

A baseline avian survey of the North Rupununi River, Region 9, Guyana

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The purpose of this eight day avian survey of the North Rupununi River in Guyana, South America, was to provide important baseline data on bird abundance, species richness and composition for this relatively unstudied and largely pristine region which is subject to a multitude of pressures across spatial and temporal scales. Two of us (DCM, MDS) have visited the biologically diverse Rupununi region of savannah, forest, and wetlands annually since 2007 and have witnessed the rapid growth of ecotourism (Nycander *et al.* 2010, Clark 2012, <http://www.foster-parrots.com/conservation-overview/>) against a backdrop of increased oil prospecting, gold mining, large scale agriculture, and growing pressures for timber extraction (Bulkan 2014), climate change impacts, and pressures to pave the road from Lethem on the Brazilian border to Georgetown on the Caribbean coast. A national Low Carbon Development Strategy, governmental, NGO, and university programs, and Internet-assisted regional and local social networking around land management and use have emerged across the Rupununi amidst this environment of rapid change in the North Rupununi system (Low Carbon Development Strategy - LCDS, Office of the President, Country of Guyana 2010 Indigenous Peoples of the South Rupununi 2012, <http://rupununi.org/>, <http://guycon.org/>, https://www.facebook.com/groups/NRDDDB/?ref=br_tf, <https://www.facebook.com/groups/YupukariVillage.NorthRupununi.Guyana/>, <https://www.facebook.com/RewaEcoLodge>, <https://www.facebook.com/IwokramaInternationalCentre>, <http://www.lesley.edu/study-abroad/guyana-semester/>).

Given climate change, the many local and regional pres-

ures on the environment, and the rate of environmental and social change and social organization (from ecotourism to natural resource management) in the Rupununi region, and given the importance of Amazonian freshwater ecosystems (Remsen & Parker 1983) and their particular vulnerability to human impacts (Castello *et al.* 2013), baseline data on

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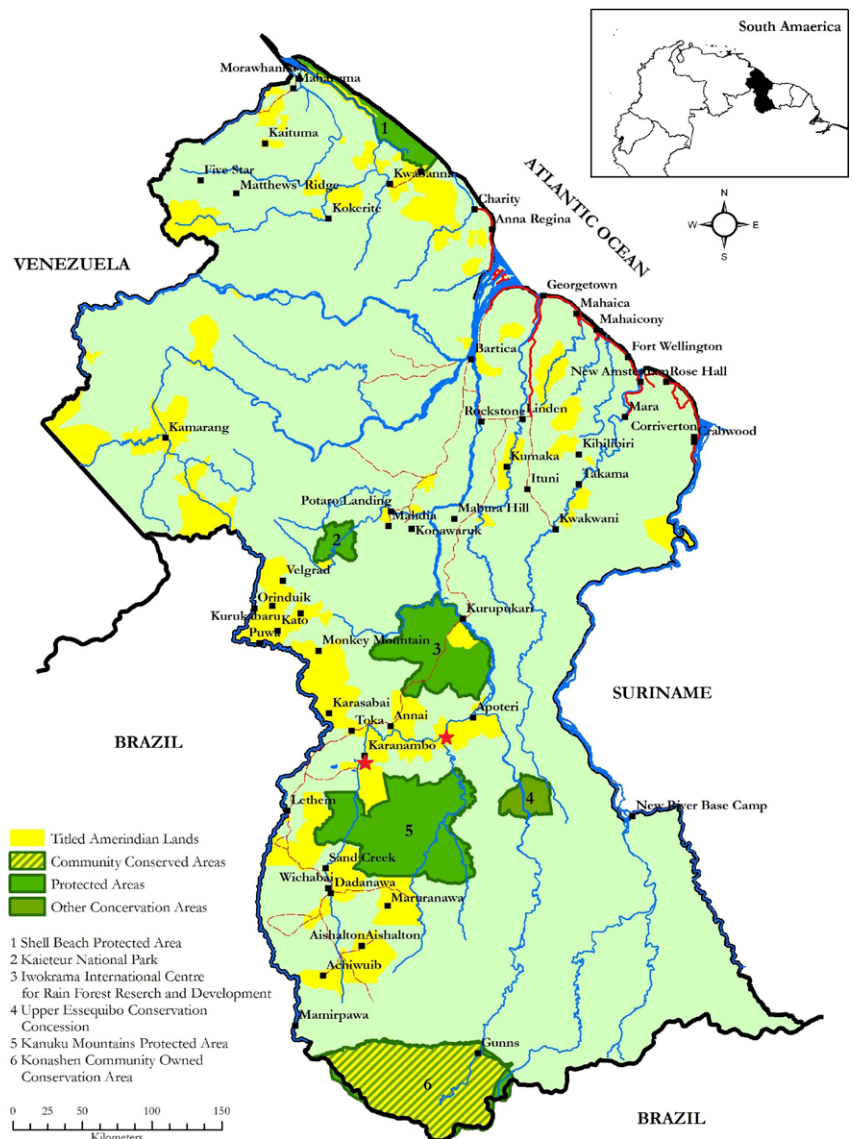


Figure 1. Guyana, South America, with preserved areas, Amerindian lands, and the beginning (west) and ending (east) of the Rupununi River Bird Survey route indicated by red stars. Courtesy of Conservation International, Guyana.

species composition and richness (as presented here), is critical for measuring ongoing and future impacts.

We chose to perform our survey using local expertise: GNN is the founder of the Guyana Amazon Tropical Birds Society and arguably the leading field ornithologist in the country and an expert in Guyana's Important Bird Areas (Narine & Narine 2009), and AW is an indigenous (Wapishan) field guide, also a leading national field ornithologist. We surveyed using traditional dugout canoes to bring us closer to the way local indigenous Makushi and Wapishan people live, in an effort to make the survey repeatable by expert local indigenous stakeholders (e.g., Luzar *et al.* 2011) and to facilitate the sharing of stories about the importance of biodiversity and its monitoring, conservation, and management. Given that 'Social networks link organizations and individuals across space and time to determine the scale of conservation actions' (Guerrero *et al.* 2012), we, who are variously associated with multiple local, regional, and global conservation networks, wanted to make local connections along our regional route to help make conservation and monitoring efforts more robust across scales.

Study Area and Background

Located on a block fault in the ancient Guianan Shield geological system of northern South America, the savannah, forest, and wetland ecosystem of south-west Guyana is still largely pristine and is relatively poorly studied (Eden 1973, Cole 1986, Watkins *et al.* 2011). The system is akin to the ecosystems of the neighboring Brazilian state of Roraima and together with it forms the greater than 50,000 km² 'Rio Branco-Rupununi formation', and represents the largest continuous Amazonian savannah (Naka *et al.* 2006).

Mees (2000) and Robbins *et al.* (2004) reported about the birds of the South Rupununi savannah, which comprise a geologically distinct ecoregion where rare birds such as the Red Siskin (*Carduelis cucullata*) have been rediscovered recently (Robbins *et al.* 2003). Montambault & Missa (2002) surveyed the Eastern Kanuku Mountain region, Mistry *et al.* (2008) studied birds as indicators of wetland status and change in North Rupununi wetlands, and Pickles *et al.* (2009) assessed the biodiversity of the Rewa River headwaters. The ornithological monitoring and research activity in Guyana in general has increased rapidly this century, after two 20 year periods of stagnation punctuated by Snyder's

(1966) national checklist, Stephens & T aylor's (1985) ornithological gazetteer, and Braun *et al.*'s (2007) checklist.

The system occurs where an ancient 'Proto-Berbice' River once connected with the Amazon basin, flowing north (Watkins *et al.* 2011). Today it contains the Rupununi River and Lake Amucu, or the 'Rupununi Portal' (De Souza *et al.* 2012) which during the rainy season (May-September) connects the Amazon basin with the upper Essequibo River system hydrologically to flow north to the Caribbean as the largest river between the Orinoco and the Amazon. This mixture allows for high fish diversity and high biological diversity in general, ranking this region as globally important (Watkins *et al.* 2011, De Souza *et al.* 2012). Rare bird

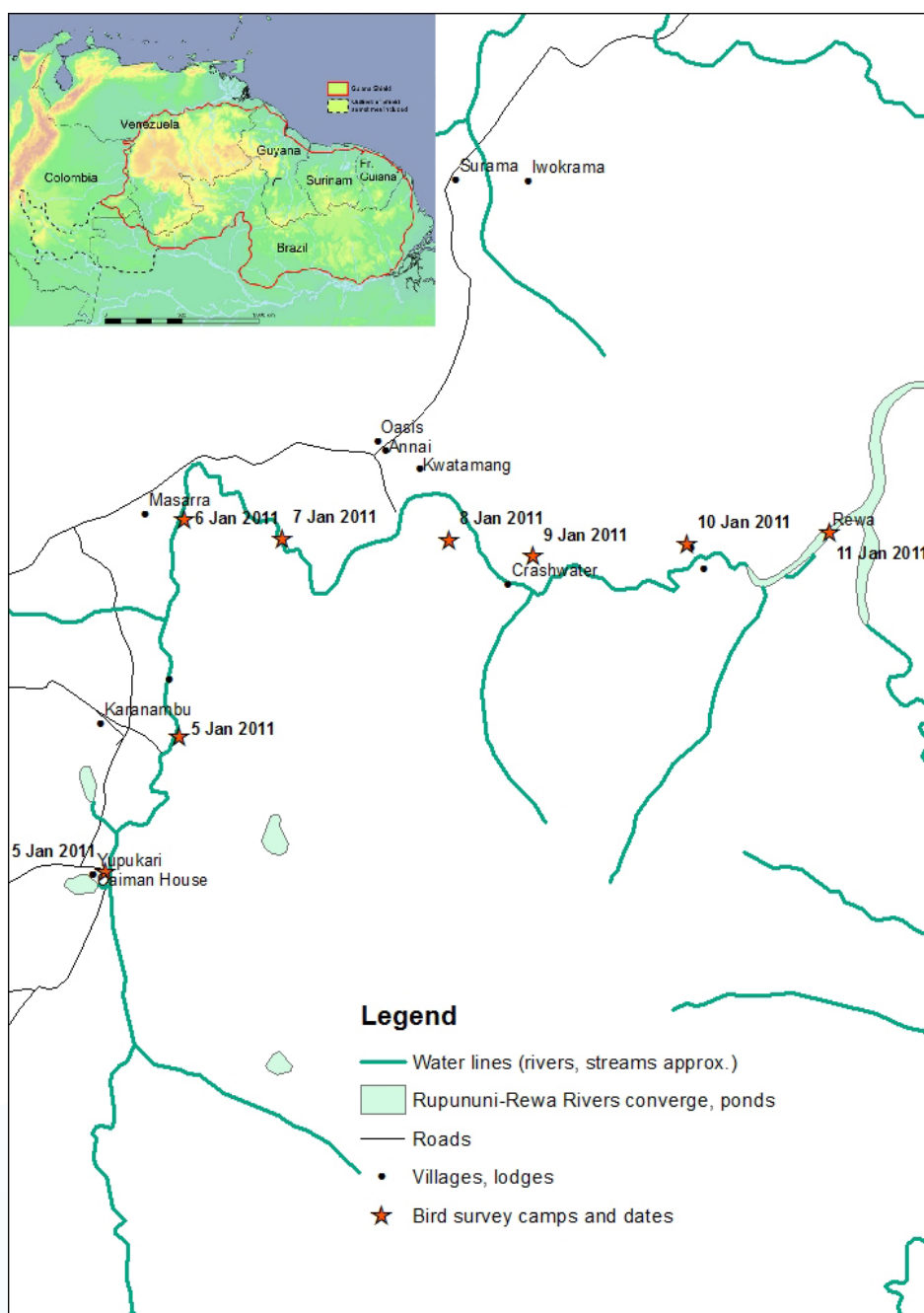


Figure 2. Map of the 6-12 January 2011 Rupununi River Bird Survey, from Yupukari village to Rewa Ec lodge and village, by dugout canoe, with start and end points and camp sites indicated (stars), and major creeks, rivers, and villages labeled. GIS shapefiles from DIVA-GIS (www.diva-gis.org/gdata). Waypoints taken with Garmin GPSMAP 60C. Google Maps® terrain image: <https://maps.google.com/maps?q=guyana+south+america&hl=en&ll=3.694337,-59.139404&spn=1.652688,2.878418&ll=42.258927,-71.015495&sspn=0.15322,0.359802&t=p&hnear=Guyana&z=9>



Figure 3. The Rupununi River from canoe (a) and airplane (b). Photos: David C. Morimoto.

species such as Rio Branco Antbird *Cercomacra carbonaria* and Hoary-throated Spinetail *Synallaxis kollari* (Vale *et al.* 2007) can be found in this system, along with species such as Crested Doradito *Pseudocolopteryx sclateri*, and to the north, in Karasabi, Sun Parakeet *Aratinga solstitialis*.

The North Rupununi region or district has a dynamic seasonal system with mean annual rainfall of 1600-1900 mm, peaking during the May-September rainy season (Mistry *et al.* 2004). The Kanuku Mountains and Pakaraima Mountains form natural boundaries to the south and north, respectively, with the Essequibo River forming the eastern boundary and the Takutu and Ireng Rivers forming the western boundary on the Brazilian border. Contained therein is a complex mix of tropical savannah, lowland forest (seasonally flooded and *terra firme*), gallery forest, and various wetland habitat types (Mistry *et al.* 2004, Naka *et al.* 2006, Robbins *et al.* 2004), as well as 24 indigenous Makushi villages, half of which are represented by the North Rupununi District Development Board (Mistry *et al.* 2004). The northern half of the Rupununi River flows north then bends eastward toward the Essequibo River, connecting many of these villages with one another. Our survey took this meandering route starting from Yupukari Village and slowly paddling and meandering through the savannah and its gallery forest, across several creek systems, and through the forest to indigenous owned and operated Rewa Ecolodge, located adjacent to Rewa village, the last village before the confluence of the Rupununi River with the Essequibo River at Apoteri Village (Figures 1 and 2).

As mentioned, the region is undergoing significant environmental and anthropic change at multiple scales, raising urgent concern for monitoring, conservation, and management and giving rise to increasing efforts to study, protect, and manage the biodiversity of the region (Shackley 1998, Montambault & Missa 2002, Pickles *et al.* 2009), to know its people and their interactions with the land (Mistry *et al.* 2004, 2010, Mulder *et al.* 2009, Read *et al.* 2010, Mistry & Berardi 2012, Berardi *et al.* 2013, Bulkan 2013), and to develop plans and policies for the future (Nycander *et al.* 2010, Watson *et al.* 2012). Involving local stakeholders is critical to these efforts (Luzar *et al.* 2011, Mistry *et al.* 2008) so that they can inform and contribute with their traditional and local knowledge and gain the paraprofessional capacity, knowledge, and understanding to continue the networked process of monitoring, conservation, and management.

Methods

After conversations with the Yupukari Village Council and Toshao (elected mayor, or ‘captain’) about the purpose of our study and advance planning with Rewa Village and Ecolodge leaders, we purchased two traditional dugout canoes (*korials*) for our journey. We departed on January 05, 2011 from Yupukari Village (3°39’47’’N, 59°20’37’’W) and spent the next 7 days and approximately 147.05 km surveying all birds detected (primarily by ear) from dawn until dusk as we paddled at a slow pace with the two canoes tied together, often drifting in the faster reaches of the river (3-5 km/hr), and during 60-90 min walking surveys where we camped along the river, until we arrived at Rewa Ecolodge (3°53’07’’N, 58°17’03’’W) on 12 January 2011. We used Restall *et al.* (2006) and Braun *et al.* (2007) as field references. We had few human encounters along the meandering route (Figure 3). We stopped for lunch for approximately 1 h each day. We did not try or plan to travel equal distances from day to day (distances estimated from maps; $\bar{x} = 21.01 \pm 6.19$ km/day), but rather went to where the river took us until sunset neared. The logistics of camping sites along the river as well as other contingencies (we suspended our survey during rain, but mostly it rained for short periods at night) made us resort to uneven distances traveled per day (Table 1). We believe that this method did not diminish the data quality or repeatability of the survey since we recorded the coordinates of each camping site and the start and finish points.

We analyzed the results in several ways at the individual, species, family, and ‘daily community’ levels, to represent the overall avian community of the North Rupununi River ecosystem and to provide several baseline measures against which to compare the results of future surveys. We tallied the total number of individuals and species detected (Appendix), plotted accumulation curves for individuals, species, and families (Figures 4-6), and calculated the approximate numbers of individuals and species detected per km (Figure 7). We determined frequency distributions of the numbers of days a species was recorded (Figure 8), determined species (Figure 9) and family abundance patterns (Figure 10), and plotted daily numbers of species for those species with >10 individuals observed on at least one day (Figure 11). We also constructed a community similarity matrix of Proportional Similarity (PS) values comparing bird communities recorded on different days (8 days, 28 comparisons; Figure

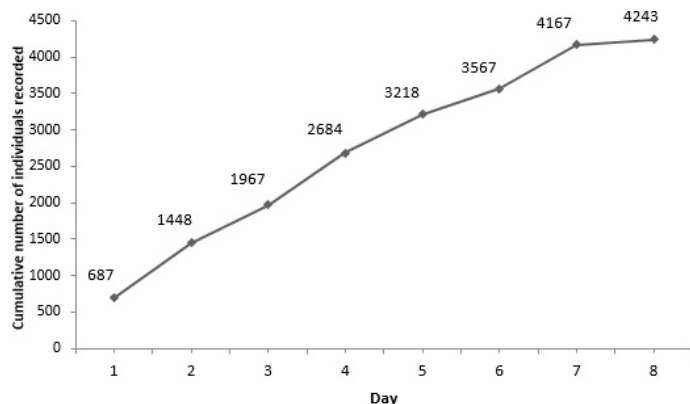


Figure 4. Cumulative number of individual birds detected by day for the eight day survey. Day 8 involved no travel by canoe.

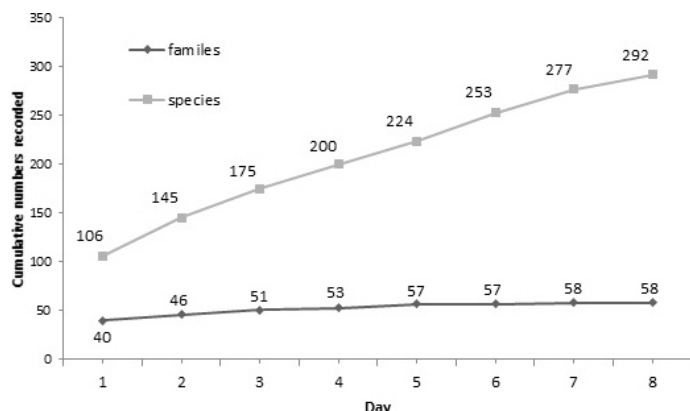


Figure 6. Cumulative numbers of species and families detected by day for the eight day survey. Day 8 involve no travel by canoe. The lack of a clear asymptote in species accumulation reveals changes in beta diversity along the ~147 km route, from savannah through bush, to forest, and across creek systems.

12), using the formula: PS (Percent or Proportional Similarity) = $\sum \text{lowest } p_i$'s for every detected species i , where p is the proportion of the total number of individuals of a given species detected on a given day (Brower *et al.* 1990). Finally, we compared our results to the avian survey results of four other regional surveys (Montambault & Missa 2002, Robbins *et al.* 2004, Mistry *et al.* 2008, Pickles *et al.* 2009) to assess the contribution of the North Rupununi River bird community to the avifauna of the greater Rupununi ecosystem (Table 2, Figures 13 & 14).

Results and Discussion

We recorded 4243 individuals, 292 species, and 58 families of birds (Appendix). Excluding day 8 when we did not travel and recorded only 2% of the total number of individuals detected, the accumulation curve for individual birds shows a fairly regular increase in the numbers of individuals recorded per day (10-18%; Figure 4), with somewhat higher %'s of individuals detected on the first half of the survey when we were traveling through savannah (Figure 5). Higher detection frequencies could be due to the more open nature of the savannah allowing for longer range auditory and visual detection, but caution must be used in interpreting these results in this way since our detection frequency was affected by distance traveled in a day, or overall daily rate of travel; we detected individuals and species at the lowest frequency on the day in which we traveled the longest distance (day 6) and at the highest frequency on the day we traveled the shortest dis-

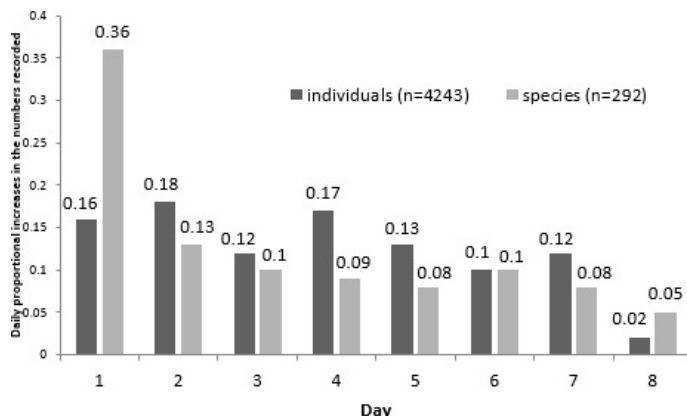


Figure 5. Daily proportional increase in the numbers of individuals and species detected. 36% of the species were detected on day 1 and another 13% on day 2, with slowly diminishing proportions thereafter. Daily %'s of individuals fluctuated slightly around and average of 14%. Day 8, being on land with no canoe travel, contributed lower %'s of species (5%) and, especially, individuals (2%).

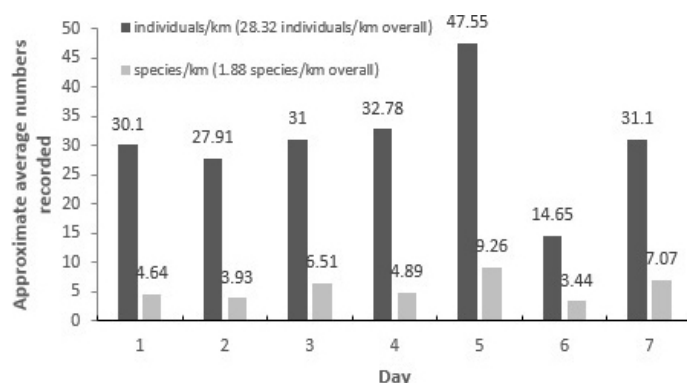


Figure 7. Approximate average numbers of individuals and species recorded per km for the 7 days of canoeing and surveying. Average daily distance was approximately 21.01 ± 6.87 km (~147.05 km total). Day 5 was the shortest daily distance travelled (~11.23 km, 7.6% distance) and day six the longest daily distance (~29.97, 20.4% distance). Day 2 had the most individuals recorded (761) and day 6 had the fewest individuals (439), while day 7 had the most species recorded (116) and day 6 had the fewest species (103). The average (\pm SD) numbers of individuals and species per day were 595.29 (123.81) and 107.86 (4.37), respectively.

tance (day 5; Table 1, Figure 7). Irregular distances traveled from day to day notwithstanding, the data are still valuable for comparison and still reveal important information about the North Rupununi River bird community.

The species accumulation curve reveals that we detected 36% of the 292 species on the first day, followed by steady daily increases of 8-13% thereafter (Figure 6). Given that we kept moving across the landscape and did not stay in any one place for very long, we did not expect our species accumulation curve to reach an asymptote. The lack of an asymptote and the steady increase in species accumulation over the 7 days of traveling as we meandered with the river gradually from savannah to forest, to the north then to the east, and across different creek systems, reflect the high β diversity of birds in this system. The lack of an asymptote also suggests that we did not fully sample the avian diversity of the North Rupununi River system; more species would likely be detected between Rewa and Apoteri Villages at the confluence of the Rupununi and Essequebo Rivers. We suggest that a repeat of this survey should thus try to include the full distance to Apoteri Village.

Family accumulation did asymptote by the 5th day as we mo-

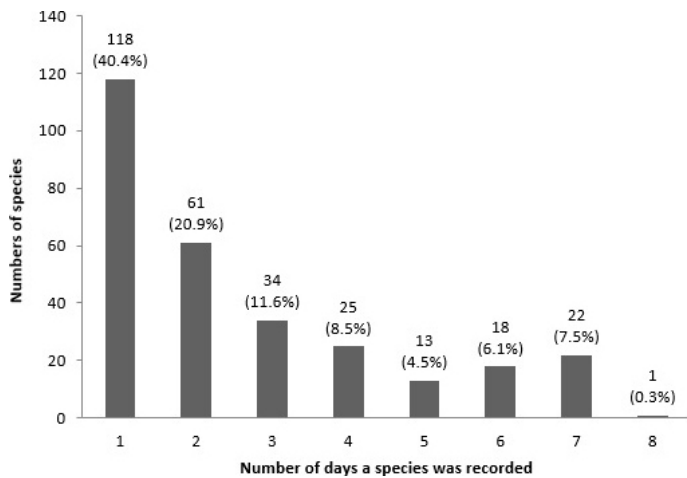


Figure 8. Frequency distribution of the numbers of days (1-8) that a species was recorded (n=292 species). Over 61% of the species were recorded on only 1 or 2 days. Only one species, the Little Woodpecker (*Veniliornis passerinus*), was recorded on all 8 days, making it a signature species of the North Rupununi River.

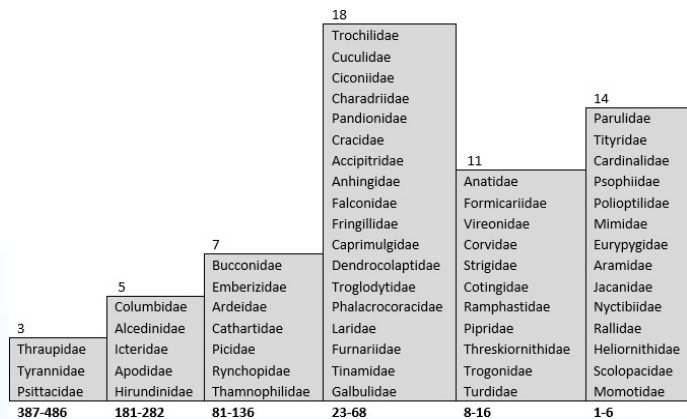


Figure 10. Frequency distribution of family abundances, with the most to least abundant families sorted from top to bottom in each abundance category (total # of individuals = 4243; total # families = 58).

ved from savannah into forested habitat (Figure 6), with the addition of wetland/forest species from four families (Aramidae, Rallidae, Eurypygidae, Momotidae), and the last (58th) family recorded being Nyctibiidae on day 7 (Appendix). The accumulation of species and families, and to a lesser extent individuals, thus reflect at least some of the broad ecological transitions along the North Rupununi River corridor.

That the avian community changed steadily from day to day as we moved along the river is also suggested by the frequency distribution of the numbers of days on which a species was recorded, with more than half (61.3%) of the species being detected on only one or two days (Figure 8). Only one species, the Little Woodpecker (*Veniliornis passerinus*), was recorded on all 8 days, with a total of 57 individuals detected, suggesting that this species is emblematic for this system.

Nearly 75% of all species were represented by only 1-10 individuals, and 61% of the species by only 1-5 individuals, with relatively few abundant species overall. (Figure 9). The most abundant (arbitrarily, >90) birds were Cocoi Heron *Ardea cocoi* (96), Black Skimmer *Rynchops niger* (93), Pale-vented Pigeon *Patagioenas cayennensis* (104), Brown-throated Parakeet *Aratinga pertinax* (136), Ringed Kingfisher *Megasceryle torquata* (98), Amazon Kingfisher *Chloroceryle amazona* (97), Swallow-winged Puffbird *Chelidoptera tenebrosa* (92), Lesser Kiskadee *Philohydor lictor*

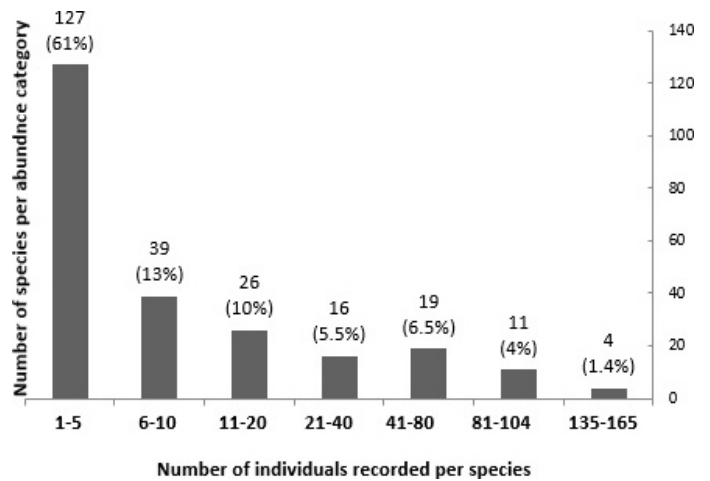


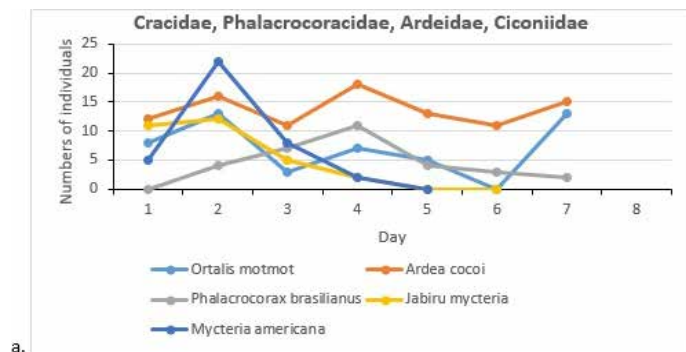
Figure 9. Frequency distribution of species by abundance category. Nearly 75% of species were recorded with 1 to 10 individuals.

(135), Southern Rough-winged Swallow *Stelgidopteryx ruficollis* (93), Red capped Cardinal *Paroaria gularis* (165), and Yellow-rumped Cacique *Cacicus cela* (138; see Appendix). At the family level, most families were similarly represented by relatively few individuals, and only three (Thraupidae, Tyrannidae, Psittacidae) were represented by more than 300 individuals (Figure 10).

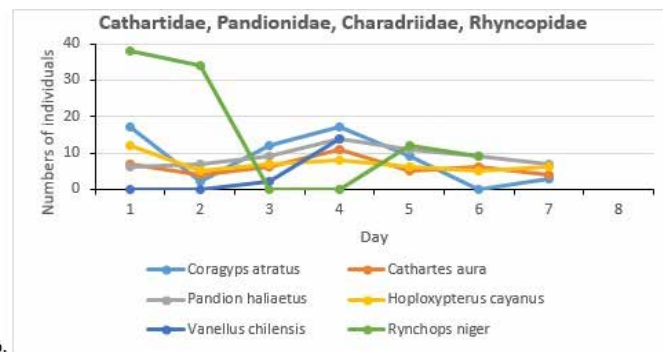
Figure 11 provides examples (a-j) of variation in abundance from day to day for the 49 species for which at least 10 individuals were detected on at least one day of the survey (plus *Amazona amazonica*, for 50 examples in all). Several patterns can be observed, from the fairly regular detection of common riparian species (e.g., *Tyrannus melancholicus*, Figure 11g, and *Thraupis episcopus*, Figure 11i), to the detection of savannah species more on the first half of the trip where savannah dominated and of forest species on the second half of the trip where the river ran through forest (e.g., *Aratinga pertinax* and *Gypopsitta caica*, respectively, Figure 11d). Some species (e.g., *Rynchops niger*, Figure 14b, and *Paroaria gularis*, Figure 11i), showed a bimodal distribution, while other, such as *Phalacrocorax brasilianus* (Figure 11a) and two *Chaetura* species (Figure 11e) show a peaked distribution.

The steady change in daily bird community composition caused by high β diversity associated with habitat change from savannah to forest and from creek system to creek system is also reflected neatly in the Community Similarity matrix (Brower *et al.* 1990); the further we traveled in distance and time the more dissimilar the bird community became. In other words, bird species composition and abundance on consecutive days of the survey were more similar to one another than those further away in space and time (Figure 12).

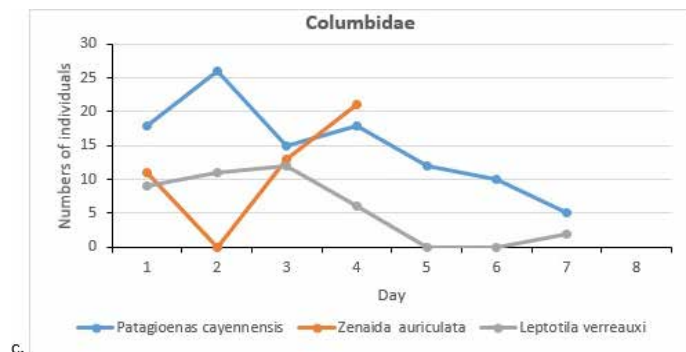
Comparisons with four published Rupununi region surveys (Table 2) reveal that of the 567 combined species (67 families) reported by these five surveys, representing 88% of the 643 Rupununi bird species (Watkins *et al.* 2011), 15 species were unique to the Rupununi Bird Survey (RBS, which recorded 51% of the combined species total. Fifteen species (5.1% of 292 RBS species; 2.6% of total 567 species) were unique to the RBS survey overall. Sixty-nine (12.2%) of the species were detected on all five surveys, and 163 (28.7%) of the species were detected on only one of the five regional surveys, which included: North Rupununi Wetlands (NRW; Mistry *et*



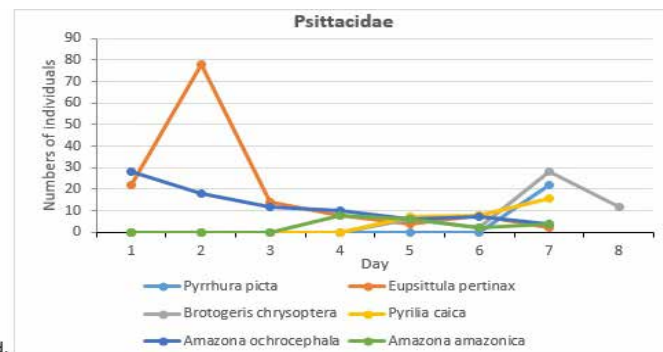
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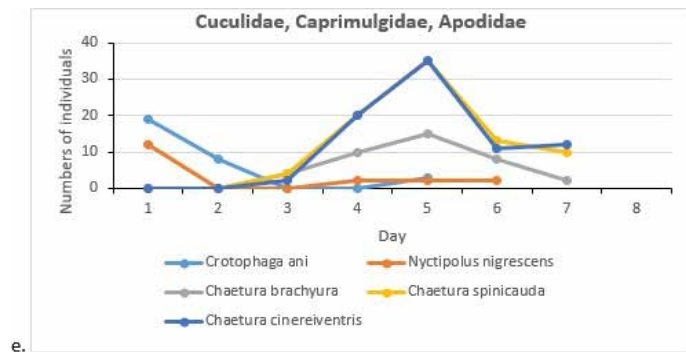
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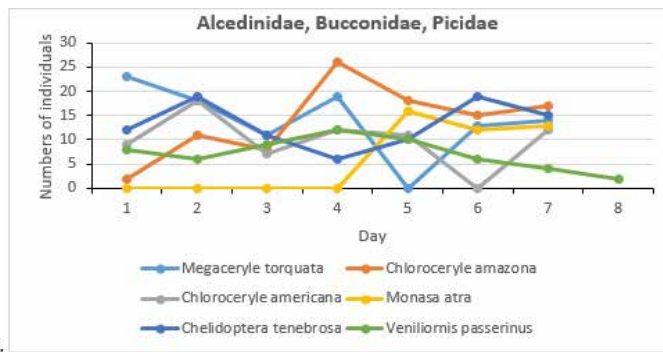
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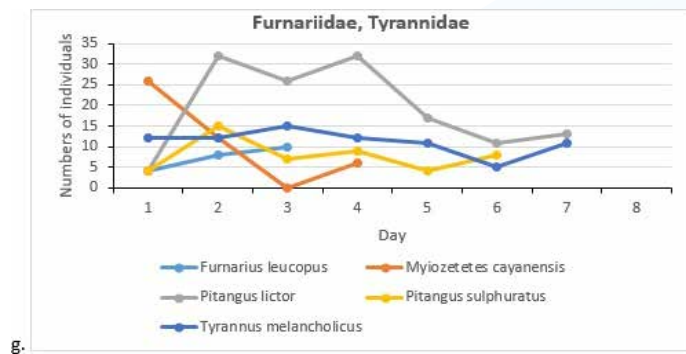
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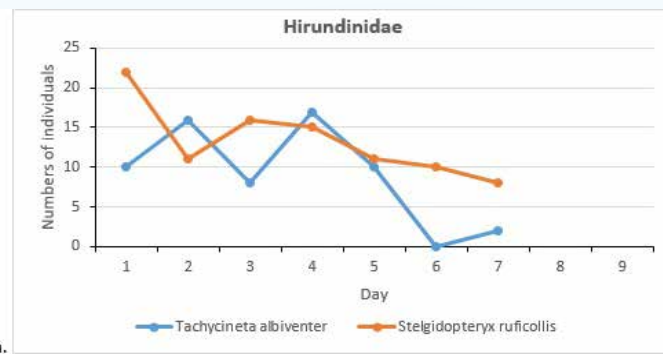
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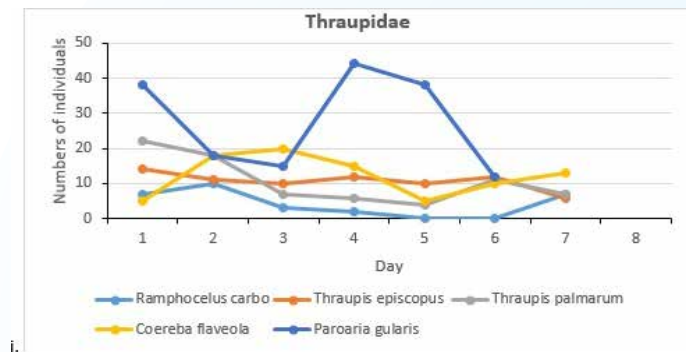
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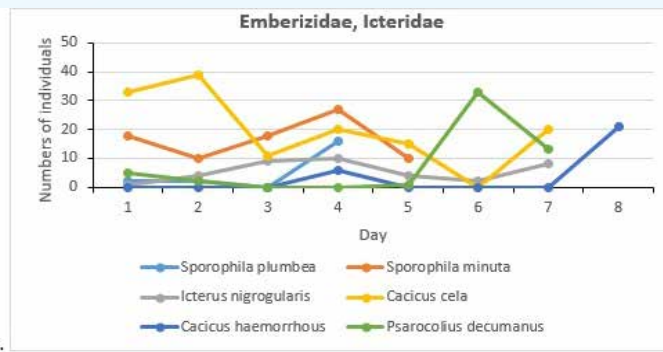
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i.



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Figure 11a-j. Examples of daily variation in bird abundance for the 49 species detected on one day with at least 10 individuals, plus *Amazona amazonica*. Several patterns can be observed, from the fairly regular detection of common riparian species to the detection of savannah species more on the first half of the trip where savannah dominated and of forest species on the second half of the trip where the river ran through forest.

days	1	2	3	4	5	6	7	PS categories
1	Yupukari							0.549-0.668
2	0.614	Rupununi River turns east						0.45-0.544
3	0.544	0.597						0.35-0.448
4	0.522	0.516	0.668					0.01-0.07
5	0.46	0.455	0.544	0.619				
6	0.389	0.445	0.461	0.502	0.56			
7	0.374	0.448	0.439	0.472	0.509	0.549		
8	0.014	0.011	0.019	0.025	0.03	0.023	0.063	

Figure 12. Community similarity matrix, with pairwise Proportional Similarity (PS) values comparing bird communities recorded on different days (8 days, 28 comparisons). Day 8, being land-based with no canoeing and at the confluence of the Rewa and Rupununi Rivers, is distinctly different and represents an 'out-group' for comparison (only 76 individuals of 22 species recorded, with 15 of those species being new to the survey), although the bird community similarity with day 8 still decreases with time and distance from Rewa. As expected, bird communities on consecutive days were more similar to each other (diagonal, darkest shading) and were less similar the more separated they were in time and distance along the river (approximate average 2.63 ± 0.84 km/h), reflecting the scale of transitions from savannah and savannah-forest edge to forest, through bush and across creeks systems, between Yupukari to Rewa River.

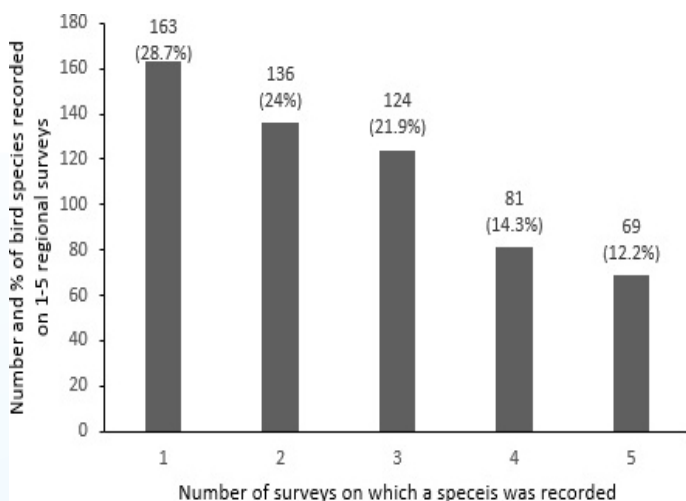


Figure 13. Numbers of species recorded on one to five of the published avifaunal surveys of the region ($n = 567$ total species): North Rupununi Wetlands (Mistry *et al.* 2008), Eastern Kanuku Mountains, Lower Kwitaro River (Montambault & Missa 2002), Rewa Head (Pickles *et al.* 2009), Southern Rupununi (Robbins *et al.* 2004).

	RBS	NRW	EMK	RH
RBS				
NRW	0.6586			
EMK	0.8386	0.5931		
RH	0.7839	0.5929	0.8737	
SR	0.855	0.5813	0.7897	0.7858

Figure 14. Community similarity (PS) matrix using numbers of species per family to compare birds detected from the five surveys in the region. North Rupununi Wetlands (Mistry *et al.* 2008); EKM = Eastern Kanuku Mountains, Lower Kwitaro River (Montambault & Missa 2002); RH = Rewa Head (Pickles *et al.* 2009); SR = Southern Rupununi (Robbins *et al.* 2004). NRW was least similar likely due to the strict focus on wetland habitats, RBS was most similar to NRW among all of the surveys. The two forest-based surveys (RH and EKM) were most similar among all pairwise comparisons followed by RBS and SR which both surveyed a mix of forest and savannah habitats. In terms of numbers of species per family, there was high similarity (78.4-87.4%) among RBS, EMK, RH, and SR.

al. 2008), Eastern Kanuku Mountains, Lower Kwitaro River (EKM: Montambault & Missa 2002), Rewa Headwaters (RH: Pickles *et al.* 2009), and Southern Rupununi (SR; Robbins *et al.* 2004).

Notwithstanding differences in survey techniques and effort among the five surveys (two of the studies, Montambault & Missa 2002 and Pickles *et al.* 2009, were rapid assessments) general patterns can be seen in the comparisons (Table 2, Figure 13). The RBS shared the highest proportion of species with the SR survey due to the extent of the SR survey and the fact that it included a mix of savannah and various forest habitats. The SR survey also had the most unique species overall, in part because of the range of habitats (foothills, savannah, forest) and also because of the ornithological differences that accompany the geological differences between the North and South Rupununi systems. Comparing the five surveys using a Community (Proportional) Similarity (PS) matrix at the level of numbers of species per family (Figure 14) reveals that NRW was least similar to RBS and all other surveys at this 'family abundance' level (although NRW did not have the lowest % shared species with RBS; Table 2), which is likely due to the strict focus of the NRW survey on wetland habitats and also explains why the NRW survey recorded the lowest total number of species. The highest overall PS at the family level occurred between the two more forest-based surveys (EKM, RH). In terms of numbers of species per family, there was high similarity (78.4-87.4%) among RBS, EMK, RH, and SR.

Conclusions

The North Rupununi Bird Survey was unique in its canoe-based methodology and in that it included abundance for each species detected, therefore providing resolution at the levels of individual, species, and community. It was not an exhaustive survey, but we did record 45.4% of the known avian species of the North Rupununi, thus emphasizing the ecological importance of this increasingly heavily used riparian corridor. The results provide valuable information against which future surveys can be compared and provide a rich glimpse into the structure of the avian community as it changes along the 147.05 km route from Yupukari Village to Rewa Ecolodge.

Ecological change is inevitable as the climate changes. The resilience of savannah-forest systems is tied to precipitation, and the phase transition from one type of habitat to another may be rapid and irreversible (Hirota *et al.* 2011, Staver *et al.* 2011). The potential impacts of climate change along with the many environmental pressures from agricultural development and road paving to timber extraction, gold mining, and oil exploration, as well as lifestyle and other social changes and increased Internet connectivity, underscore how critically important it is to monitor the status of this globally important eco-region and conserve what is possible. We suggest that the RBS be repeated at least every 5-7 years so that we can monitor the North Rupununi River corridor at time scales commensurate with the pace, extent, and threat of change.

If we are to move beyond the 'precautionary principle' of conservation to efforts that actually allow us to predict and act effectively, we need more than monitoring and research.

Research is important, for sure (e.g. Funk *et al.* 2005, Sodhi *et al.* 2008, Naeem *et al.* 2012, Wearn *et al.* 2012), but active engagement of local people in every phase of work, and the integration of natural and social science (e.g. Mistry *et al.* 2004, 2010, Read *et al.* 2010, Persha *et al.* 2011, Guerrero *et al.* 2012) is essential if we are to act across scales in an integrative and effective fashion. For this reason we conducted our survey with local stakeholders and expertise and using traditional canoes, making the RBS relatively easy to replicate with the growing cadre of indigenous paraprofessionals emerging in the North Rupununi (Luzar *et al.* 2011).

Before, during and since the RBS we shared our passion for birds and discussed the threats to the health of the North Rupununi River ecosystem with local people, and we listened to stories of the river and of natural resource concerns and management approaches with village leaders (council members, Toshaos), Sydney Allicock, local Amerindian leader and current Parliament member, and with ecotourism companies and NFP organizations developing Rupununi-based projects. We hope that our efforts contribute to an emergent fascination with birds and a collective expertise and ethos around monitoring, conservation, and management of the biological diversity, culture, and natural resources of this important river corridor.

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Table 1. Dates, approximate kms travelled per day, camp coordinates (Garmin GPSMAP 60C), for the 8 day north Rupununi Bird Survey (RBS).

Location	Date	N	W	(km, approximate)
Yupukari landing	05.01.2011	3°39'46.90"	59°20'36.98"	
camp 1	06.01.2011	3°45'34.31"	59°10'02.63"	22.85
camp 2	07.01.2011	3°55'02.17"	59°16'25.59"	27.99
camp 3	08.01.2011	3°54'00.06"	59°12'06.78"	16.74
camp 4	09.01.2011	3°53'36.60"	59°04'41.21"	21.87
camp 5	10.01.2011	3°52'43.92"	59°01'00.57"	11.23
camp 6	11.01.2011	3°52'58.11"	58°54'10.57"	29.97
Rewa Ecolodge	12.01.2011	3°53'07.36"	58°17'02.63"	16.40
				147.05

Table 2. Comparison of the north Rupununi River Bird Survey (RBS) by dugout canoe with other published surveys of the avifauna of the region. A total of 567 combined species (67 families) was recorded by these five surveys, representing 88% of the 643 Rupununi bird species (Watkins *et al.* 2011). Fifteen species (5.1% of 292 RBS species; 2.6% of total 567 species) were unique to the RBS survey overall. NRW = North Rupununi Wetlands (Mistry *et al.* 2008); EKM = Eastern Kanuku Mountains, Lower Kwitaro River (Montambault & Missa 2002); RH = Rewa Head (Pickles *et al.* 2009); SR = Southern Rupununi (Robbins *et al.* 2004).

Site	# species per site	# (%) unique species/site	# (%) unique RBS species	# species shared (% total combined)	Total # combined species
NRW	210	63 (30.0%)	145 (49.7%)	147 (41.5%)	354
EKM	264	98 (37.1%)	126 (43.1%)	166 (42.6%)	390
RH	251	97 (38.6%)	138 (47.3%)	154 (39.6%)	389
SR	455	212 (46.6%)	49 (16.8%)	243 (47.6%)	504

Appendix. A field checklist of birds recorded along the Rupununi River from Yupukari Village to Rewa Eco-lodge, by dugout canoe (taxonomy following BirdLife International 2014). Results of the 8 day (05-12 January 2011) north Rupununi Bird Survey (RBS) by dugout canoe, with daily and overall totals for each species recoded, abundance codes (ABU), distribution codes (EN/MI/IBA), and habitat codes (after Braun *et al.* 2007), daily summaries for total numbers of individuals and species recorded, and grand total numbers of individuals, species, and families.

English Name	Scientific Name	ABU ¹	EN/MI/IBA ²	HABITAT ³	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Total
Tinamous	<i>Tinamidae</i>												
Great Tinamou	<i>Tinamus major</i>	F		LF						1	1		2
Cinereous Tinamou	<i>Crypturellus cinereus</i>	F		LF, SC						1	1		2
Little Tinamou	<i>Crypturellus soui</i>	F		SC, LF						1			1
Undulated Tinamou	<i>Crypturellus undulatus</i>	F		LF	1				5	3			9
Red-legged Tinamou	<i>Crypturellus erythropus</i>	U		LF, SC	2				2	3			7
Variegated Tinamou	<i>Crypturellus variegatus</i>	F		LF		1			1				2
Ducks, Geese	<i>Anatidae</i>			-									
White-faced Whistling-Duck	<i>Dendrocygna viduata</i>	C		FW				6					6
Black-bellied Whistling-Duck	<i>Dendrocygna autumnalis</i>	C		FW					2				2
Muscovy Duck	<i>Cairina moschata</i>	C		FW, RI			8						8
Curassows, Guans	<i>Cracidae</i>			-									
Little Chachalaca	<i>Ortalis motmot</i>	C		LF, SC	8	13	3	7	5		13		49
Marail Guan	<i>Penelope marail</i>	U	GUI, IBA	LF							1		1
Lesser Razor-billed Curassow	<i>Mitu tomentosum</i>	UL	AMN, IBA	RI, LF	1	2	2	2			1		8
Black Curassow	<i>Crax alector</i>	F	AMN, IBA	LF, MF							2		2
Cormorants	<i>Phalacrocoracidae</i>			-									
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>	C		FW, RI		4	7	11	4	3	2		31
Anhingas	<i>Anhingidae</i>			-									
Anhinga	<i>Anhinga anhinga</i>	C		FW, RI	4	9	7	9	6	8	7		50
Hérons	<i>Ardeidae</i>			-									
Rufescent Tiger-Heron	<i>Tigrisoma lineatum</i>	F		FW				1					1
Cocoi Heron	<i>Ardea cocoi</i>	C		FW, RI	12	16	11	18	13	11	15		96
Great White Egret	<i>Ardea alba</i>	C		MU, FW	1	4	4	6	2	1	1		19
Little Blue Heron	<i>Egretta cearulea</i>	C		MN, MU, FW	2	2		1		1			6
Green-backed Heron	<i>Butorides striata</i>	C		FW, MN, RI	1	2							3
Capped Heron	<i>Pilherodius pileatus</i>	F		FW, RI				1					1
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	C		FW, MU							1		1
Boat-billed Heron	<i>Cochlearius cochlearius</i>	F		FW, MN	1				1	1			3

Ibises	Threskiornithidae			-								
Green Ibis	<i>Mesembrinibis cayennensis</i>	C	IBA	LF, RI	2	1			2	4		9
Storks	Ciconiidae			-								
Jabiru	<i>Jabiru mycteria</i>	F		FW, SV	11	12	5	2				30
Wood Stork	<i>Mycteria americana</i>	C	SDM	FW	5	22	8	2				37
Vultures	Cathartidae			-								
American Black Vulture	<i>Coragyps atratus</i>	C		SC, HU	17	2	12	17	9		3	60
Turkey Vulture	<i>Cathartes aura</i>	C		HU, SC, SV	7	4	6	11	5	6	4	43
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	C		SV, SC, FW		1	2					3
Greater Yellow-headed Vulture	<i>Cathartes melambrotus</i>	C		LF					2	2		4
King Vulture	<i>Sarcorampus papa</i>	F		LF, SV						1		1
Osprey	Pandionidae			-								
Osprey	<i>Pandion haliaetus</i>	F	NEA, SDM	MA, FW, RI	6	7	9	14	11	9	7	63
Hawks, Eagles	Accipitridae			-								
Swallow-tailed Kite	<i>Elanoides forficatus</i>	F	SDM	LF, MF					4			4
Pearl Kite	<i>Gampsonyx swainsonii</i>	U		SV, SC, HU		1	2					3
Plumbeous Kite	<i>Ictinia plumbea</i>	F	SDM	LF	5							5
Black-collared Hawk	<i>Busarellus nigricollis</i>	F		FW, RI				1				1
Crane Hawk	<i>Geranoospiza caerulescens</i>	F		LF						1		1
Grey-lined Hawk	<i>Buteo nitidus</i>	F		SC, HU		3	1		1			5
Common Black Hawk	<i>Buteogallus anthracinus</i>	UL		MN, PA			1		1			2
Great Black Hawk	<i>Buteogallus urubitinga</i>	F		LF, RI	2	4	3	1	4	3	2	19
Savanna Hawk	<i>Buteogallus meridionalis</i>	C		SV, SC		2	2	2	1			7
Roadside Hawk	<i>Rupornis magnirostris</i>	C		HU, SC		6	1	1			1	9
White-tailed Hawk	<i>Geranoaetus albicaudatus</i>	F		SV, SC				1		1		2
Zone-tailed Hawk	<i>Buteo albonotatus</i>	U		LF, SC			1					1
Falcons, Caracaras	Falconidae			-								
Lined Forest-Falcon	<i>Micrastur gilvicollis</i>	U		LF					1			1
Black Caracara	<i>Daptrius ater</i>	F		RI, LF, SC			1	3	2			6
Red-throated Caracara	<i>Ibycter americanus</i>	F		LF						2		2
Crested Caracara	<i>Caracara cheriway</i>	C		SV, HU, SC	4						3	7
Yellow-headed Caracara	<i>Milvago chimachima</i>	C		SV, SC, HU	8		3	2		2		15
Laughing Falcon	<i>Herpetotheres cachinnans</i>	U		LF, SC		1			1		1	3
American Kestrel	<i>Falco sparverius</i>	F	SDM	SV, SC, HU				1				1
Bat Falcon	<i>Falco rufigularis</i>	F		LF, SC, RI	1	1	2	1	1	2	2	10

Parrots		Psittacidae										
Painted Parakeet	<i>Pyrrhura picta</i>	C		LF, MF						22		22
Brown-throated Parakeet	<i>Eupsittula pertinax</i>	C		SV, SC	22	78	14	8	4	8	2	136
Red-bellied Macaw	<i>Orthopsittaca manilatus</i>	C		PA, SV						2		2
Red-and-Green Macaw	<i>Ara chloropterus</i>	F		LF		2			2	2	6	12
Blue-and-Yellow Macaw	<i>Ara ararauna</i>	F		PA, LF, RI		2					6	8
Green-rumped Parrotlet	<i>Forpus passerinus</i>	C		LF, HU							2	2
Golden-winged Parakeet	<i>Brotogeris chrysoptera</i>	C		LF					6	2	28	48
Black-headed Parrot	<i>Pionites melanocephalus</i>	F	AMN, IBA	LF							4	4
Caica Parrot	<i>Pyrilia caica</i>	F	GUI, IBA	LF					7	8	16	31
Blue-headed Parrot	<i>Pionus menstruus</i>	C		LF					2			2
Dusky Parrot	<i>Pionus fuscus</i>	C		LF					1	1	3	5
Yellow-crowned Amazon	<i>Amazona ochrocephala</i>	C		SV, SC	28	18	12	10	6	7	4	85
Orange-winged Amazon	<i>Amazona amazonica</i>	C		LF, SC				8	6	2	4	20
Southern Mealy Amazon	<i>Amazona farinosa</i>	C		LF						2	4	6
Red-fan Parrot	<i>Derophtus accipitrinus</i>	C		LF					2		2	4
Cuckoos		Cuculidae										
Common Squirrel Cuckoo	<i>Piaya cayana</i>	F		LF	7	3		1	1	2	3	17
Striped Cuckoo	<i>Tapera naevia</i>	F		SC, SV, HU	4	4	6	2				16
Greater Ani	<i>Crotophaga major</i>	C		RI, MN, FW	4							4
Smoothed-billed Ani	<i>Crotophaga ani</i>	C		SC, HU	19	8			3			30
Typical Owls		Strigidae										
Tropical Screech Owl	<i>Megascops choliba</i>	F		SC, LF	2				1			3
Tawny-bellied Screech Owl	<i>Megascops watsonii</i>	U		LF					1			1
Spectacled Owl	<i>Pulsatrix perspicillata</i>	U		LF		1			1	2		4
Amazonian Pygmy-Owl	<i>Glaucidium hardyi</i>	U		LF, MF						1		1
Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum</i>	F		SC, LF			2					2
Burrowing Owl	<i>Athene cunicularia</i>	F		SV, SC				1				1
Mottled Owl	<i>Ciccaba virgata</i>	?		LF, MF					1			1
Potoos		Nyctibiidae										
Great Potoo	<i>Nyctibius grandis</i>	U		LF							1	1
White-winged Potoo	<i>Nyctibius leucopterus</i>	U	AMN	LF						1		1
Nighthawks, Nightjar		Caprimulgidae										
Least Nighthawk	<i>Chordeiles pusillus</i>	C		SV		2						2

Lesser Nighthawk	<i>Chordeiles acutipennis</i>	C	SC, SV				2				2
Common Pauraque	<i>Nyctidromus albicollis</i>	C	SC, HU	2	3			2			7
Rufous Nightjar	<i>Antrostomus rufus</i>	F	SC, LF					2			2
White-tailed Nightjar	<i>Hydrosalis cayennensis</i>	F	SV, SC						2		2
Blackish Nightjar	<i>Nyctipolus nigrescens</i>	F	LF, SC, RI		12			2	2	2	18
Swifts	Apodidae		-								
Short-tailed Swift	<i>Chaetura brachyura</i>	C	LF, SC, HU			4	10	15	8	2	39
Band-rumped Swift	<i>Chaetura spinicaudus</i>	C	LF, RI			4	20	35	13	10	82
Grey-Rumped Swift	<i>Chaetura cinereiventris</i>	C	LF, MF, RI			2	20	35	11	12	80
Fork-Tailed Palm-Swift	<i>Tachornis squamata</i>	C	PA, SV, SC							2	2
Hummingbirds	Trochilidae		-								
Long-tailed Hermit	<i>Phaethornis superciliosus</i>	F	LF, MF				1	2			3
Reddish Hermit	<i>Phaethornis ruber</i>	F	LF		3				1	1	5
Grey-breasted Sabrewing	<i>Campylopterus largipennis</i>	F	LF			2					2
Rufous-breasted Sabrewing	<i>Campylopterus hyperythrus</i>	C	TEP, IBA MF			2	2		2		6
White-necked Jacobin	<i>Florisuga mellivora</i>	F	FL, RI							2	2
Black-throated Mango	<i>Anthracothonax nigricollis</i>	F	SC, LF, RI			4					4
Blue-tailed Emerald	<i>Chlorostilbon mellisugus</i>	F	SC, SV, LF	2	2	4	1		2		11
Fork-tailed Woodnymph	<i>Thalurania furcata</i>	F	LF, MF							1	1
White-chinned Sapphire	<i>Hylocharis cyanus</i>	F	LF			1					1
White-tailed Goldenthrout	<i>Polytmus guainumbi</i>	F	SV		1	2	4	2			9
Glittering-throated Emerald	<i>Amazilia fimbriata</i>	C	SV, SC, LF		2	6	8				16
Black-eared Fairy	<i>Heliothryx auritus</i>	U	LF	2		2	2				6
Long-billed Starthroat	<i>Heliomaster longirostris</i>	F	LF, RI			1					1
Crimson Topaz	<i>Topaza pella</i>	U	RI, LF						1		1
Trogons	Trogonidae		-								
Green-backed Trogon	<i>Trogon viridis</i>	F	LF	2	2	1				1	6
Violaceous Trogon	<i>Trogon violaceus</i>	F	LF						1		1
Black-tailed Trogon	<i>Trogon melanurus</i>	F	LF							1	1
Kingfishers	Alcedinidae		-								
Ringed Kingfisher	<i>Megasceryle torquata</i>	F	RI, FW, MN	23	18	11	19		13	14	98
Amazon Kingfisher	<i>Chloroceryle amazona</i>	F	RI, FW, MN	2	11	8	26	18	15	17	97
Green Kingfisher	<i>Chloroceryle americana</i>	F	RI, FW, MN	9	18	7	12	11		12	69
American Pygmy Kingfisher	<i>Chloroceryle aenea</i>	U	RI, LF, FW	1	1			1	1		4

Ground Antbirds		Formicariidae											
Spotted Antpitta	<i>Hylopezus macularius</i>	U		LF								2	2
Thrush-like Antpitta	<i>Myrmothera campanisona</i>	F		LF		1	3	6	1	1	2		14
Tyrant Flycatchers		Tyrannidae											
Yellow-bellied Elaenia	<i>Elaenia flavogaster</i>	C		SC, HU	2	2							4
Southern Beardless-Tyrannulet	<i>Camptostoma obsoletum</i>	F		SC, LF	2	4							6
Mouse-colored Tyrannulet	<i>Phaeomyias murina</i>	F		SC	4								4
Pale-tipped Tyrannulet	<i>Inezia caudata</i>	F		SC, MN, RI	1								1
Yellow Tyrannulet	<i>Capsiempis flaveola</i>	SL		LF, SC	1								1
Sooty-headed Tyrannulet	<i>Phyllomyias griseiceps</i>	UL		LF					1				1
Slender-footed Tyrannulet	<i>Zimmerius gracilipes</i>	F		LF			1		1	1			3
Short-tailed Pygmy-Tyrant	<i>Myiornis ecaudatus</i>	F		LF						1			1
Helmeted Pygmy-Tyrant	<i>Lophotriccus galeatus</i>	F		LF, MF						1			1
Pale-eyed Pygmy-Tyrant	<i>Atalotriccus pilaris</i>	F		SC						1			1
Common Tody-Flycatcher	<i>Todirostrum cinereum</i>	F		SC, HU	3	2	1	1					7
Yellow-margined Flycatcher	<i>Tolmomyias assimilis</i>	F		LF				2	1				3
Boat-billed Flycatcher	<i>Megarynchus pitangua</i>	F		LF, RI				6					6
Dusky-chested Flycatcher	<i>Myiozetetes luteiventris</i>	SL		LF, RI				1					1
Rusty-margined Flycatcher	<i>Myiozetetes cayanensis</i>	C		HU, SC, RI	26	12		6					44
Yellow-throated Flycatcher	<i>Conopias parvus</i>	F	AMN, IBA	LF	2								2
Piratic Flycatcher	<i>Legatus leucophaeus</i>	F	AUS	LF, HU	2	2	1						5
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	U		MF, LF			1	1					2
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	F		SC, RI, MN			2	1					3
Yellow-breasted Flycatcher	<i>Tolmomyias flaviventris</i>	F		SC, MN				1					1
Drab Water-Tyrant	<i>Ochthornis littoralis</i>	CL		RI				1		8			9
Pied Water-Tyrant	<i>Fluvicola pica</i>	F		FW	1	2	3	7					13
White-headed Marsh-Tyrant	<i>Arundinicola leucocephala</i>	F		FW	2								2
Lesser Kiskadee	<i>Pitangus lictor</i>	F		FW, RI	4	32	26	32	17	11	13		135
Great Kiskadee	<i>Pitangus sulphuratus</i>	C		HU, SC, MN	4	15	7	9	4	8			47
White-throated Kingbird	<i>Tyrannus albogularis</i>	U	AUS?	SV, RI	1	2				2	7		12
Tropical Kingbird	<i>Tyrannus melancholicus</i>	C		SC, HU, SV	12	12	15	12	11	5	11		78
Grey Kingbird	<i>Tyrannus dominicensis</i>	F	NEA	HU, SC, MN	1								1

Mourners, Becards, Tityras	<i>Incertae Sedis</i>			-									
Grayish Mourner	<i>Rhytipterna simplex</i>	F		LF								1	1
Cinereous Mourner	<i>Laniocera hypopyrra</i>	U		LF			1					1	2
Black-tailed Tityra	<i>Tityra cayana</i>	U		LF					2				2
Cinnamon Attila	<i>Attila cinnamomeus</i>	F		LF, SC, RI			1	2	1	1	3		8
Bright-rumped Attila	<i>Attila spadiceus</i>	U		LF, MF				1	1		2		4
Cotingas	<i>Cotingidae</i>			-									
Purple-breasted Cotinga	<i>Cotinga cotinga</i>	U		LF								1	1
Bare-necked Fruitcrow	<i>Gymnoderus foetidus</i>	U		RI, LF			1						1
Capuchinbird	<i>Perissocephalus tricolor</i>	F	AMN	LF			1						1
Screaming Piha	<i>Lipaugus vociferans</i>	C		LF					1	4	4		9
Manakins	<i>Pipridae</i>			-									
Blue-backed Manakin	<i>Chiroxiphia pareola</i>	C		SC, LF					2	2			4
White-crowned Manakin	<i>Pipra pipra</i>	F		LF, MF			1	2			2		5
Tiny Tyrant-manakin	<i>Tyrannutes virescens</i>	F	GUI, IBA	LF						1			1
Vireos	<i>Vireonidae</i>			-									
Red-eyed Vireo	<i>Vireo olivaceus</i>	F	NEA	LF			2	3	1				6
Lemon-chested Greenlet	<i>Hylophilus thoracicus</i>	F		LF			1	4	2				7
Ashy-headed Greenlet	<i>Hylophilus pectoralis</i>	C		SC, MN					1		1		2
Rufous-browed Peppershrike	<i>Cyclarhis gujanensis</i>	F		SC, RI, MF			1						1
Jays	<i>Corvidae</i>			-									
Cayenne Jay	<i>Cyanocorax cayanus</i>	F	GUI, IBA	LF			7			7			14
Swallows	<i>Hirundinidae</i>			-									
Grey-breasted Martin	<i>Progne chalybea</i>	C		HU, SC					1	9			10
Brown-chested Martin	<i>Progne tapera</i>	F	AUS	SV, SC, RI						4			4
White-winged Swallow	<i>Tachycineta albiventer</i>	C		RI, FW			10	16	8	17	10	2	63
White-banded Swallow	<i>Atticora fasciata</i>	C		RI							6	2	8
Southern Rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>	C		FW, RI, SC			22	11	16	15	11	10	93
Sand Martin	<i>Riparia riparia</i>	F	NEA	SV, HU, FW							1		1
Barn Swallow	<i>Hirundo rustica</i>	C	NEA	SV, HU, SC							2		2
Wrens	<i>Troglodytidae</i>			-									
Coraya Wren	<i>Thryothorus coraya</i>	F		LF			3	1			2	2	8
Buff-breasted Wren	<i>Thryothorus leucotis</i>	F		LF, RI, SC			4	7	2		1	2	16

House Wren	<i>Troglodytes aedon</i>	C	SC, HU	2	2					4	
Musician Wren	<i>Cyphorhinus arada</i>	F	LF		4					4	
Gnatwrens,Gnatcatchers	<i>Poliophtilidae</i>	-									
Long-billed Gnatwren	<i>Ramphocaenus melanurus</i>	F	IBA, LF	1	3					4	
Tropical Gnatcatcher	<i>Poliophtila plumbea</i>	F	SC, LF	1						1	
Thrushes	<i>Turdidae</i>	-									
Pale-eyed Thrush	<i>Turdus leucops</i>	?	MF		1	1				2	
Cocoa Thrush	<i>Turdus fumigatus</i>	F	LF				1	3		4	
White-necked Thrush	<i>Turdus albicollis</i>	F	LF, MF				1	1		2	
Mockingbirds	<i>Mimidae</i>	-									
Tropical Mockingbird	<i>Mimus gilvus</i>	C	SC, HU	2	1	2				5	
Tanagers	<i>Thraupidae</i>	-									
Hooded Tanager	<i>Nemosia pileata</i>	F	SC		2	2				4	
Flame-crested Tanager	<i>Tachyphonus cristatus</i>	F	LF				2			2	
Fulvous-crested Tanager	<i>Tachyphonus surinamus</i>	F	LF					2		2	
White-lined Tanager	<i>Tachyphonus rufus</i>	F	SC, HU		1					1	
Silver-beaked Tanager	<i>Ramphocelus carbo</i>	C	SC, HU	7	10	3	2		7	29	
Blue-gray Tanager	<i>Thraupis episcopus</i>	C	SC, HU	14	11	10	12	10	12	6	75
Palm Tanager	<i>Thraupis palmarum</i>	C	SC, HU, PA	22	18	7	6	4	11	7	75
Turquoise Tanager	<i>Tangara mexicana</i>	F	LF, HU	2							2
Spotted Tanager	<i>Tangara punctata</i>	F	LF, MF		1		2				3
Burnished-buff Tanager	<i>Tangara cayana</i>	C	SC, SV, HU	4					6		10
Yellow-bellied Tanager	<i>Tangara xanthogastra</i>	F	MF		2						2
Blue Dacnis	<i>Dacnis cayana</i>	C	LF, SC						2		2
Green Honeycreeper	<i>Chlorophanes spiza</i>	C	LF	2					1		3
Purple Honeycreeper	<i>Cyanerpes caeruleus</i>	F	LF, MF		6	4	2		2		14
Chestnut-vented Conebill	<i>Conirostrum speciosum</i>	F	SC, LF		1	2					3
Bananaquit	<i>Coereba flaveola</i>	C	LF, SC, HU	5	18	20	15	5	10	13	86
Red-capped Cardinal	<i>Paroaria gularis</i>	C	RI, SC	38	18	15	44	38	12		165
Emberizine Finches	<i>Emberizidae</i>	-									
Blue-black Grassquit	<i>Volatinia jacarina</i>	C	HU,FW, SC	2			1				3
Grey Seedeater	<i>Sporophila intermedia</i>	F	SV, SC	6							6

Plumbeous Seedeater	Sporophila plumbea	F		SV	2	2		16						20
Lesson's Seedeater	Sporophila bouvronides	U		SC		1								1
Ruddy-breasted Seedeater	Sporophila minuta	C		SC,FW, HU	18	10	18	27	10					83
Chestnut-bellied Seedeater	Sporophila castaneiventris	F		SC, HU		2		4						6
Large-billed Seed-Finch	Oryzoborus crassirostris	U		FW, SC	1									1
Lesser Seed-Finch	Oryzoborus angolensis	F		SC, HU, LF	5	6								11
Grosbeaks, Saltators	Cardinalidae	-												
Buff-throated Saltator	Saltator maximus	F		SC, LF				1						1
Greyish Saltator	Saltator coerulescens	F		SC, HU	2		1	2	2					7
Blue-black Grosbeak	Cyanocopsa cyanoidea	F		LF							2			2
Wood Warblers	Parulidae	-												
Yellow Warbler	Dendroica petechia	F	NEA	MN, SC, HU		1	1	1						3
Masked Yellowthroat	Geothlypis aequinoctialis	F		FW, SC	1	2								3
New World Blackbirds	Icteridae	-												
Epaulet Oriole	Icterus cayanensis	UL?		PA, FW, RI			2				2			4
Yellow Oriole	Icterus nigrogularis	F		SC, HU, MN	1	4	9	10	4	2	8			38
Yellow-rumped Cacique	Cacicus cela	C		RI, LF, HU	33	39	11	20	15		20			138
Red-rumped Cacique	Cacicus haemorrhous	C		LF				6				21		27
Crested Oropendola	Psarocolius decumanus	C		LF	5	2			1	33	13			54
Green Oropendola	Psarocolius viridis	C		LF, MF						1				1
Cardueline Finches	Fringillidae	-												
Finsch's Euphonia	Euphonia finschi	F	GUI, IBA	LF, SC	6	4	3	4	2		3			22
Violetaceous Euphonia	Euphonia violacea	F		LF, HU	4		2		2	7				15
Golden-sided Euphonia	Euphonia cayennensis	F	GUI, IBA	LF				2						2
Total # individuals					687	761	519	717	534	439	510	76		4243
Total # species					106	110	109	107	104	103	116	22		301

¹Abundance (ABU): F = fairly common (5-20 individuals encountered daily in prime habitat and season), U = uncommon (small numbers recorded but not encountered daily), C = common (more than 20 individuals encountered daily in prime habitat and season), UL=uncommon and local, CL= common and local, SL=scarse and local.