Para Bara Community Atlas

Rupununi
Guyana

Project Fauna
January 2013

Project Fauna Community Atlas January 2013

Atlas credits: Jane M. Read, Syracuse University; Jose M.V. Fragoso and Jeffrey Luzar, Stanford University; Han Overman, State University of New York – ESF.

Layout, design, and maps: Paul G. Kloster and Philip G. Curtis.

Photo credits: Jose M.V. Fragoso , Jeffrey Luzar, Jane M. Read, Sean Giery, Anthony Cummings

Based on data gathered by Project Fauna from 2007-2010. Images based on Landsat Thematic Mapper scenes acquired 1st October 2005 combined with Aster GDEM elevation data (ASTER GDEM is a product of METI and NASA).

Project Fauna is the field name for U.S. National Science Foundation award DEB 0508094 (2005-2011) "Biodiversity dynamics and land-use changes in the Amazon: multi-scale interactions between ecological systems and resource-use decisions by indigenous peoples", directed by Principal Investigator Jose M. V. Fragoso.

This atlas was created in the Integrated Spatial Dynamics (ISD) Laboratory, Dept. Geography, Syracuse University, Syracuse, NY, USA.

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Acknowledgments

This atlas was created by Project Fauna as part of U.S. National Science Foundation-funded research to investigate biodiversity dynamics and cultural practices by the indigenous peoples of the Rupununi. It provides a summary of the major datasets that we created using data gathered in the field from 2007-2010 at 23 study communities, focusing on information that can be of immediate use by the communities.

Project Fauna gratefully acknowledges the Para Bara para-biologists and para-anthropologists Andrew Mandook, Leona Mandook, Bernard Manaka and Mirichi Manaka, along with their substitutes who included Aaron Martin, Billy Martin, Eli Martin, Harry Manaka, Ishmael Manaka, and Manasseh Manaka for their dedicated service to their community and this project. Without their hard work and dedication, as well as the logistical and technical assistance of the community leaders, the study and this atlas would not have been possible. In Guyana, William Andries, Mike Williams, Sydney Allicock, Emily Allicock, Bryan Allicock, Kid James, Nick Fredericks and Wilson Laurantino, among others, provided strong moral and logistical support for all our efforts and we thank them for their commitment to the project. We also thank the North Rupununi District Development Board, the Bina Hill Institute, the South Central and Deep South District Toshaos' Councils. Thanks also to David Singh of Conservation International-Guyana; Raquel Thomas, Dane Gobin and other members of the Iwokrama International Centre; the Guyana Environmental Protection Agency; the Regional Democratic Council of Region 9 (RDC); and the Ministry of Amerindian Affairs for supporting the project, and the latter two for permitting the work. A special thanks to Shirley Melville for her friendship and support, and to Duane de Freitas of Dadanawa Ranch. We are grateful for the help of a number of volunteers throughout this effort.

A week-long conversation between José Fragoso and Jacir de Souza during a visit to Jacir's community of Maturuca, in Roraima, Brazil, inspired the quest to understand the relationship between indigenous culture and the environment that ultimately gave rise to this project. We thank all the Macuxi, Wapishana and Wai Wai leaders in Brazil who supported the initial development of the project, especially Marinaldo Trajano, Joênia Batista de Carvalho, and Jacir José de Souza.

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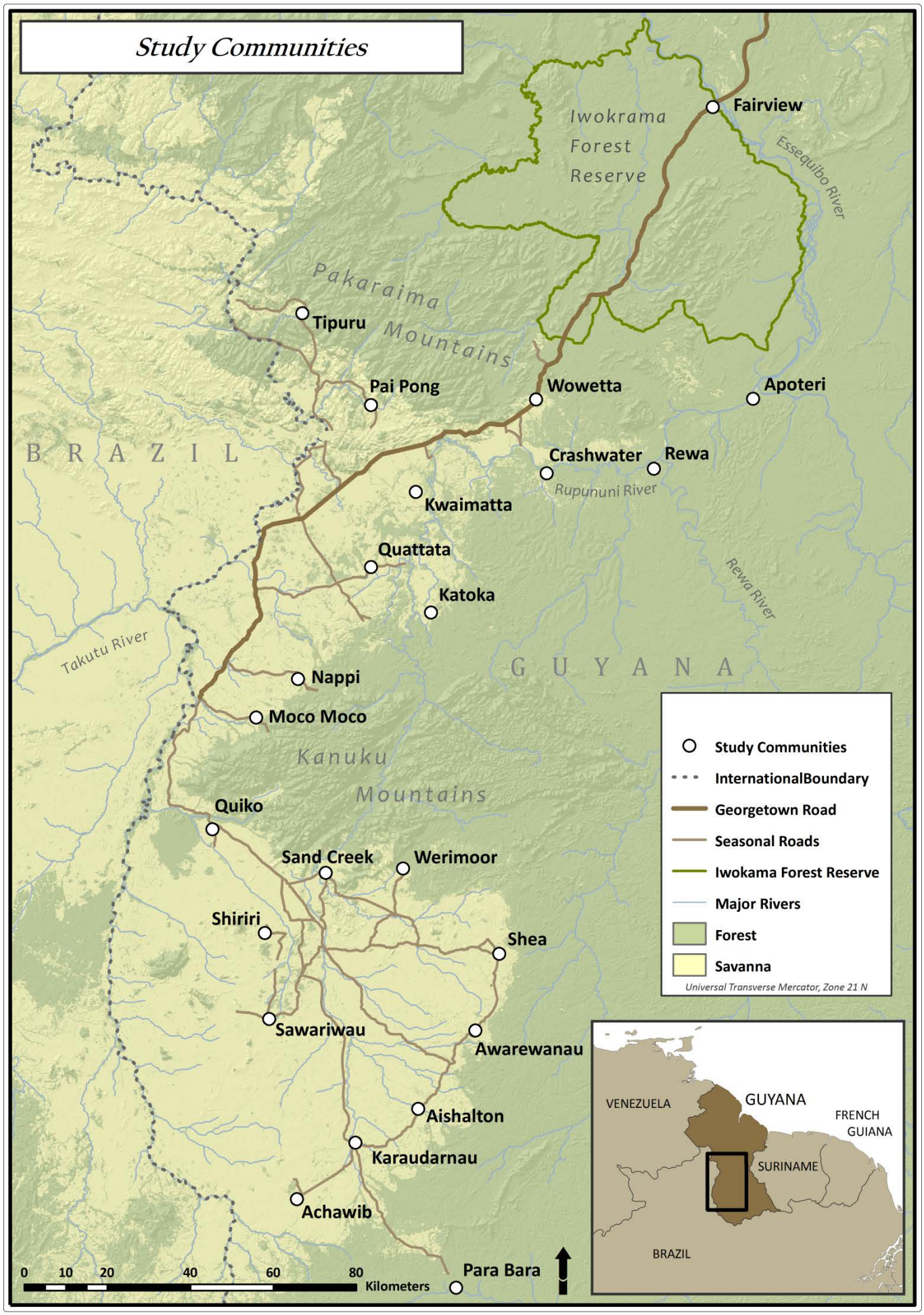
Kilometers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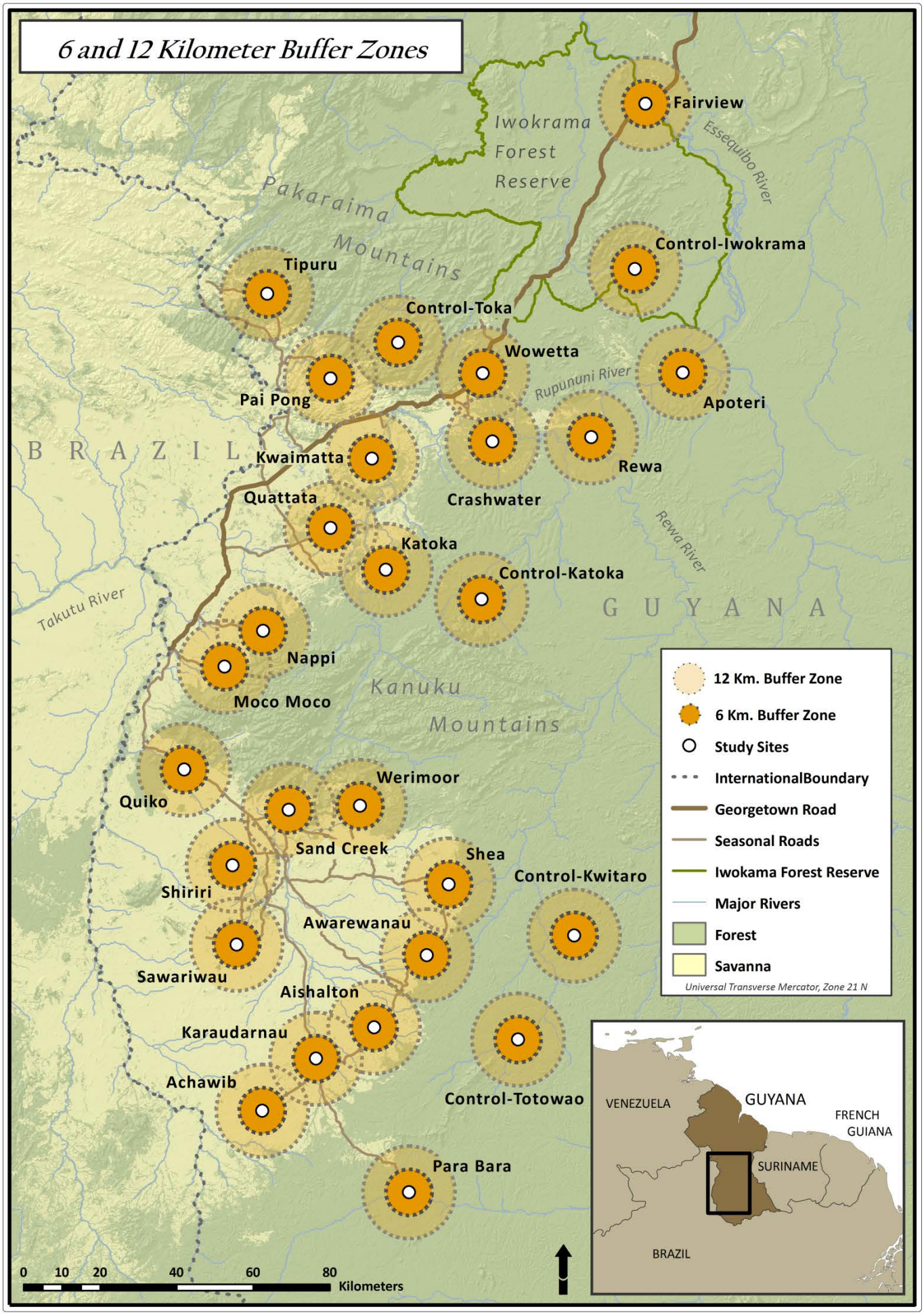
The Research Design

Project Fauna focused on 23 communities and five control sites throughout the Rupununi. The communities were selected based on their distribution in the study area, their representative location with respect to vegetation type and topographic characteristics, proximity to other communities, and willingness of the community members to participate in the project.

Eight transects were opened around each study site. At each site, four transects were opened within a 6km radius ('near') from the center of the site, and four within a 6-12km radius ('far') of the center. The map opposite shows the locations of the 6 and 12km buffers around the study sites. This design allows us to determine whether the number of animals changes with distance from the community.

Within each buffer, the starting location of each transect (start coordinates and bearing) was determined randomly, from which trained field technicians from the communities used global positioning system (GPS) units, compasses, and tape measures to cut 4km-long straight transects. In the case of meeting impassable obstructions (cliffs, rivers), the technicians followed rules for turning and continuing the transects until they reached 4km in length.


6 and 12 Kilometer Buffer Zones
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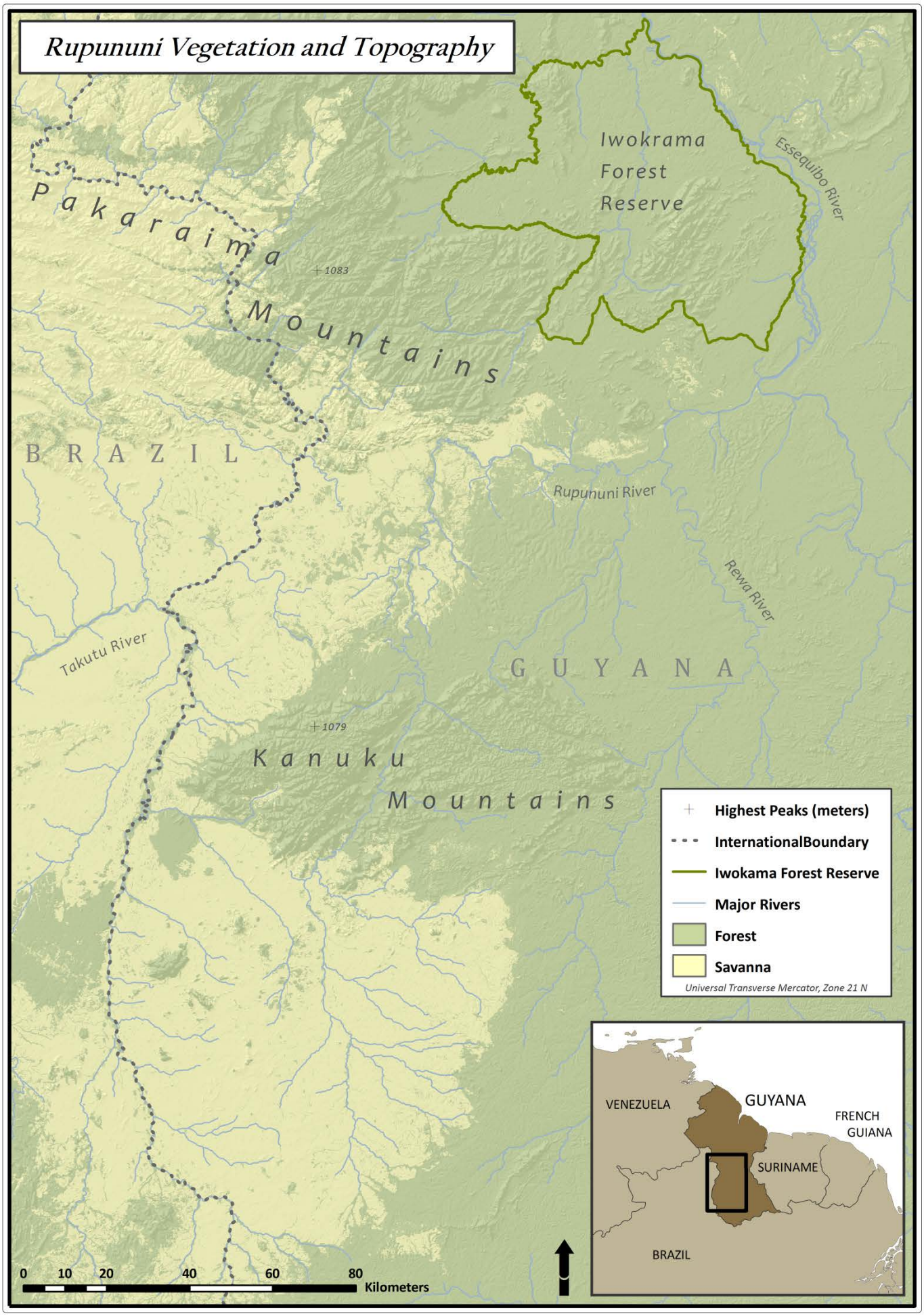
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Pakaraima
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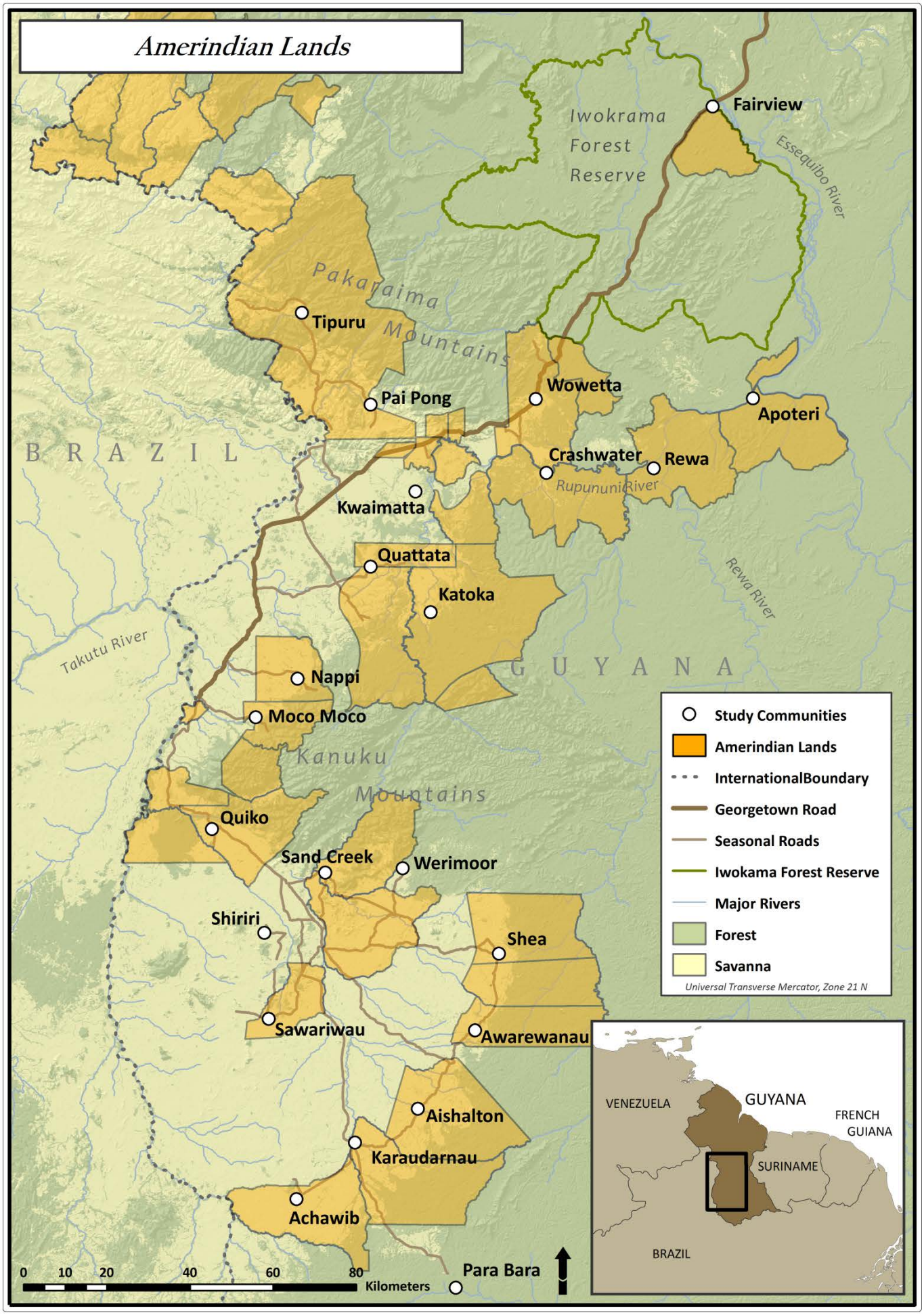
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GUYANA
FRENCH GUIANA
SURINAME
BRAZIL

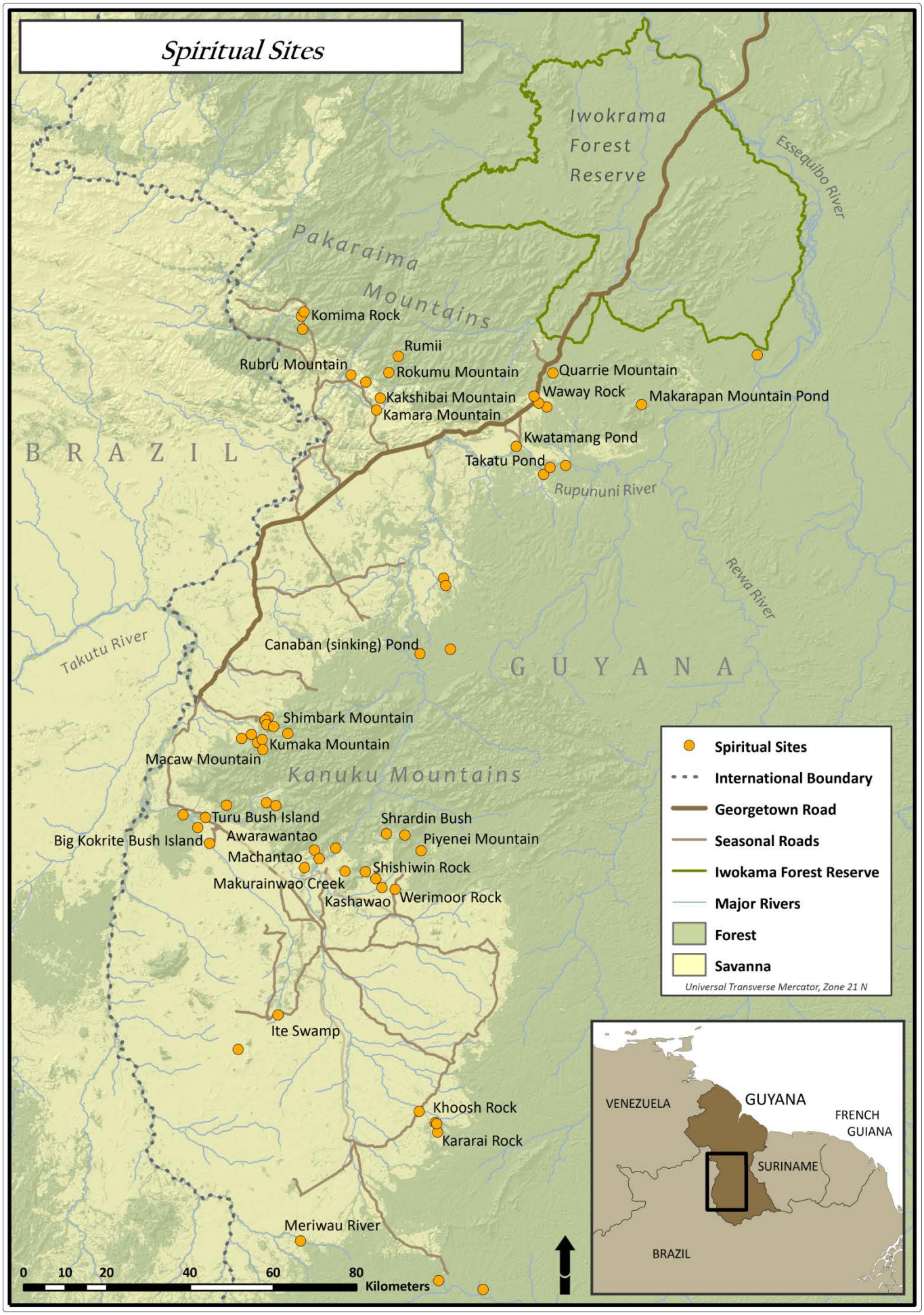
Community	Village Population	Distance from Village to Gtown Road (km)
Achawib	620	122.5
Aishalton	1076	111.8
Apoteri	311	41.9
Awarewanau	621	103.9
Crashwater	191	15.3
Fairview	197	0.1
Karaudarnau	1053	113.1
Katoka	649	37.0
Kwaimatta	122	10.7
Moco Moco	393	13.5
Nappi	578	15.7
Pai Pong	494	12.1
Para Bara	147	154.4
Quattata	212	19.5
Quiko	428	31.8
Rewa	245	32.8
Sand Creek	649	51.9
Sawariwau	453	78.9
Shea & Marurunau	1192	94.8
Shiriri	68	58.6
Tipuru	193	38.8
Werimoor	323	63.9
Wowetta	199	0.0

Spiritual Sites

The map of spiritual sites on the opposite page shows locations of sites identified by community members as having special meaning.

Data were gathered by local technicians or the project anthropologist through one-time surveys with the principal hunters of each community (as identified by the community leaders and/or hunting return surveys). Questions were asked about places that hunters avoided or in which they had to use extra caution. In addition, interviews were conducted with knowledgeable members of each community including the elderly, *toshao* (community leader), and/or *piaiman* (shaman) about places generally known to be sacred and/or dangerous.

Details and locations of sites were determined and mapped based on information gathered from the surveys and interviews, as well as from supplementary information provided by project technicians. Locations of sites were marked on topographic or hardcopy satellite images and later digitized and stored in GIS (geographic information system) format as points.


Spiritual Sites
Iwokrama Forest Reserve
Essequibo River
Pakaraima Mountains
Komima Rock
Rumii
Rubru Mountain
Rokumu Mountain
Quarrie Mountain
Kakshibai Mountain
Waway Rock
Makarapan Mountain Pond
Kamara Mountain
Kwatamang Pond
BRAZIL
Takatu Pond
Rupununi River
Rewa River
Takutu River
Canaban (sinking) Pond
GUYANA
Shimbark Mountain
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Macaw Mountain
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Turu Bush Island
Shrardin Bush
Awarawantao
Big Kokrite Bush Island
Piyenei Mountain
Machantao
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Kashawao
Werimoor Rock
Ite Swamp
Khoosh Rock
Kararai Rock
Meriwau River
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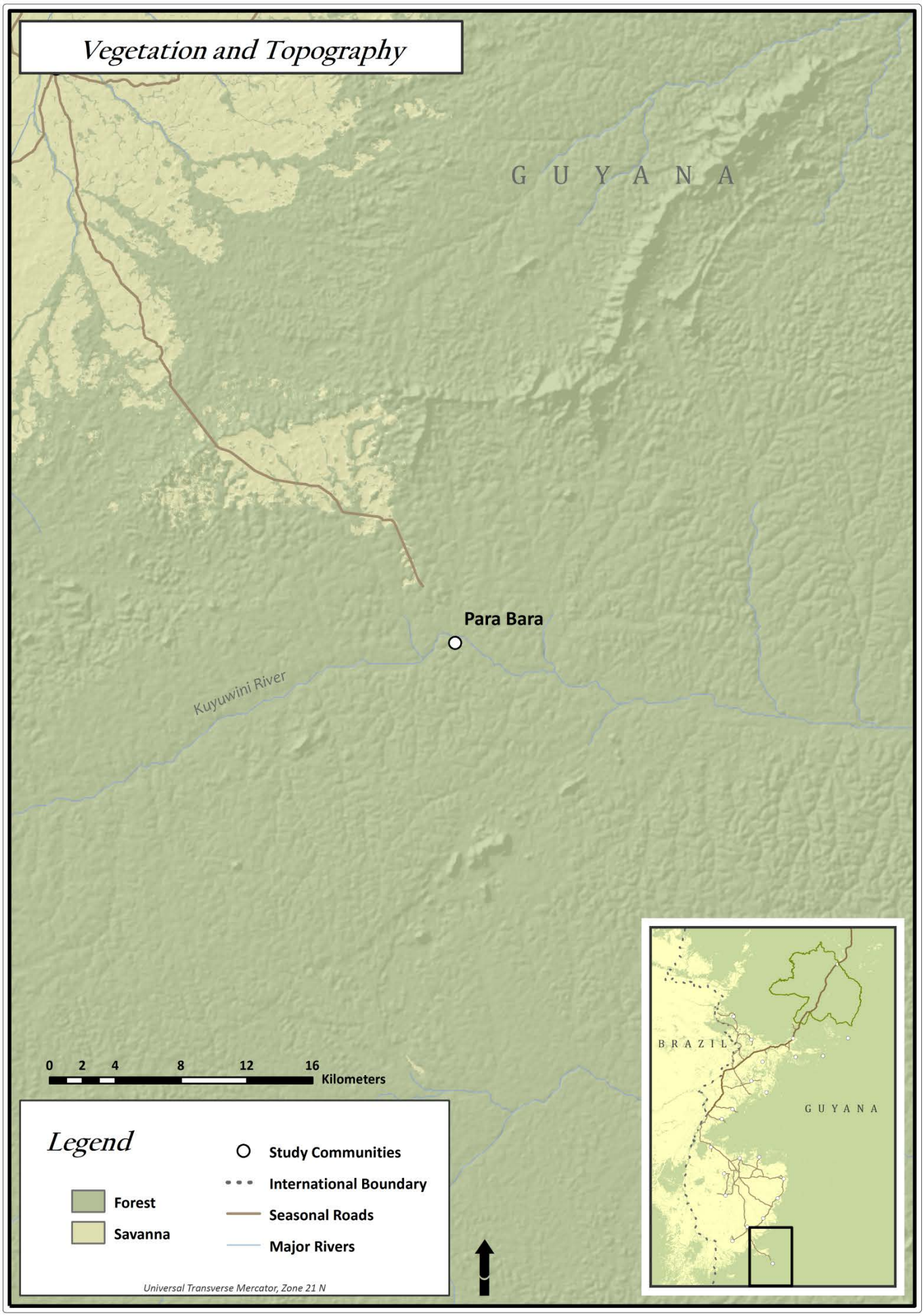
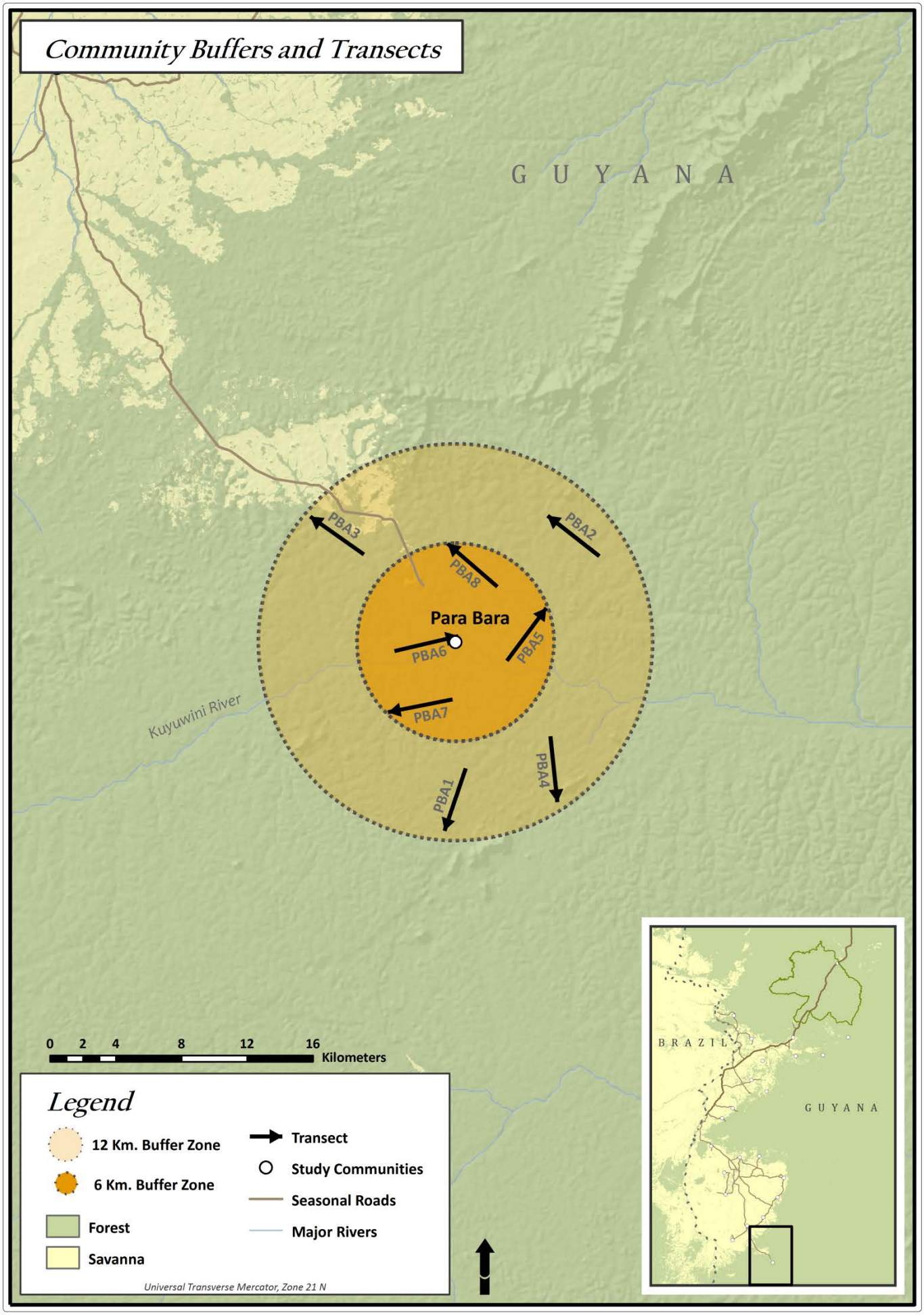
Major Rivers
Forest
Savanna
Universal Transverse Mercator, Zone 21 N
VENEZUELA
GUYANA
FRENCH GUIANA
SURINAME
BRAZIL

Para Bara


Vegetation and Topography
G U Y A N A
Para Bara
Kuyuwini River
0 2 4 8 12 16
Kilometers
Legend
Study Communities
International Boundary
Seasonal Roads
Major Rivers
Forest
Savanna
Universal Transverse Mercator, Zone 21 N
B R A Z I L
G U Y A N A


Community Buffers and Transects
G U Y A N A
PBA3
PBA2
PBA8
Para Bara
PBA6
PBA5
PBA7
Kuyuwini River
PBA1
PBA4
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Kilometers
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Universal Transverse Mercator, Zone 21 N
B R A Z I L
G U Y A N A

Vegetation

We calculated forest and savannah cover for the region within 12 kilometers of Para Bara village (where the transects were located). 44274 ha of these lands were forested and 962 ha in savanna in October 2005 (based on classified Landsat-TM data).

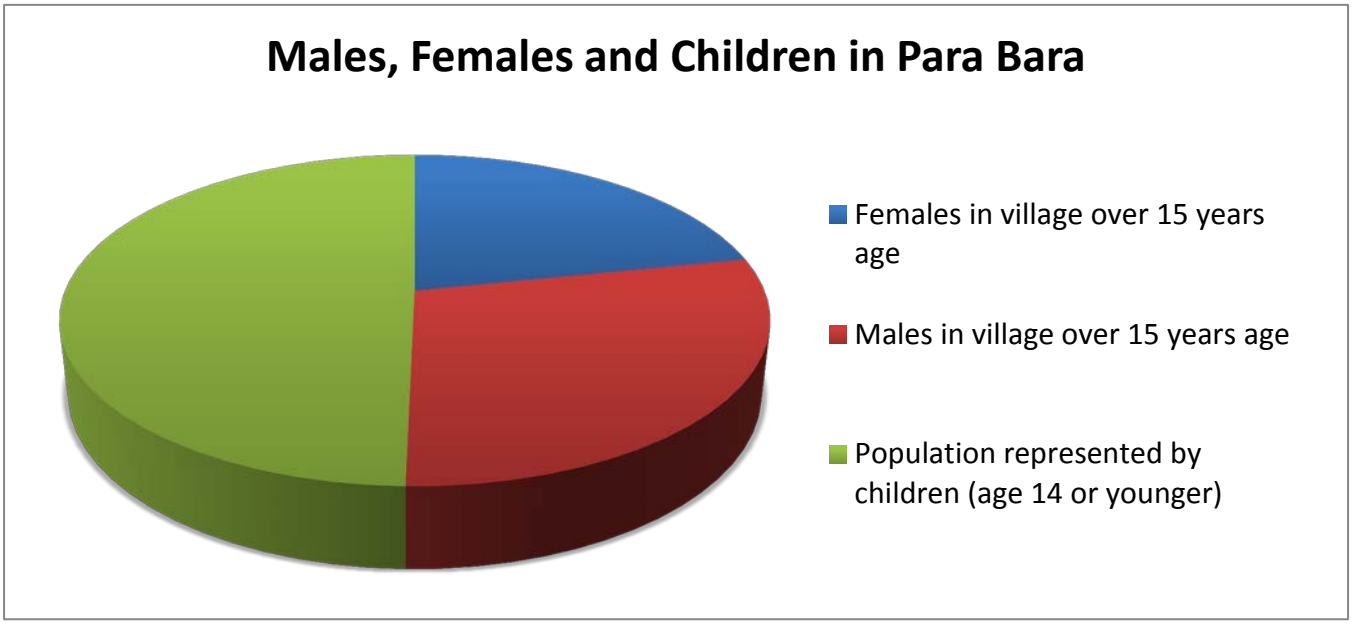
Transects

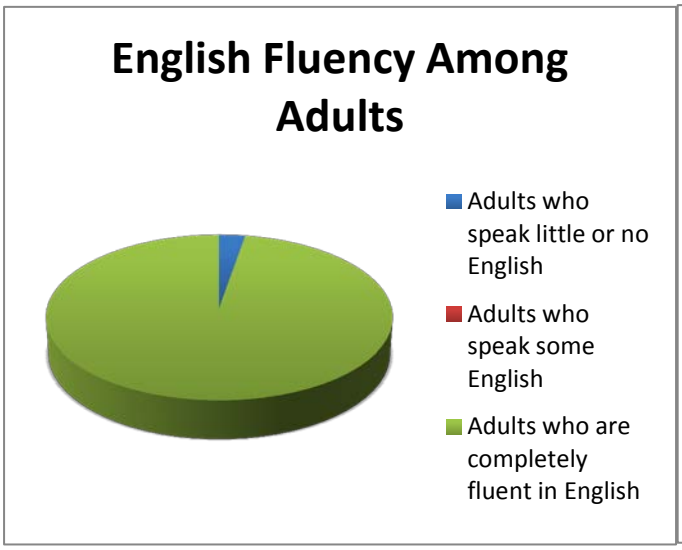
Transect ID	Near/Far Buffer	Start X-coordinate (UTM m)	Start Y-coordinate (UTM m)	End X-coordinate (UTM m)	End y-coordinate (UTM m)	Azimuth*	Compass Bearing*	Length (m)
PBA1	Far	251327	223896	250025	220114	199	214	4000
PBA2	Far	259477	236720	256325	239183	308	323	4000
PBA3	Far	245147	236851	241870	239145	305	320	4000
PBA4	Far	256479	225825	256897	221847	174	189	4000
PBA5	Near	253837	230403	256244	233598	37	52	4000
PBA6	Near	246995	230998	250892	231898	77	92	4000
PBA7	Near	250523	228062	246596	227299	259	274	4000
PBA8	Near	253258	234876	250239	237500	311	326	4000

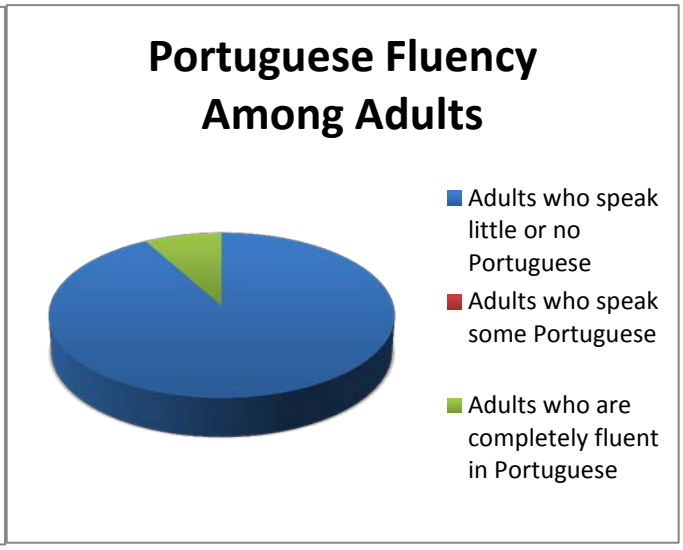
* Azimuth = bearing from true North in degrees; Compass = bearing from magnetic North in degrees (magnetic declination = 15 degrees).

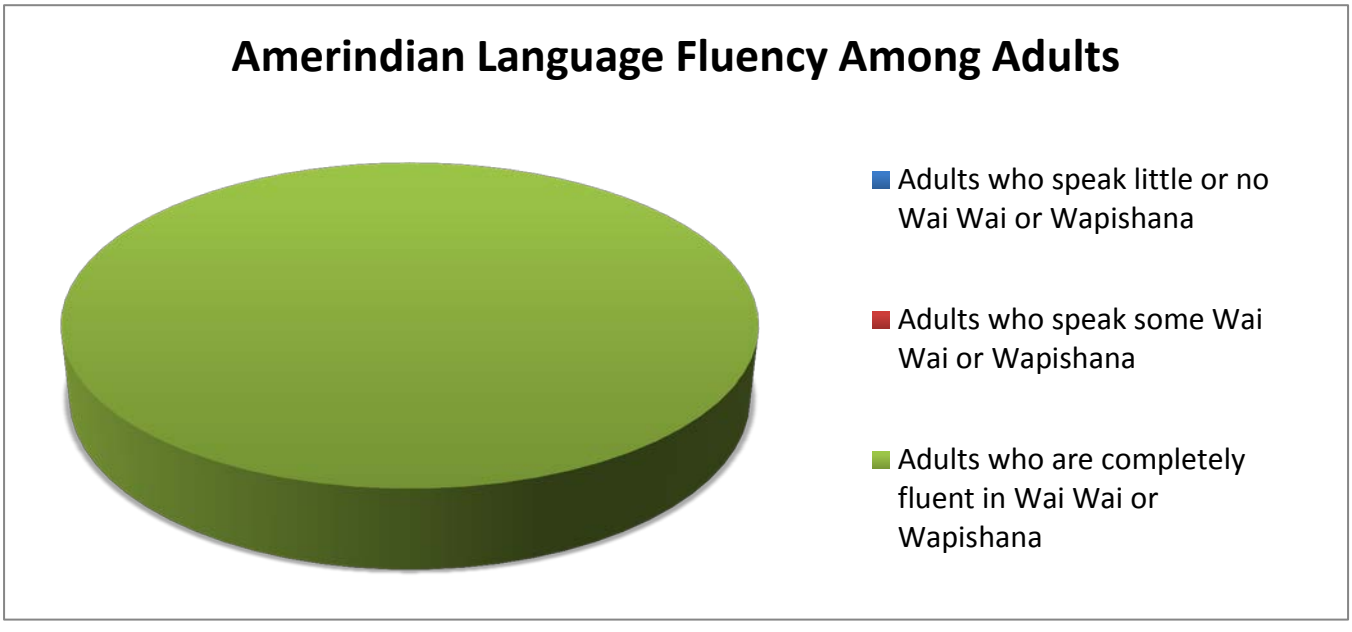
Transects were walked by two field technicians twice a month. On the first pass each month, the technicians recorded data on animal sightings. On the second pass, they recorded information on animal signs as well as fruits. For the majority of transects, we obtained two years, and in many cases three years, of data. Analysis of these datasets is ongoing and not yet completed, and so we do not present summaries here. These will be made available at a later date.

Socioeconomic Data

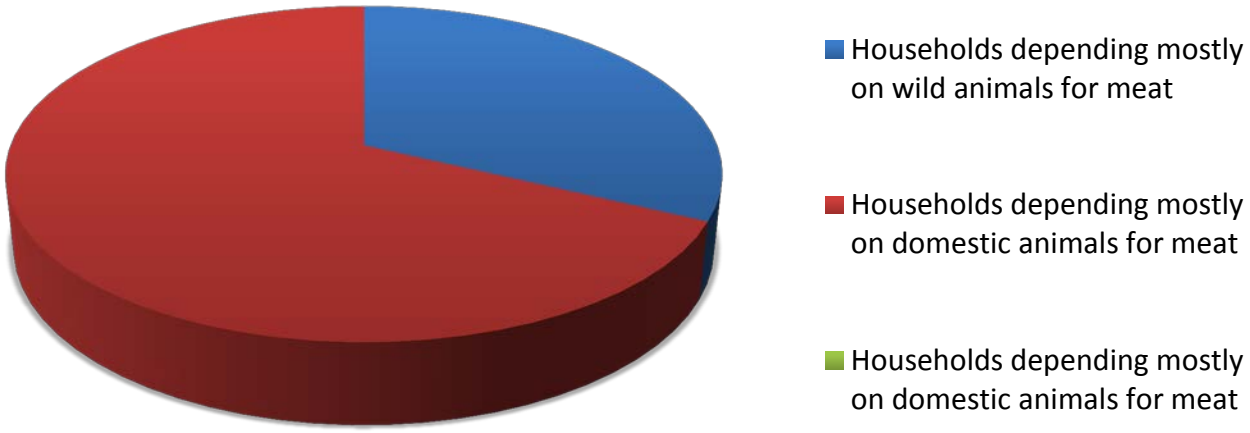




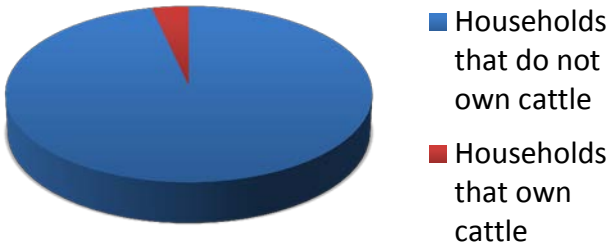




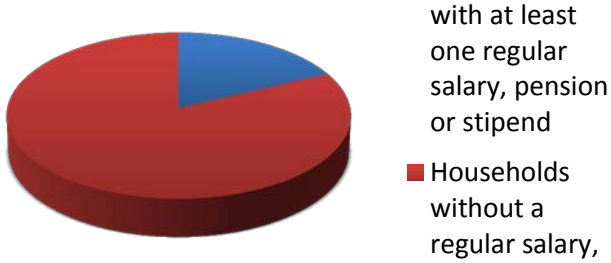
Primary Sources of Meat



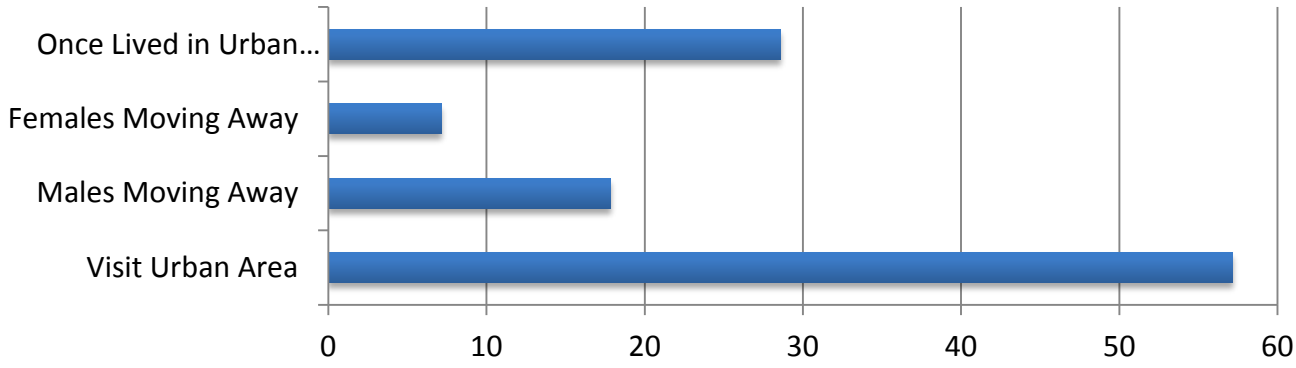
Cattle Ownership



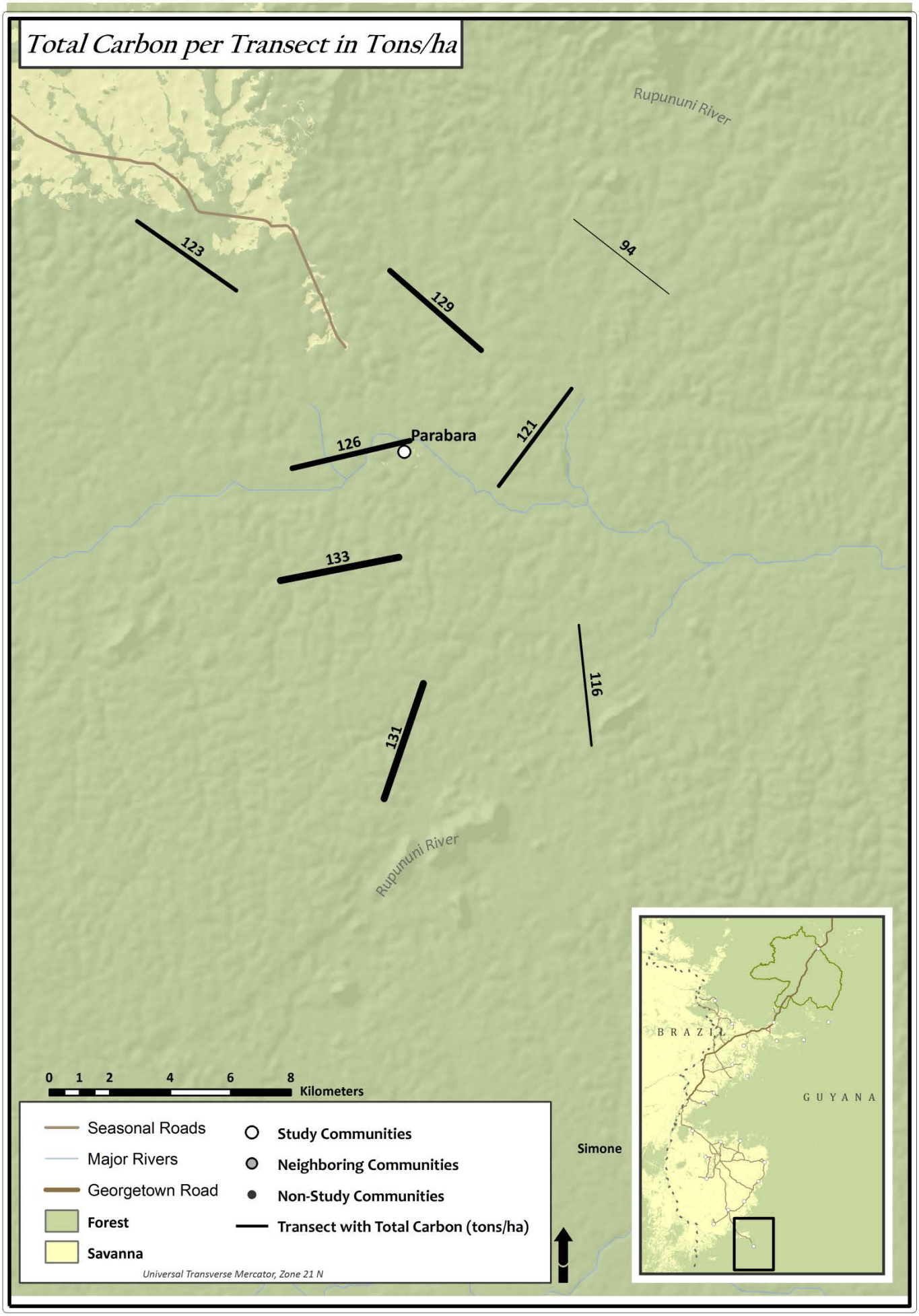
Monthly Income



Migration



This chart shows the percentage of Para Bara households where 1) at least one current member has once lived in an urban area (Lethem, Normandia, Georgetown, or Boa Vista) 2) at least one female has moved away to an urban area in the last 5 years, 3) at least one male has moved away to an urban area in the last 5 years and 4) where at least one current member has (temporarily) visited an urban area in the past year.


Total Carbon per Transect in Tons/ha
Rupununi River
123
129
94
126
Parabara
121
133
116
131
Rupununi River
0 1 2 4 6 8
Kilometers
Seasonal Roads
Major Rivers
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Savanna
Study Communities
Neighboring Communities
Non-Study Communities
Transect with Total Carbon (tons/ha)
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Simone
BRAZIL
GUYANA

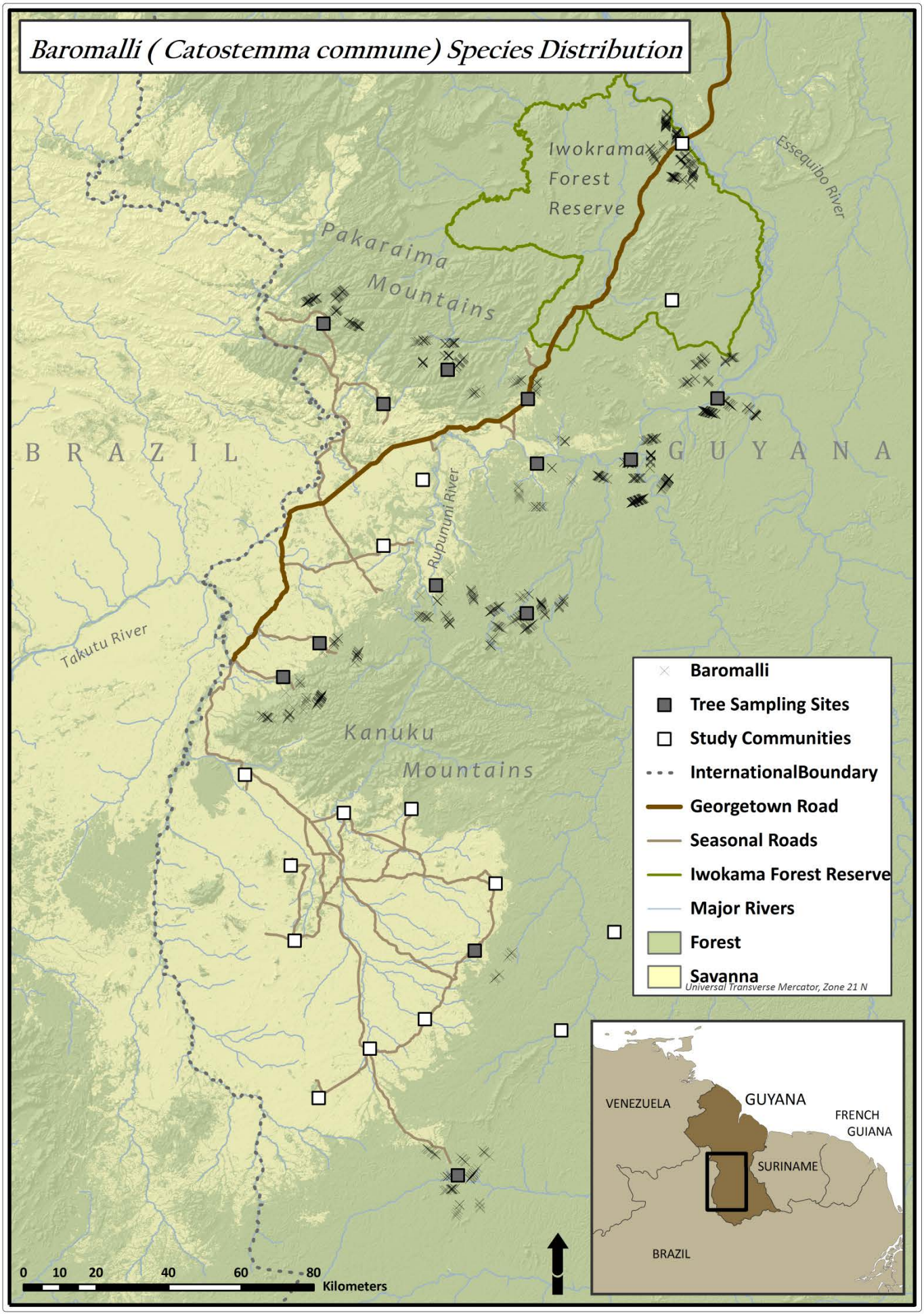
Carbon

The map of total carbon per transect on the opposite page shows the total amount of carbon in tons/ha for each transect calculated using land cover distribution and carbon estimates of each land cover type.

This was calculated based on sample measurements from a 4 ha area derived from a 10m-wide strip centered along the transect. Total Moist Carbon was calculated based on soil, litter, shrub, and tree biomass.

Fruiting Trees

Data on fruiting trees were gathered by Anthony Cummings, Persaud Moses, Ricky Moses, Carro Moses, Stephen Andries, Matthew Alvin, Benedict Joseph, and Han Overman along transects at selected (forested) study sites. On each transect, the following data on all trees ≥25cm DBH (diameter at breast height) and all mature palms were gathered: location along the transect, species name, and DBH. Individual trees were mapped using GIS. The maps opposite show the locations of trees mapped along the transects for four species that are important for the most-hunted wildlife in the Rupununi.


Baromalli (Catostemma commune) Species Distribution
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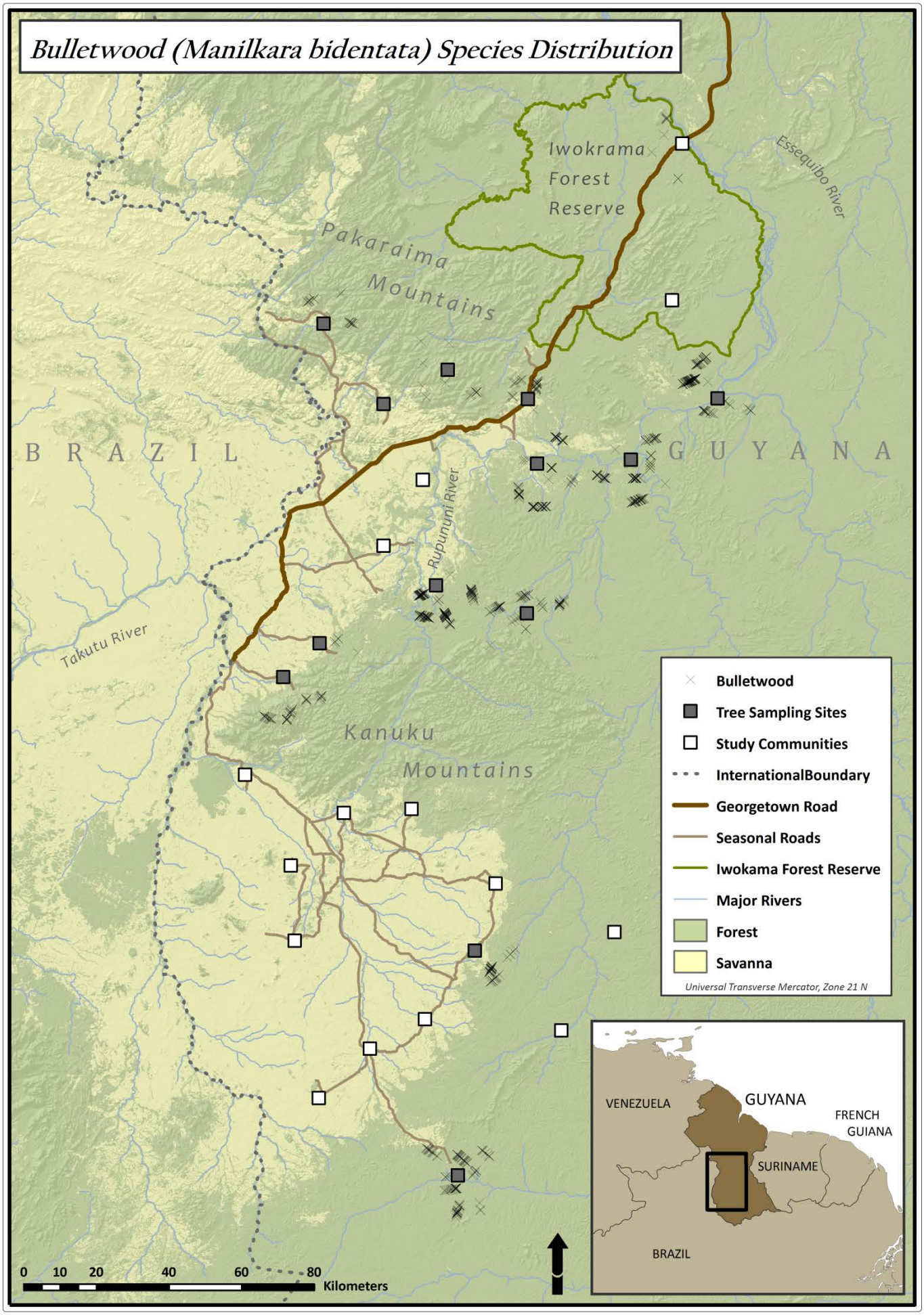
BRAZIL
0 10 20 40 60 80
Kilometers


Bulletwood (Manilkara bidentata) Species Distribution
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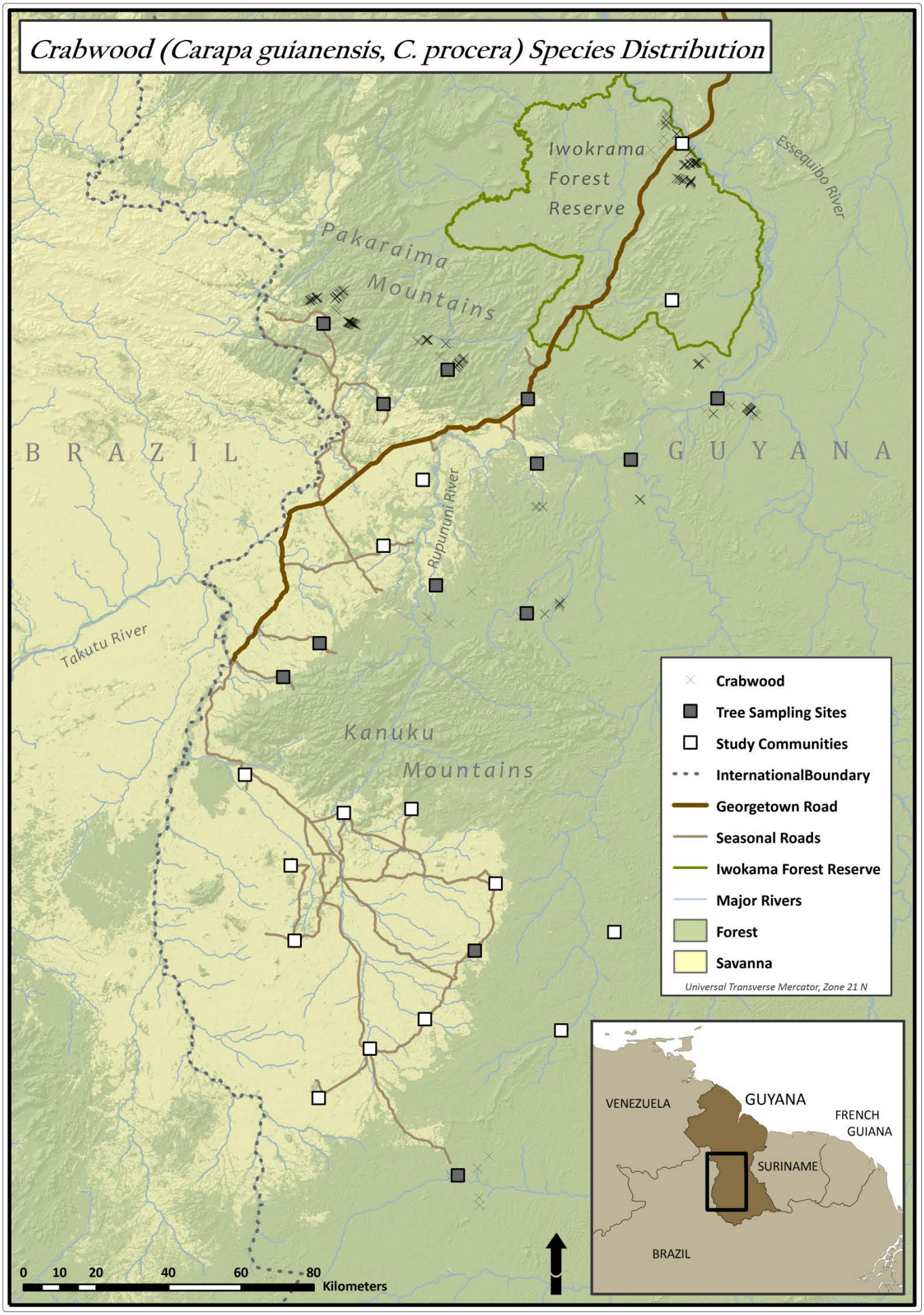
Universal Transverse Mercator, Zone 21 N
VENEZUELA
GUYANA
FRENCH GUIANA
SURINAME
BRAZIL
0 10 20 40 60 80
Kilometers


Crabwood (Carapa guianensis, C. procera) Species Distribution
Iwokrama Forest Reserve
Pakaraima Mountains
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BRAZIL
GUYANA
Rupununi River
Takutu River
Kanuku Mountains
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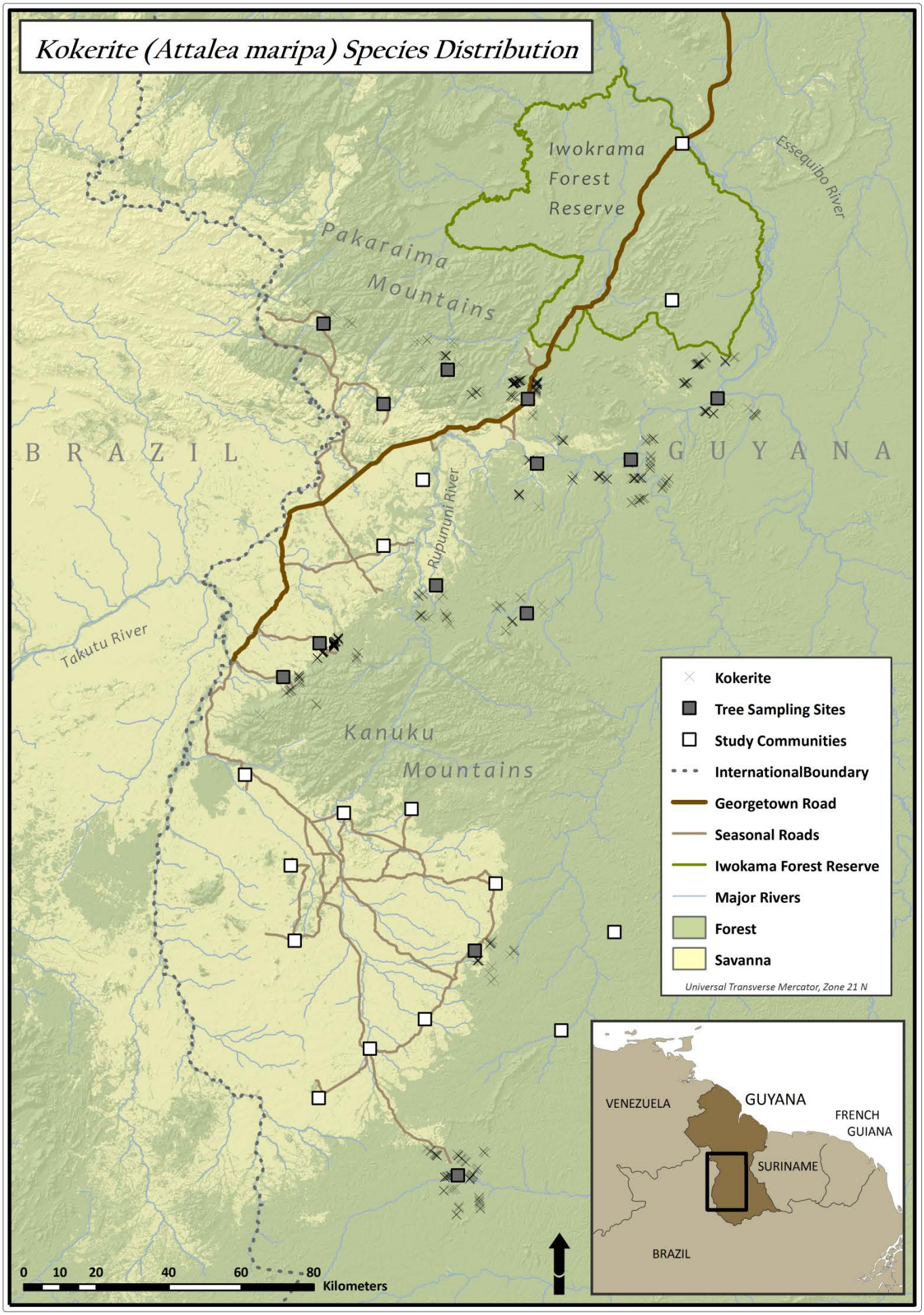
Universal Transverse Mercator, Zone 21 N
VENEZUELA
GUYANA
FRENCH GUIANA
SURINAME
BRAZIL
0 10 20 40 60 80
Kilometers


Kokerite (Attalea maripa) Species Distribution
Iwokrama Forest Reserve
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Essequibo River
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SURINAME
BRAZIL
0 10 20 40 60 80
Kilometers

Project Fauna Personnel

Researchers

Jose Fragoso, Principal Investigator (PI): Stanford University; biologist
Kirsten Silvius, co-PI: Moore Foundation; biologist
Jane Read, co-PI: Syracuse University; geographer
James Gibbs, co-PI: State University of New York—ESF; biologist
Luiz Flamarion de Oliveira, co-PI: Museu Nacional, Rio de Janeiro; biologist
Leda Martins, co-PI: Pitzer College; anthropologist
Robert Miller, researcher: FUNAI; agro-ecologist
Carla de Albuquerque, researcher: Independent; anthropologist
Jerome Chave, co-PI: Centre National de la Recherche Scientifique; biologist
Jeffrey Luzar, Post-doc: State University of New York—ESF; anthropologist
Han Overman, Post-doc: State University of New York—ESF; biologist
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