



Additions to the avifauna of two localities in the southern Rupununi region, Guyana

Brian J. O'Shea,^{1,2} Asaph Wilson,³ Jonathan K. Wrights⁴

1 North Carolina Museum of Natural Sciences, 11 W. Jones Street, Raleigh, NC, 27601, USA, **2** Global Wildlife Conservation, PO Box 129, Austin TX 78767, USA. **3** South Rupununi Conservation Society, Shulinab, Upper Takutu-Upper Essequibo, Guyana. **4** National Agricultural Research and Extension Institute, National Plant Protection Organization, Mon Repos, East Coast Demerara, Guyana.

Corresponding author: Brian J. O'Shea, brian.oshea@naturalsciences.org

Abstract

We report new records from ornithology surveys conducted at Kusad Mountain and Parabara savanna in Guyana's southern Rupununi region during October and November 2013. Both localities had existing species lists based on surveys conducted in 2000, but had not been formally surveyed since. We surveyed birds over 15 field days, adding 22 and 10 species to the existing lists for Kusad and Parabara, respectively. Our findings augment prior knowledge of the status and distribution of birds in this region of the Guiana Shield. The southern Rupununi harbors high avian diversity, including rare species such as Rio Branco Antbird (*Cercomacra carbonaria*), Hoary-throated Spinetail (*Synallaxis kollari*), Bearded Tachuri (*Polystictus pectoralis*), and Red Siskin (*Spinus cucullatus*), which are likely to continue to draw tourism revenue to local communities if their habitats remain intact.

Key words

Neotropics; Guiana Shield; birds; inventory; conservation; savanna; ecotourism.

Academic editor: Nárgila Gomes Moura | Received 9 December 2016 | Accepted 6 May 2017 | Published 21 July 2017

Citation: O'Shea BJ, Wilson A, Wrights JK (2017) Additions to the avifauna of two localities in the southern Rupununi region, Guyana. Check List 13 (4): 113–120. <https://doi.org/10.15560/13.4.113>

Introduction

The Rio Branco-Rupununi savannas form the largest savanna enclave in Amazonia, covering approximately 54,000 km² in the northern Brazilian state of Roraima and adjacent southwestern Guyana (Robbins et al. 2004, Barbosa et al. 2005, Santos and Silva 2007). This vast ecosystem supports a complex mosaic of wetland, savanna, and forest habitats, with isolated mountains occurring throughout. In Guyana, the Kanuku Mountains divide the Rupununi savanna into northern and southern regions, which differ in their geological history (Hammond 2005) and present-day land use. The southern Rupununi remains unaffected by large-scale agricul-

ture, which has greatly altered other savanna regions in the Neotropics, including Roraima (Naka et al. 2006). Although much of the southern Rupununi is used as open range for cattle, and savanna fires are frequent in the dry season, the region remains sparsely populated, presenting opportunities for effective conservation and the development of tourism.

The savanna avifauna of Roraima was described by Naka et al. (2006) and presented in detail by Santos and Silva (2007), who listed 306 species. Many of these species were also recorded in Guyana during extensive surveys by the Smithsonian Institution and the University of Kansas (hereafter SI/KU) at 5 sites in the southern

Rupununi between 1995–2001. The results of those surveys were summarized by Robbins et al. (2004), who presented a comprehensive list of 456 species for the region and characterized the Rio Branco-Rupununi avifauna as most similar to that of the Gran Sabana of Venezuela. Prior to this work, the only accounts of the Guyana Rupununi avifauna published in the modern literature were those of G.F. Mees (Mees and Mees-Balchin 1990, Mees 2000), who spent a total of 3 months in the southern Rupununi between 1989–1992 (Robbins et al. 2004). Although the Rupununi avifauna was known to some degree from the work of Snyder (1966), the SI/KU surveys yielded several surprising discoveries, including a previously unknown population of the Red Siskin (*Spinus cucullatus*; IUCN Endangered; Robbins et al. 2003), as well as 10 species not recorded previously in Guyana. Since that time, there have been no formal ornithological surveys in the southern Rupununi. Consequently, although many bird species are now known to occur in the region, details of their status and distribution are still lacking.

This report provides locality records from surveys conducted by the South Rupununi Biodiversity Assessment Team (BAT), a group of scientists, students, and community representatives that surveyed multiple taxa at 2 localities in the southern Rupununi from 23 October–6 November 2013, under the auspices of the Worldwide Fund for Nature (WWF) and Global Wildlife Conservation (Alonso et al. 2016). In this paper, we report species new for the two sampled localities since Robbins et al. (2004), including 4 significant regional records.

Methods

Study sites. Our surveys were based from two main camps: Kusad Mountain (02.812° N, 059.867° W; 23–30 October) and Parabara savanna (02.182° N, 059.337° W; 31 October–6 November; WGS84 used for all coordinates). Both camps were within 5 km of the camps established at Kusad and Parabara by SI/KU in October–November 2000 and March–April 2000, respectively (Robbins et al. 2004). Kusad is an isolated mountain rising out of the savanna to a maximum elevation of approximately 800 m. Our camp was situated along a creek at the base of the north flank of the mountain. Habitat at Kusad was a mix of forest and savanna; near the camp itself, the savanna was moderately wet with fairly dense stands of the dominant savanna tree (*Curatella americana*, Dilleniaceae) and long (> 1m) grass (Fig. 1). Waterways in the savanna were characterized by conspicuous linear stands of the Moriche or Ité Palm (*Mauritia flexuosa*). Aside from a few small clearings, the entire mountain was covered by tall forest (Fig. 1); on the lower slopes, this forest was quite dry on rocky ground, with few large trees, whereas at higher elevations (ca. 500 m and above) it was more humid, with a substantial soil layer and somewhat greater stature and structural complexity.

The Parabara site was in a large savanna inclusion



Figure 1. Kusad Mountain in the southern Rupununi savanna, with typical savanna habitat in the foreground. Photo by A. M. Snyder.

with many “bush islands” of varying size; the camp itself was situated near a corridor of humid forest several hundred meters wide. From this camp, we could walk long distances across the savanna and along the road linking Parabara village with other settlements (Fig. 2). Most of our observations were made within a radius of 3 km around the camp.

All necessary permits to conduct research were issued in advance by the Guyana Environmental Protection Agency. Permission to conduct research on Amerindian-titled lands was granted by the Ministry of Indigenous Peoples’ Affairs.

Field methods. We used a variety of methods to survey the avifauna. Our primary method was casual observation of birds while walking along roads and trails, or across the savanna itself, noting all species of birds seen and heard. We were active mainly during the first 2–3 hours of daylight, after which bird activity tapered off dramatically, especially in savanna, where it reached a near standstill by mid-day. We also used mist nets set in forest around each camp on an opportunistic basis. A small number of specimens were collected and deposited at the National Museum of Natural History, Smithsonian Institution (USNM) and the Centre for the Study of Biological Diversity at the University of Guyana. Birds were documented primarily by sound recording, using a Marantz PMD-661 digital recorder and a Sennheiser ME-62 microphone. All recordings are archived at the Macaulay Library at the Cornell Lab of Ornithology, Ithaca, NY, USA (ML). We made 4 recordings of the dawn soundscape using a stereo microphone pair (Sennheiser MKH-20 and MKH-30). Stereo recordings typically ran for approximately 2 h, beginning 30–45 min before sunrise. Two stereo recordings were made from each site — 1 from an old agricultural clearing on Kusad Mountain on 26 October (ML 224900), another from a marsh in the savanna roughly 7 km from the Kusad camp on 28 October (ML 224977), and 2 from the savanna in Parabara, 1–3 km from the camp, on 2 and 5 November (ML 224901, 224902, respectively; Fig. 2). A list of species in each stereo recording is given in the Appendix.

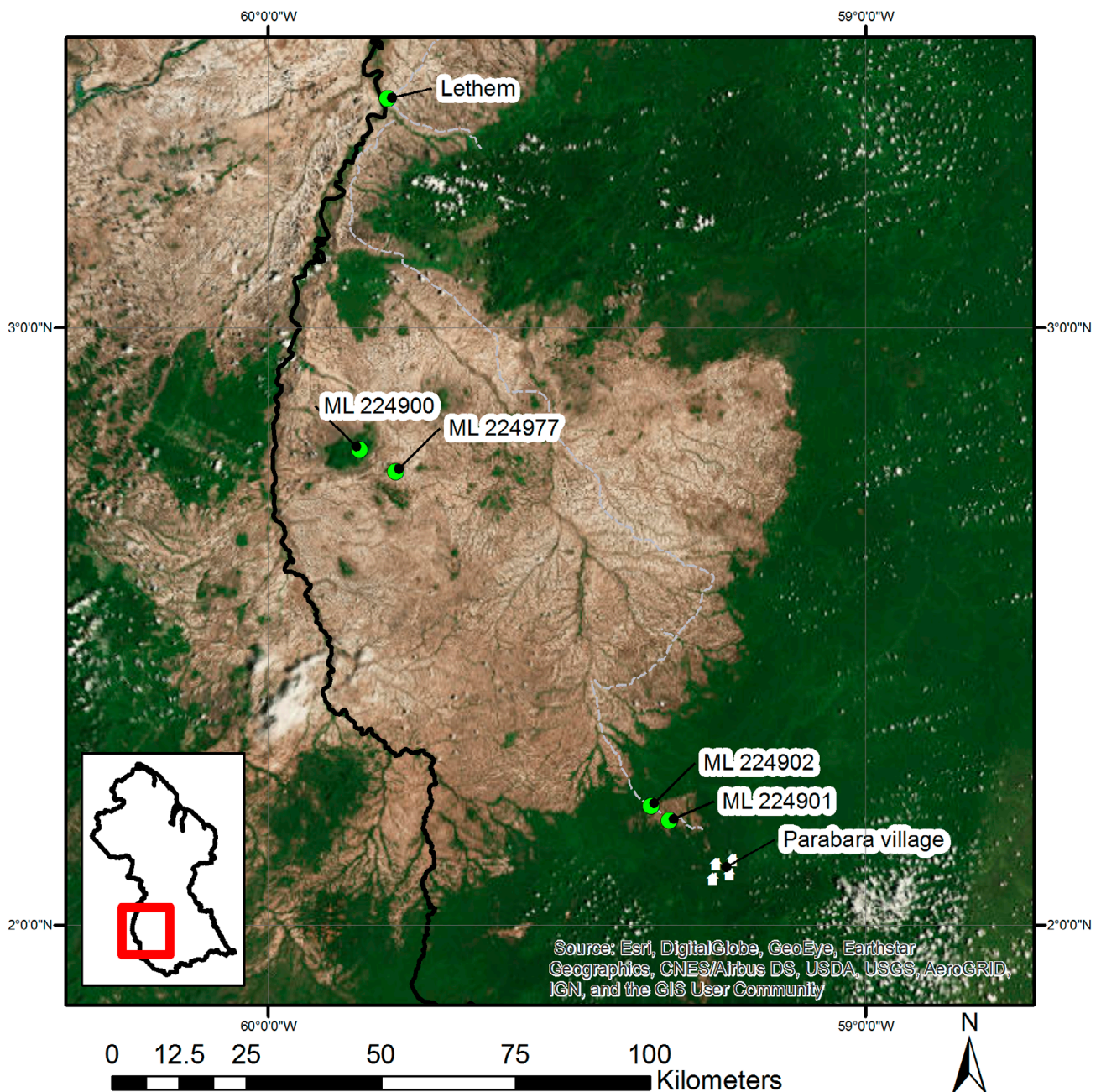


Figure 2. Satellite image of the southern Rupununi region, with localities for stereo recordings (see text and Table 1). Inset shows the location of the region in Guyana. Savanna and forest are indicated by brown and green, respectively. The solid black line indicates the Brazil border; the dashed gray line is the principal road through the region.

Our complete locality lists were merged with the list from Robbins et al. (2004) for the southern Rupununi region (see O'Shea et al. 2016). Taxonomy and nomenclature of the species listed here follow the AOU South American Checklist Committee (Remsen et al. 2016).

Results

New locality records are presented in Table 1. We added 22 and 10 species to previous lists (Robbins et al. 2004) for Kusad and Parabara, respectively. Of the 31 species listed in Table 1, 15 were documented with either sound recordings or specimens. Using a stereo microphone pair to record the dawn chorus at 2 locations per site, we doc-

umented 105 species (50 at Kusad and 80 at Parabara). Species in each dawn chorus recording are listed in the Appendix. Recordings documenting additional species from this expedition are archived at the Macaulay Library (ML 224903 and 224965-224990).

Discussion

Our observations bring the number of species known to occur at Parabara and Kusad to 345 and 200, respectively. Although there have been numerous surveys of birds in Guyana over the past 2 decades, resulting in detailed inventories for several localities (e.g., Braun et al. 2003, Robbins et al. 2004, 2007, Ridgely et al. 2005, O'Shea

Table 1. New records for Kusad (K) and Parabara savanna (P) localities, based on the list of Robbins et al. (2004). Species with an asterisk represent first published records for the south Rupununi region. The § symbol denotes species not listed for the Roraima savannas by Santos and Silva (2007).

Species	English name	K	P	voucher
<i>Crypturellus undulatus</i>	Undulated Tinamou	X		USNM 651488; ML 224900
<i>Cairina moschata</i>	Muscovy Duck	X		Sight record only
<i>Penelope jacquacu/marail*</i>	Spix's/Marail Guan		X	ML 224901
<i>Crax alector</i>	Black Curassow		X	ML 224901
<i>Mitu tomentosum*§</i>	Crestless Curassow		X	ML 224901
<i>Tigrisoma lineatum*</i>	Rufescent Tiger-Heron	X	X	ML 224901
<i>Ardea alba</i>	Great Egret	X		Sight record only
<i>Theristicus caudatus</i>	Buff-necked Ibis	X		ML 224977
<i>Cathartes melambrotus</i>	Greater Yellow-headed Vulture	X		Sight record only
<i>Geranospiza caerulescens</i>	Crane Hawk	X		Sight record only
<i>Buteo brachyurus</i>	Short-tailed Hawk	X		Sight record only
<i>Spizaetus ornatus*§</i>	Ornate Hawk-Eagle	X		Sight record only
<i>Aramides cajaneus</i>	Gray-cowled Wood-Rail	X		Sight record only
<i>Calidris fuscicollis</i>	White-rumped Sandpiper		X	Sight record only
<i>Micrastur mirandollei*§</i>	Slaty-backed Forest-falcon		X	ML 224901
<i>Athene cunicularia</i>	Burrowing Owl	X		Sight record only
<i>Antristomus rufus*§</i>	Rufous Nightjar		X	ML 224901
<i>Phaethornis superciliosus</i>	Long-tailed Hermit	X		Sight record only
<i>Amazilia brevirostris*</i>	White-chested Emerald	X		ML 224900; USNM 627409, 627421, 627495
<i>Momotus momota</i>	Amazonian Motmot	X		ML 224900
<i>Notharchus macrorhynchos</i>	Guianan Puffbird	X		Sight record only
<i>Chelidoptera tenebrosa</i>	Swallow-winged Puffbird	X		Sight record only
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	X		ML 224900
<i>Campephilus melanoleucos</i>	Crimson-crested Woodpecker		X	ML 224903
<i>Campephilus rubricollis</i>	Red-necked Woodpecker	X		ML 224900
<i>Cercomacra tyrannina</i>	Dusky Antbird	X		Sight record only
<i>Mionectes macconnelli*§</i>	McConnell's Flycatcher	X		Sight record only
<i>Tolmomyias sulphurescens</i>	Yellow-olive Flycatcher		X	Sight record only
<i>Lipaugus vociferans</i>	Screaming Piha	X		ML 224900
<i>Hirundo rustica</i>	Barn Swallow	X		ML 224977
<i>Parula pitiayumi</i>	Tropical Parula		X	Sight record only

et al. 2007, O'Shea 2008, Milensky et al. 2016) and a comprehensive list of the country's avifauna (Braun et al. 2007), few localities have been surveyed rigorously more than once. Repeated surveys invariably extend the known distributions of many bird species, generate a more complete assessment of their status at a given site, and can document the presence of species that may have colonized a locality recently or been overlooked previously (O'Shea 2008, O'Shea and Wrights 2015).

The forest avifauna of Kusad Mountain was particularly interesting. Like Robbins et al. (2004), we did not find many typical bird species of Guianan lowland rain-forest at that site, including most species of Furnariidae and Thamnophilidae, leading us to conclude that they are genuinely absent on Kusad despite its size (> 5000 ha) and almost complete forest cover. Particularly noticeable was the total absence of understory mixed-species flocks dominated by *Thamnomanes antshrikes* and *Epinecrophylla* and *Myrmotherula* antwrens; and species that follow army ants. Instead, the forest avifauna was characterized by relatively few species, many of which occur patchily, if at all, in extensive lowland forest in the region, such as *Phaethornis augusti* (Sooty-capped Hermit), *Herpsilochmus rufimarginatus* (Rufous-winged

Antwren), *Tolmomyias sulphurescens* (Yellow-olive Flycatcher), *Chiroxiphia pareola* (Blue-backed Manakin), and *Basileuterus culicivorus* (Golden-crowned Warbler). On the lower slopes, where the forest was generally shorter and drier, the avifauna was composed of many of the same species found in gallery forest and bush islands elsewhere in the southern Rupununi. However, we observed an interesting subset of the Guianan lowland forest avifauna on the mountain, particularly at higher elevations (above ca. 500 m), including *Crax alector* (Black Curassow), *Notharchus macrorhynchos* (Guianan Puffbird), *Monasa atra* (Black Nunbird), *Campephilus rubricollis* (Red-necked Woodpecker), *Perissocephalus tricolor* (Capuchinbird), *Lipaugus vociferans* (Screaming Piha), and *Turdus albicollis* (White-necked Thrush). Considering that many species that appear to be absent on Kusad are birds of forest interior that are known to have low potential for mobility across fragmented landscapes (Stouffer et al. 2011), we suggest that forest species occurring on Kusad are those most likely to disperse across the savanna, either directly or via the network of gallery forests in the regional landscape. Although poorly documented, there are several anecdotal records of forest birds occurring in gallery forest in the Rupununi, far

from extensive rainforest; for example, both *Jacamerops aureus* (Great Jacamar) and *Tyrannetes virescens* (Tiny Tyrant-Manakin) have been observed in gallery forest along the Rupununi River at Dadanawa (B.J. O'Shea and A. Wilson, pers. obs.). The use of gallery forests as dispersal corridors by forest birds in the Rupununi deserves more study.

In general, our new records are of widespread species known previously from elsewhere in Guyana and adjacent Roraima (Naka et al. 2006, Braun et al. 2007), although 8 species listed in Table 1 were not listed previously for the southern Rupununi region (Robbins et al. 2004), and 5 of those 8 species were also not listed for the Roraima savannas by Santos and Silva (2007; Table 1). Our records therefore confirm the presence of these species in the mosaic of forest and savanna habitats of the southern Rupununi (and, presumably, Roraima), and highlight the incomplete state of knowledge of the region's avifauna. Four records significant for Guyana are detailed below.

***Crypturellus undulatus* (Undulated Tinamou).** We obtained a specimen of *C. undulatus* at the Kusad camp (USNM 651488), the first to be taken from Guyana in modern times. Although this species has a wide range in South America, the subspecies occurring on the Guiana Shield (*C. u. simplex*) is poorly represented in museum collections. *Crypturellus* tinamous are shy and rarely seen; anecdotal accounts of this species' occurrence at several mixed forest/savanna localities in southern Guyana, including Kusad (Robbins et al. 2004), are complicated by the similarity of its vocalizations to those of *Crypturellus erythropus* (Red-legged Tinamou). Our specimen documents this species for the south Rupununi region, where it is likely an uncommon resident of low-land forest.

***Mitu tomentosum* (Crestless Curassow).** A pre-dawn recording near the Parabara camp on 2 November 2013 (ML 224901) features this species singing simultaneously with *Crax alector* (Black Curassow). *Mitu tomentosum* was not listed for the southern Rupununi by Robbins et al. (2004), who cite accounts of the species' occurrence in the region in the 1800s and more recent observations from the Essequibo drainage north of the Kanuku Mountains (Ridgely et al. 2005). Santos and Silva (2007) did not list this species for the Roraima savannas. Our recording confirms its presence in the south Rupununi region, where it is evidently rare. We agree with Robbins et al. that this species has likely declined due to hunting pressure.

***Antrostomus rufus* (Rufous Nightjar).** A pre-dawn recording near our Parabara camp on 2 November 2013 (ML 224901) features this species singing in the distance. In Guyana, *A. rufus* occurs primarily in white-sand savannas of the coastal plain between the Demerara and Corentyne rivers (Ridgely et al. 2005, O'Shea unpubl. data), and it also occurs in the contiguous savannas of

the Zanderij Belt in Suriname (Ottema et al. 2009). It is listed for Roraima by Naka et al. (2006) but not by Santos and Silva (2007), suggesting that it is relatively rare and local in the Roraima savannas. The first documented record of this species in the interior of Guyana was a bird tape recorded in 1998 near Surama, on the north edge of the northern Rupununi (Ridgely et al. 2005), where the species has since been found to be more widespread (R. Allicock pers. comm.). Our record is the first for the southern Rupununi region.

***Amazilia brevirostris* (White-chested Emerald).** Hummingbirds collected at Kusad by SI/KU in 2000 (USNM 627409, 627421, 627495; Table 1) were originally identified as *Amazilia versicolor* (Robbins et al. 2004). They were subsequently reassigned to *A. chionopectus*, a synonym for *A. brevirostris* (Bangs and Penard 1918, Weller and Schuchmann 2009), based on their entirely black bills and lack of blue on the crown (C.M. Milensky pers. comm.). Recordings obtained in 2013 matched those of *A. brevirostris* from the northern Rupununi region (e.g., ML 72480), and not those of *A. versicolor*. Based on these recordings and specimen evidence, we present *A. brevirostris* as an addition to the known avifauna of the southern Rupununi region. *Amazilia versicolor* is known in Guyana from a specimen taken at Gunn's Landing, in the far south of the country, in 1999 (USNM 625395), although the species is likely more widespread in southern Guyana than this one record indicates. Both species occur in adjacent Roraima (Naka et al. 2006, Santos and Silva 2007).

Our records enhance knowledge of the Rio Branco-Rupununi avifauna and highlight the impressive avian diversity of the southern Rupununi, which includes species that are increasingly at risk from habitat loss or direct persecution in other parts of their ranges, including *Mitu tomentosum*, *Polystictus pectoralis* (Bearded Tachuri), *Spinus cucullatus*, and the narrowly endemic *Cercomacra carbonaria* (Rio Branco Antbird) and *Synallaxis kollari* (Hoary-throated Spinetail), both of which occur only in gallery forests of the Rio Branco drainage (Naka et al. 2006). Combining our lists with that of Robbins et al. (2004) increases the number of species known from the southern Rupununi to 487 (O'Shea et al. 2016), and this figure will certainly increase further with additional survey effort. The region's high diversity is due to its heterogeneous mosaic of habitat types with distinct bird communities, and the abrupt transitions among them. Our findings are significant considering the rapid economic and social changes in Guyana that are already transforming the country's natural landscapes and biodiversity at a pace that will only accelerate. Tourism is emerging as a key industry in Guyana's developing economy, and the country is becoming increasingly popular as a destination for bird-watchers, many of whom are seeking the rare and endemic species known to occur in the southern Rupununi. Detailed distributional knowledge of the country's bird species is important for the development of

tourism and should inform land management, including the design of nature reserves as Guyana's infrastructure expands.

Acknowledgements

This expedition was conducted under EPA-Guyana Permit #102113 BR027, and we thank Diana Fernandes and Indarjit Ramdass of EPA-Guyana, as well as the Ministry of Indigenous Peoples' Affairs, for permission to conduct research in the southern Rupununi. We are grateful for logistical support from the communities of Shulinab, Potarinau, and Dadanawa, as well as the staff of WWF-Guyana and Leeanne Alonso. BJO thanks the Macaulay Library for technical and archival assistance, and C.M. Milensky for granting access to the USNM collection.

Authors' Contributions

All authors collected the data. BJO identified species on sound recordings, examined specimens at USNM, prepared the Figures and Table, and wrote the text.

References

- Alonso LE, Persaud J, Williams A (Eds) (2016) Biodiversity assessment survey of the South Rupununi Savannah, Guyana. BAT Survey Report No. 1. WWF-Guianas, Georgetown, 306 pp.
- Bangs O, Penard TE (1918) Notes on a collection of Surinam birds. *Bulletin of the Museum of Comparative Zoology* 62: 25–93.
- Barbosa RI, Costa e Souza JM, Xaud HAM (2005) Savanas de Roraima: referencial geográfico e histórico. In: Barbosa RI, Xaud HAM, Costa e Souza JM (Eds) Savanas de Roraima: Etnoecologia, Biodiversidade e Potenciais Agrossilvipastoris. FEMACT-RR, Boa Vista, 11–19.
- Braun MJ, Robbins MB, Milensky CM, O'Shea BJ, Barber BM, Hinds W, Prince WS (2003) New birds for Guyana from Mts. Roraima and Ayanganna. *Bulletin of the British Ornithologists' Club* 123: 24–32.
- Braun MJ, Robbins MB, Finch DW, Schmidt BK (2007) A Field Checklist of the Birds of Guyana, 2nd Edition. Smithsonian Institution, Washington, DC, 32 pp.
- Hammond DS (2005) Biophysical features of the Guiana Shield. In: Hammond DS (Ed.) Tropical Forests of the Guiana Shield. CABI Publishing, Wallingford, UK, 15–194.
- Mees GF (2000) Birds of the Rupununi South Savannah, Guyana. Published by the author, Busselton, W.A., 48 pp.
- Mees GF, Mees-Balchin VJ (1990) *Basileuterus flaveolus* (Baird) in Guyana. *Bulletin of the British Ornithologists' Club* 110: 179–181.
- Milensky CM, Saucier JR, Robbins MB, O'Shea BJ, Radosavljevic A, Davis TJ, Pierre M (2016) The avifauna of Mt. Ayanganna, Guyana, with notes on breeding birds of the Guianan tepuis. *Cotinga* 38: 64–78.
- Naka LN, Cohn-Haft M, Mallet-Rodrigues F, Santos MPD, de Fátima Torres M (2006) The avifauna of the Brazilian state of Roraima: bird distribution and biogeography in the Rio Branco basin. *Revista Brasileira de Ornitologia* 14: 197–238.
- O'Shea BJ (2008) Birds of the Konashen COCA, southern Guyana. In: Alonso LE, McCullough J, Naskrecki P, Alexander E, Wright HE (Eds) A Rapid Biological Assessment of the Konashen Community Owned Conservation Area, Southern Guyana. RAP Bulletin of Biological Assessment 51. Conservation International, Arlington, VA, 63–68.
- O'Shea BJ, Milensky CM, Claramunt S, Schmidt BK, Gebhard CA, Schmitt CG, Erskine KT (2007) New records for Guyana, with description of the voice of Roraiman Nightjar (*Caprimulgus whitei*). *Bulletin of the British Ornithologists' Club* 127: 118–128.
- O'Shea BJ, Wrights JK (2015) Additions to the avifauna of the upper Potaro Plateau and Kaieteur National Park, Guyana [unpublished report]. WWF-Guyana, Georgetown, 12 pp.
- O'Shea BJ, Wilson A, Wrights JK (2016) Additions to the avifauna of the southern Rupununi region, Guyana. In: Alonso LE, Persaud J, Williams A (Eds) Biodiversity Assessment Survey of the South Rupununi Savannah, Guyana. BAT Survey Report No. 1. WWF-Guianas, Georgetown, 87–102, 239–252.
- Ottema OH, Ribot JHJM, Spaans AL (2009) Annotated checklist of the birds of Suriname. Paramaribo: WWF-Guianas, Paramaribo, 144 pp.
- Remsen JV Jr, Areta JJ, Cadena CD, Claramunt S, Jaramillo A, Pacheco JF, Pérez-Emán J, Robbins MB, Stiles FG, Stotz DF, Zimmer KJ. Version 26 October 2016. A classification of the bird species of South America. American Ornithologists' Union. <http://www.museum.lsu.edu/~Remsen/SACCBaseline.htm>. Accessed on: 2017-04-26.
- Ridgely RS, Agro D, Joseph L (2005) Birds of Iwokrama Forest. *Proceedings of the Academy of Natural Sciences of Philadelphia* 154: 109–121. [https://doi.org/10.1635/0097-3157\(2004\)154\[0109:BOIF\]2.0.CO;2](https://doi.org/10.1635/0097-3157(2004)154[0109:BOIF]2.0.CO;2)
- Robbins MB, Braun MJ, Finch DW (2003) Discovery of a population of the endangered Red Siskin (*Carduelis cucullata*) in Guyana. *Auk* 120: 291–298. [https://doi.org/10.1642/0004-8038\(2003\)120\[0291:doapo\]2.0.co;2](https://doi.org/10.1642/0004-8038(2003)120[0291:doapo]2.0.co;2)
- Robbins MB, Braun MJ, Finch DW (2004) Avifauna of the Guyana southern Rupununi, with comparisons to other savannas of northern South America. *Ornitología Neotropical* 15: 173–200.
- Robbins MB, Braun MJ, Milensky CM, Schmidt BK, Prince W, Rice NH, Finch DW, O'Shea BJ (2007) Avifauna of the upper Essequibo River and Acary Mountains, southern Guyana. *Ornitología Neotropical* 18: 339–368.
- Santos MPD, da Silva JMC (2007) As aves das savanas de Roraima. *Revista Brasileira de Ornitologia* 15: 189–207.
- Snyder DE (1966) The birds of Guyana. The Peabody Museum, Salem, MA, 308 pp.
- Stouffer PC, Johnson EI, Bierregaard RO Jr, Lovejoy TE (2011) Understory bird communities in Amazonian rainforest fragments: species turnover through 25 years post-isolation in recovering landscapes. *PloS One* 6: e20543. <https://doi.org/10.1371/journal.pone.0020543>
- Weller AA, Schuchmann K-L (2009) Re-evaluation of *Agyrtria brevirostris* Lesson (Aves, Trochilidae), with notes on its taxonomic status and relationships to *A. chionopectus* Gould and *A. versicolor* Vieillot. *Zoosystematics and Evolution* 85: 143–149. <https://doi.org/10.1002/zoos.200800020>

Appendix

Table A1. Species recorded on four dawn chorus recordings near Kusad (ML 224900, 224977) and Parabara (ML 224901, 224902).

Species	English name	224900	224977	224901	224902
<i>Crypturellus soui</i>	Little Tinamou				X
<i>Crypturellus undulatus</i>	Undulated Tinamou	X			
<i>Crypturellus variegatus</i>	Variegated Tinamou			X	
<i>Penelope jacquacu/marail</i>	Spix's/Marail Guan			X	X
<i>Ortalis motmot</i>	Variable Chachalaca			X	X
<i>Crax alector</i>	Black Curassow			X	
<i>Mitu tomentosum</i>	Crestless Curassow			X	
<i>Patagioenas speciosa</i>	Scaled Pigeon			X	X
<i>Patagioenas cayennensis</i>	Pale-vented Pigeon			X	X
<i>Patagioenas plumbea</i>	Plumbeous Pigeon			X	
<i>Leptotila verreauxi</i>	White-tipped Dove	X			X
<i>Leptotila rufaxilla</i>	Gray-fronted Dove				X
<i>Columbina passerina</i>	Common Ground Dove		X		X
<i>Crotophaga ani</i>	Smooth-billed Ani				X
<i>Nyctidromus albicollis</i>	Common Pauraque			X	
<i>Antristomus rufus</i>	Rufous Nightjar			X	
<i>Tachornis squamata</i>	Fork-tailed Palm-Swift		X		
<i>Polytmus therisiae</i>	Green-tailed Goldenthrout			X	
<i>Anthracothonax nigricollis</i>	Black-throated Mango	X			
<i>Amazilia brevirostris</i>	White-chested Emerald	X			
<i>Amazilia fimbriata</i>	Glittering-throated Emerald		X		X
<i>Vanellus chilensis</i>	Southern Lapwing		X	X	
<i>Burhinus bistriatus</i>	Double-striped Thick-knee		X		
<i>Jacana jacana</i>	Wattled Jacana		X		
<i>Eurypyga helias</i>	Sunbittern			X	
<i>Tigrisoma lineatum</i>	Rufescent Tiger-Heron			X	
<i>Mesembrinibis cayennensis</i>	Green Ibis			X	
<i>Theristicus caudatus</i>	Buff-necked Ibis		X		
<i>Rupornis magnirostris</i>	Roadside Hawk	X		X	
<i>Buteo nitidus</i>	Gray-lined Hawk	X			
<i>Megascops choliba</i>	Tropical Screech-Owl			X	
<i>Pulsatrix perspicillata</i>	Spectacled Owl	X			
<i>Glaucidium hardyi</i>	Amazonian Pygmy-Owl				X
<i>Glaucidium brasilianum</i>	Ferruginous Pygmy-Owl	X			X
<i>Trogon viridis</i>	Green-backed Trogon	X		X	
<i>Momotus momota</i>	Amazonian Motmot	X		X	
<i>Bucco tamatia</i>	Spotted Puffbird			X	
<i>Monasa atra</i>	Black Nunbird	X			
<i>Ramphastos tucanus</i>	White-throated Toucan	X		X	
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	X		X	X
<i>Dryocopus lineatus</i>	Lineated Woodpecker	X		X	
<i>Campephilus rubricollis</i>	Red-necked Woodpecker	X			
<i>Campephilus melanoleucos</i>	Crimson-crested Woodpecker	X			X
<i>Micrastur mirandollei</i>	Slaty-backed Forest-falcon			X	
<i>Milvago chimachima</i>	Yellow-headed Caracara		X		
<i>Amazona ochrocephala</i>	Yellow-crowned Parrot		X		X
<i>Amazona amazonica</i>	Orange-winged Parrot			X	X
<i>Eupsittula pertinax</i>	Brown-throated Parakeet			X	
<i>Orthopsittaca manilatus</i>	Red-bellied Macaw		X	X	X
<i>Ara ararauna</i>	Blue-and-yellow Macaw	X		X	
<i>Ara macao</i>	Scarlet Macaw				X
<i>Ara chloropterus</i>	Red-and-green Macaw			X	
<i>Diopsittaca nobilis</i>	Red-shouldered Macaw		X	X	X
<i>Thamnophilus punctatus</i>	Northern Slaty-Antshrike			X	
<i>Myrmotherula axillaris</i>	White-flanked Antwren			X	
<i>Herpsilochmus rufimarginatus</i>	Rufous-winged Antwren	X			
<i>Formicivora grisea</i>	White-fringed Antwren	X		X	

Continued

Table A1. Continued.

Species	English name	224900	224977	224901	224902
<i>Myrmoborus leucophrys</i>	White-browed Antbird			X	
<i>Percnostola rufifrons</i>	Black-headed Antbird			X	
<i>Myrmothera campanisona</i>	Thrush-like Antpitta			X	
<i>Dendrocolaptes certhia</i>	Amazonian Barred-Woodcreeper			X	X
<i>Xiphorhynchus guttatus</i>	Buff-throated Woodcreeper	X		X	
<i>Myiopagis gaimardii</i>	Forest Elaenia	X		X	
<i>Elaenia flavogaster</i>	Yellow-bellied Elaenia			X	X
<i>Elaenia cristata</i>	Plain-crested Elaenia			X	X
<i>Tolmomyias sulphurescens</i>	Yellow-olive Flycatcher	X			
<i>Tolmomyias poliocephalus</i>	Gray-crowned Flycatcher			X	
<i>Tolmomyias flaviventris</i>	Yellow-breasted Flycatcher			X	
<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher		X		
<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher			X	
<i>Pitangus sulphuratus</i>	Great Kiskadee		X		
<i>Conopias parvus</i>	Yellow-throated Flycatcher			X	
<i>Myiodynastes maculatus</i>	Streaked Flycatcher	X			
<i>Megarynchus pitangua</i>	Boat-billed Flycatcher			X	
<i>Tyrannus albogularis</i>	White-throated Kingbird				X
<i>Tyrannus melancholicus</i>	Tropical Kingbird			X	X
<i>Tyrannus savanna</i>	Fork-tailed Flycatcher				X
<i>Rhytipterna simplex</i>	Grayish Mourner			X	
<i>Ramphotrigon ruficauda</i>	Rufous-tailed Flatbill			X	
<i>Attila spadiceus</i>	Bright-rumped Attila	X		X	
<i>Cephalopterus ornatus</i>	Amazonian Umbrellabird				X
<i>Perissocephalus tricolor</i>	Capuchinbird	X			
<i>Lipaugus vociferans</i>	Screaming Piha	X		X	
<i>Chiroxiphia pareola</i>	Blue-backed Manakin	X			
<i>Lepidothrix serena</i>	White-fronted Manakin			X	
<i>Ceratopipra erythrocephala</i>	Golden-headed Manakin			X	
<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike	X			
<i>Hylophilus thoracicus</i>	Lemon-chested Greenlet			X	
<i>Pachysylvia muscicapina</i>	Buff-cheeked Greenlet			X	
<i>Vireo olivaceus</i>	Red-eyed Vireo	X			
<i>Stelgidopteryx rufigollis</i>	Southern Rough-winged Swallow				X
<i>Progne chalybea</i>	Gray-breasted Martin		X		
<i>Hirundo rustica</i>	Barn Swallow		X		
<i>Campylorhynchus griseus</i>	Bicolored Wren		X		X
<i>Ramphocaenus melanurus</i>	Long-billed Gnatwren			X	
<i>Turdus leucomelas</i>	Pale-breasted Thrush	X		X	X
<i>Mimus gilvus</i>	Tropical Mockingbird		X		
<i>Thraupis episcopus</i>	Blue-gray Tanager			X	X
<i>Thraupis palmarum</i>	Palm Tanager	X		X	X
<i>Emberizoides herbicola</i>	Wedge-tailed Grass-finch			X	X
<i>Parula pitaiyumi</i>	Tropical Parula	X			
<i>Psarocolius viridis</i>	Green Oropendola			X	
<i>Cacicus sp.</i>	Red-rumped/Yellow-rumped Cacique			X	
<i>Icterus cayennensis</i>	Epaulet Oriole			X	
<i>Sturnella magna</i>	Eastern Meadowlark		X	X	X