Dickman, 1987) and measures must be taken to guarantee their existence. Howler monkeys (*A. g. clamitans*) utilize areas of forests close to urban developments and are suffering from contact with several electric hazards. Here we describe a way to mitigate the occurrence of such accidents around Porto Alegre.

Methods

Porto Alegre is the capital city of the state of Rio Grande do Sul, Brazil (Fig. 1), with a population of 1.4 million (IBGE, 2006). Approximately 10% of the municipal area is natural semi-deciduous seasonal forest, influenced by Atlantic rainforest (Brack *et al.*, 1998; Velez *et al.,* 1998). The southernmost area of the municipality (Fig. 2) is a rural landscape containing a number of small villages. The most important natural areas are also in this zone, which is also the most important area for howler monkeys (*Alouatta guariba clamitans*) (Romanowski *et al.*, 1998; Lokschin *et al.*, 2005). Lami Biological Reserve, the only biological

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

reserve of the city, is located in this region (30°14'13,2"S, 51°05'43,4"W). In its buffer zone there are some forest fragments and a district named Lami, which is an urban area holding around 2,700 people (Porto Alegre, 2006), with many native trees still remaining around the houses. Most of the power lines in Brazil are aerial. Since 1999, the '*Programa Macacos Urbanos*' (Urban Monkeys Program) has been documenting howler monkey mutilations and deaths caused by electric hazards in Lami (Printes, 1999). We conducted a survey to identify the critical areas where electric cables, responsible for the majority of accidents, should be insulated. These areas were identified based on previously documented howler distribution (Romanowski, 1998), the presence of vegetation, known accidents and reports from local people. Areas where electric cables pass through tree branches (especially those of *Ficus organensis*), and riparian forests were prioritized for cable insulation. Areas where howlers died or were mutilated were plotted on a Global Positioning System (GPS) and photographed. String bridges were also installed on three critical points, based on assessment of risk of animals being electrocuted (Figure 2, a, b and c).

Results and Discussion

From 2000 to 2006 eight howlers were electrocuted and three of them died as a result of injuries sustained. This number is lower than that found by Printes (1999) who recorded three cases in one year in the same locality. But our results may have underestimated the total number of deaths and mutilations caused by electric discharge since not all accidents are reported or recorded. When animals attempt to use cables as a bridge or as a base (Fig. 3), they support two of their limbs on two different cables causing a short circuit. Electric current, passing through the animals' body, may cause burns, hemorrhage and cardiac arrest, which can eventually kill them. Low tension cables (127 – 380 v) are the main cause of accidents, due to their frequent use by howlers as bridges between forest fragments. Howlers are not the only victims of such accidents in the region. Birds with large wing spans are also susceptible; these include the southern screamer (*Chauna torquata* Oken, 1816) and striped owl (*Rhinoptynx clamator* Vieillot, 1807).

The first step to reduce electric hazards was the installation of a bridge in 1999. It consisted of two parallel vertical strings. This model of bridge had no success and was replaced by another one, similar to a 'ship ladder' but in a horizontal orientation (Figures 4 and 5). The 'steps of the ladder' are used by howlers in a horizontal plane (the same way ladders are used by humans vertically). We reported accidents to the relevant authorities every time we became aware of their occurrence and requested the insulation of the cables, at least in critical areas. As nothing was done by 2003 a legal strategy was adopted; in March 2003, a legal case was presented based on National Legislation for Environmental Crimes (nº 9605/98), citing known cases. This resulted in Civil Inquiry nº 21/03 and the legal authorities judged that the Electric Energy State Company (CEEE) should insulate cables in critical areas. The insulation work started in 2004 costing approximately US$ 30,000. The '*Programa Macacos Urbanos*' was ordered by the court to designate priority areas, identifying those in which cables presented a higher risk of accidents. We decided that close

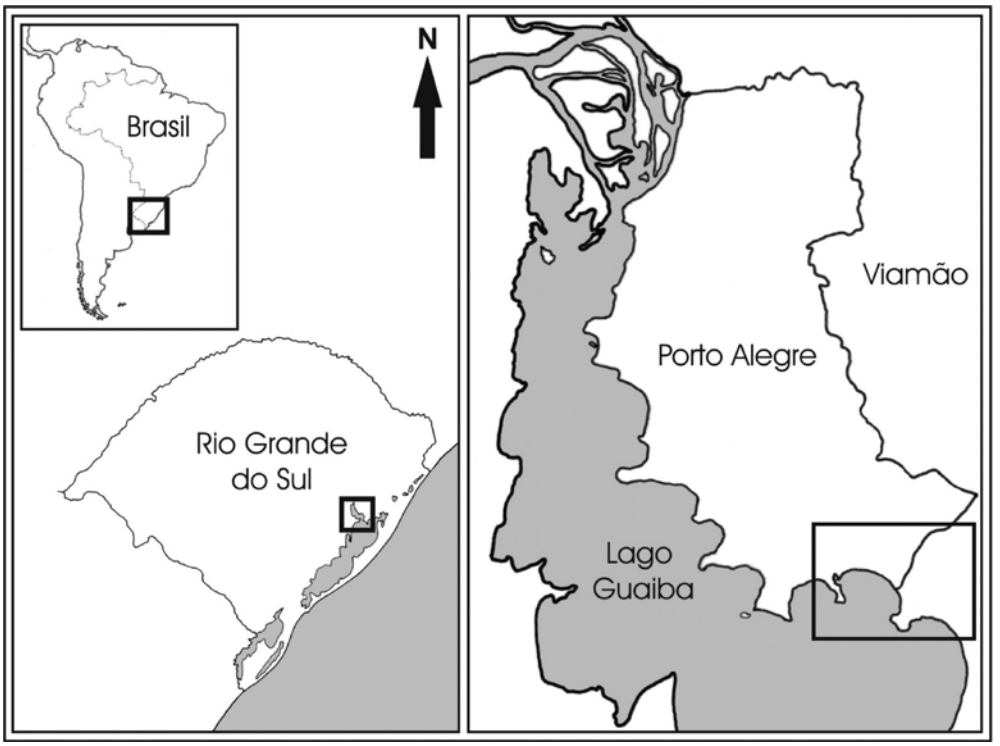


Figure 1. Porto Alegre, RS, Brazil. (30° S, 51° W)

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

collaboration with local communities was vital for the successful implementation of any conservation activities. The first step taken to engage with local communities was to use about 10 local residents to monitor the occurrence of howler electrocutions pre-installation and use of bridges post-installation. Thus, the presence of houses and people's availability to collaborate was a decisive point in choosing areas for new bridges. Two other bridges were installed in critical areas in 2003 and 2004, with local people reporting occasional use by howlers. In March 5, 2006, we saw a group of howlers crossing one of these bridges (Fig. 2c and Fig. 5). There seems to be a seasonal pattern to the use of bridges by howlers, probably linked to the availability of food resources.

We suggest that bridges should be considered a complementary activity to the insulation of electric cables. In addition to insulation, the three low tension cables must be braided forming only one cable, thereafter reducing the possibility of animal use. Since the first bridge was installed and critical areas were isolated accidents have become rare. One accident was recorded in 2005 in an already insulated area, which had its terminal poles exposed. Since then, the CEEE arranged to insulate all terminals. In 2006, another howler was hurt on high tension cables, in an area already requested to be insolated. The CEEE does not have a way to isolate this type of cables, so pruning was requested. These two last cases suggest that prioritized areas are actually being used by howlers and that they are exposed to danger. If cables are not insulated, they offer potential risks to the animals. Nowadays, to reduce accidents, CEEE has taken the responsibility for keeping cables insulated and trees cut. This legal decision in favor of wild animals was the first one in the country and might set a precedent in Environmental



Figure 2. Southernmost area of Porto Alegre, and the neighboring city of Viamão, Itapuã district. a, b and c are critical points where bridges for howler monkeys were installed in Lami, Porto Alegre, RS, Brazil.



Figure 4. String bridge, 'ship ladder' model, before being installed in Lami, Porto Alegre. (Photo by L. X. Lokschin).



Figure 3. Howler monkeys (*Alouatta guariba clamitans*) using cables as a bridge, at Lami, Porto Alegre. (Photo by L. X. Lokschin).



Figure 5. String bridge where howlers were seen crossing between forest fragments at Lami, Porto Alegre. (Photo by G. Buss).

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

Justice. The '*Programa Macacos Urbanos*' will keep supervising selected areas around Porto Alegre, monitoring risks to howler monkeys from power lines and installing bridges in critical points. In 2006, a howler died from electrocution crossing low tension cables at Itapuã Village (30°17'00"S, 51°01'19"W), in the neighboring municipality of Viamão, 20 km from Lami (Fig. 2). This resulted in a preliminary study of other cases at Itapuã Village that revealed at least five other deaths caused by contact with electric cables. The first one was in 1995. At present, we are mapping critical points where cables must be insulated at Itapuã.

Conservation Consequences

In 2002, a Municipal Law (Nº 9.971) was created regulating the use of 'ecological' power lines in Porto Alegre. These lines can be either underground or aerial, with an insulating or semi-insulating cover, and built in a compact form. With appropriate monitoring and community participation the enforcement of this law (Decree nº 14.196/03) should guarantee a lower impact of cables on wild howler populations. However, the application of this law is not retroactive; areas where cables were installed before 2003 are still dangerous and should be monitored. Other municipalities should create laws concerning power lines and their impact on flora and fauna; we suggest that researchers should collaborate in this long process. Brazilian researchers should meet in a forum to discuss primates in urban areas. The aim of this forum should be getting to know common problems and standardizing proposals and actions to be taken.

Acknowledgments

We would like to thank the cooperation of the "Núcleo Amigos da Terra Brasil" (Friends of Earth), managers of the Lami Biological Reserve, Eng. Nelson (CEEE), André Chein Alonso, José Samir Borges, (Fundação Zoobotânica do Rio Grande de Sul), Gleide Marsicano, Comando de Policiamento Ambiental, Dr. Helena Romanowski, Dr. Liane Printes, Dr. Fernanda Michalski and MSc. Darren Norris for suggestions on the manuscript. Special thanks to Enio Mancuso (*in memoriam*).

Luisa Xavier Lokschin, Rodrigo Cambará Printes, Juliane Nunes Hallal Cabral and **Gerson Buss,** Programa Macacos Urbanos, Departamento de Zoologia – Instituto de Biociências – Universidade Federal do Rio Grande do Sul (UFRGS), Av. Bento Gonçalves, n º9500 prédio 43435, sala 218, CEP 90501-970, Porto Alegre, RS, Brasil, e-mail: <lxlokschin@yahoo.com.br>, <cambara7@gmail.com>, <paccifica@hotmail.com>, <gbuss_pmu@yahoo.com.br>.

References

Alberti, M. & Marzluff, J. M. 2004. Ecological resilience in urban ecosystems: Linking urban patterns to human and ecological functions. *Urban Ecosystems* 7: 241–264.

Alonso, A. C.; Cabral, J. N. H.; Lokschin, L. X.; Marsicano, G.; Roll, A.; Buss, G.; Printes, R. C.; Santos, M. F.; Jardim, M. M. A. & Romanowski, H. P. 2005. Programa Macacos Urbanos: Manejo de bugio-ruivo (*Alouatta guariba clamitans* Cabrera 1940) em Porto Alegre. *Livro de resumos do XI Congresso Brasileiro de Primatologia: 67. SBPr – PUC RS.*

Brack, P.; Rodrigues, R. S.; Sobral, M.; Leite, S. L. de C. 1998. Árvores e arbustos na vegetação natural de Porto Alegre, Rio Grande do Sul, Brasil. *Iheringia – Ser. Bot.* 51(2): 139–166.

Buss, G. 1996. Urban Monkeys – *Alouatta fusca* in the municipality of Porto Alegre. *Neotrop. Primates* 4(2): 61–62.

Codenotti, T. L.; Silva, V. M.; Albuquerque, V. J.; Camargo, E. V.; Silveira, R. M. M. 2002. Distribuição e situação atual de conservação de *Alouatta caraya* (Humboldt, 1912) no Rio Grande do Sul, Brasil. *Neotrop. Primates* 10 (3): 132–140.

Dickman, C. R. 1987. Habitat fragmentation and vertebrate species richness in an urban environment. *J. Appl. Ecol.* 24: 337–351.

Harcourt, A. H. & Parks, S. A. 2003. Threatened primates experience high human densities: adding an index of threat to the IUCN Red List criteria. *Biol. Conserv.* 109: 137–149.

IBGE, 2006. Instituto Brasileiro de geografia e estatística. Website: <http://www.ibge.gov.br> Accessed on March 30, 2006.

Lokschin, L. X.; Paim, F. P.; Cabral, J. N. H.; Rossato, R. S.; Setubal, R. B.; Alonso, A. C.; Silva, F. E.; Buss, G. & Romanowski, H. P. 2005. Programa Macacos Urbanos: Ocorrência e distribuição do bugio-ruivo (*Alouatta guariba clamitans* Cabrera, 1940) em Porto Alegre, RS, Etapa 2 – resultados preliminares. *Livro de resumos do XI Congresso Brasileiro de Primatologia*: 120. *SBPr – PUC RS.*

Machado, A. B. M.; Martins, C. S. & Drummond, G. M. 2005 Lista da fauna brasileira ameaçada de extinção. Fundação Biodiversitas. Belo Horizonte, MG, Brasil, 157pp.

Marques, A. A. 2003. Primatas. In. *Livro Vermelho da Fauna Ameaçada de Extinção no Estado do Rio Grande do Sul.* Fontana, C; Bencke, G. & Reis, R. E. (eds), pp. 499–506. Edipucrs, Porto Alegre, RS, Brasil.

Menezes, M. O. T. 2005. Influência da urbanização sobre uma população de *Callithrix jacchus* (Linnaeus, 1758) de vida livre no Campus do PICI (UFC), Fortaleza, Ceará. *Livro de resumos do XI Congresso Brasileiro de Primatologia*: 129. *SBPr – PUC RS.*

Oliveira, R. C. R., Coelho, A. S. & Melo, F. R. 2003. Estimativa de densidade e tamanho populacional de sauá (*Callicebus nigrifrons*) em um fragmento de mata em regeneração, Viçosa, Minas Gerais, Brasil. *Neotrop. Primates* 11(2): 91–94.

Porto Alegre, 2006. Censo populacional de Porto Alegre. Website: <http://www2.portoalegre.rs.gov.br/spm/default.php?reg=46&p_secao=43> Accessed on March 28, 2006.

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

Poveda, K. & Sánchez-Palomino, P. 2004. Habitat use by the White-footed tamarin, *Saguinus leucopus*: a comparison between a forest-dwelling group and an urban group in Mariquita, Colombia. *Neotrop. Primates* 12(1): 6–9.

Printes, R. C. 1999. The Lami Biological Reserve, Rio Grande do Sul, Brazil and the danger of power lines to howlers in urban reserves. *Neotrop. Primates* 7(4): 135–136.

Romanowski, H. P.; Dornelles, S. da S.; Buss, G.; Brutto, L. F. G.; Jardim, M. M. de A; Printes, R. C.; Fialho, M. de S. 1998. Bugio-ruivo: o ronco ameaçado. In: *Atlas Ambiental de Porto Alegre,* Menegat, R. (ed), pp. 62–63. UFRGS / PMPA / INPE, Porto Alegre, RS, Brasil.

Rylands, A.B., Bampi, M.I., Chiarello, A.G., da Fonseca, G.A.B., Mendes, S.L. & Marcelino, M. 2003. *Alouatta guariba*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* Website <www.iucnredlist.org>. Accessed May 5, 2006.

Vasconcelos, C. M.; Subirá, R. J. & Kluczkovski Jr., A. 2005. Projeto piloto de reintegração de grupos de sauim-de-coleira, *Saguinus bicolor*, ao habitat natural em Manaus, Amazonas, Brasil. *Livro de resumos do XI Congresso Brasileiro de Primatologia:* 176. SBPr–PUC RS.

Velez, E. M.; Meira, J. R. & Oliveira, P. L. 1998. Avaliação dos morros com base no uso do solo. In: *Atlas Ambiental de Porto Alegre, Menegat, R. (ed), pp. 81 Editora da Universidade. UFRGS/PMPA/INPE, Porto Alegre,* RS, Brasil.

Preliminary Survey on the Current Distribution of Primates in Belize

Siân S. Waters and Oscar Ulloa

Introduction

Black howler monkeys (*Alouatta pigra*) and Yucatan spider monkeys (*Ateles geoffroyi yucatanensis*) are the only non-human primate species found in Belize. Black howler monkeys occupy the most restricted range of any other species in the genus *Alouatta* (Wolfheim, 1983), and are listed as Endangered in the IUCN Red List (IUCN, 2006). The Yucatan spider monkey is listed as Vulnerable in the IUCN Red List (IUCN, 2006). Both species are threatened with ongoing habitat loss and degradation (IUCN, 2006). Howler monkeys are the focus of the Community Baboon Sanctuary Conservation Program in an area along the Belize River (Horwich, 1990) and have been reintroduced in the Cockscomb Wildlife Reserve (Horwich *et al.*, 1993). Data have been collected on black howler monkey group size and ranging behavior in two areas of Belize (Horwich *et al.*, 2001; Pavelka, 2003), but no countrywide survey of the species has taken place since the 1980s (Horwich and Johnson, 1986). Spider monkeys are vulnerable to habitat fragmentation because they occur in low numbers, have low fecundity rates, and rely on ripe fruit, a patchily distributed food resource (Meffe and Carroll, 1994). Basic information on this species in Belize is lacking. A known area of spider monkey distribution in the Chiquibul protected area (comprised of the Chiquibul Forest Reserve and the Chiquibul National Park) is heavily frequented by illegal collectors of xaté palm leaves (*Chamaedorea* sp.). This activity has been prevalent since 1998 (Anon, 2005) and up to 1,000 illegal xaté collectors have been reported to camp and hunt in the area while harvesting the leaf (Friends for Conservation and Development, 2005). This must give cause for concern for the species even in a protected area.

Methods

We undertook a countrywide assessment of human/wildlife conflict among subsistence farmers in Belize from March to May 2006 (the results of which will be published elsewhere). As part of the survey we asked questions about the presence of howler monkeys, spider monkeys and Baird's tapir (*Tapirus bairdii*). The latter two species were chosen because they are amongst the first species to disappear from over-exploited forests (Bodmer *et al.*, 1997) and are, as such, more vulnerable to population fragmentation and eventual extinction. Black howler monkeys were included in the list because they often inhabit similar riparian habitat to that of the Baird's tapir. Using a structured questionnaire, we surveyed all districts of Belize for evidence of crop raiding by wild animals. The villages surveyed were all outside protected areas and were selected because they were predominantly dependent on subsistence agriculture. Villages and communities whose livelihoods depended on employment in intensive agriculture such as cattle ranching, and sugar cane, citrus and banana plantations were excluded. The questionnaire was administered at every sixth house in a village to a person who worked on his/her farm. The respondents' farms or gardens were typically situated outside the villages surveyed and were visited when possible. When the questionnaire was completed, and if the respondent had not already mentioned the species as a crop raider, the respondent was asked about the presence of primates and tapirs in the area. GPS locations for each species were recorded if presence was reported by at least two respondents independently of one another in the village surveyed or, if the animals were directly observed, or if howler monkey vocalizations were heard. Howler vocalizations could occur at any time of the day or night. Early morning walks were taken in all forests where the focal species were reported as occurring. A GIS map was generated from these data.

Results

A total of 168 people were interviewed during the survey and 14.9% reported that howler monkeys were present near their farms or gardens. Reports of the presence of black howler monkeys came from all districts except Corozal,

Downloaded From: https://complete.bioone.org/journals/Neotropical-Primates on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use