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AVIFAUNA OF THE GUYANA SOUTHERN RUPUNUNI, WITH COMPARISONS TO OTHER SAVANNAS OF NORTHERN SOUTH AMERICA

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Resumen. – Avifauna del Rupununi del Sur, Guyana, con comparaciones con otras sabanas del norte de Sudamérica. – Inventarios en cinco sitios de la sabana del Rupununi del Sur en Guyana generaron gran cantidad de información acerca de la composición, abundancia relativa y estatus reproductivo de la avifauna de esta región tan poco conocida. Registros notables de esos inventarios incluyeron el descubrimiento de una población del Cardenalito de Venezuela (*Carduelis cucullata*), y una especie críptica no descrita de atrapamoscas. La comparación de nuestros resultados con listas de especies de las principales sabanas en el norte de Sudamérica apoyan la idea de que la avifauna de Roraima-Rupununi es más similar a la de la contigua gran sabana de Venezuela, mientras que la avifauna de la sabana Sipaliwini del sur de Surinam es más similar a la del Amapá del noreste de Brasil. Se presentan comentarios detallados para 30 especies, de las cuales 10 son nuevas para Guyana.

Abstract. – Surveys of five sites in the southern Rupununi savanna of Guyana contribute considerably to our knowledge of the species composition, relative abundance, and breeding status of the avifauna of this poorly known region. Highlights from these surveys include the discovery of a previously unknown population of the endangered Red Siskin (*Carduelis cucullata*), and an unrecognized cryptic species of flycatcher. Comparison of our Rupununi results with species lists for several major savannas in northern South America further supports the conclusion that the avifauna of the Roraima-Rupununi is most similar to the contiguous "Gran Sabana" of Venezuela, whereas the Sipaliwini savanna avifauna of southern Suriname is most similar to the Amapá of northeastern Brazil. Details are presented for 30 species, including 10 new for Guyana. *Accepted 18 October 2003.*

Key words: Avifauna, biogeography, savanna, Guyana, southern Rupununi.

INTRODUCTION

The status and distribution of Neotropical avifaunas in savanna woodland and savanna grassland are considered to be well understood because of the relatively low species diversity coupled with the accessibility of these habitats (Silva 1995a, 1995b, Stotz *et al.* 1996). Nevertheless, very little has been published on the avifauna of the extensive Roraima-Rupununi savannas which cover c. 54,000 km^2 of extreme northern Brazil and southwestern Guyana (Fig. 1). Aside from Pinto's (1966) avifaunal catalog of the Brazilian territory of Roraima and the work of Moskovits *et al.* (1985) and Silva (1998) on the

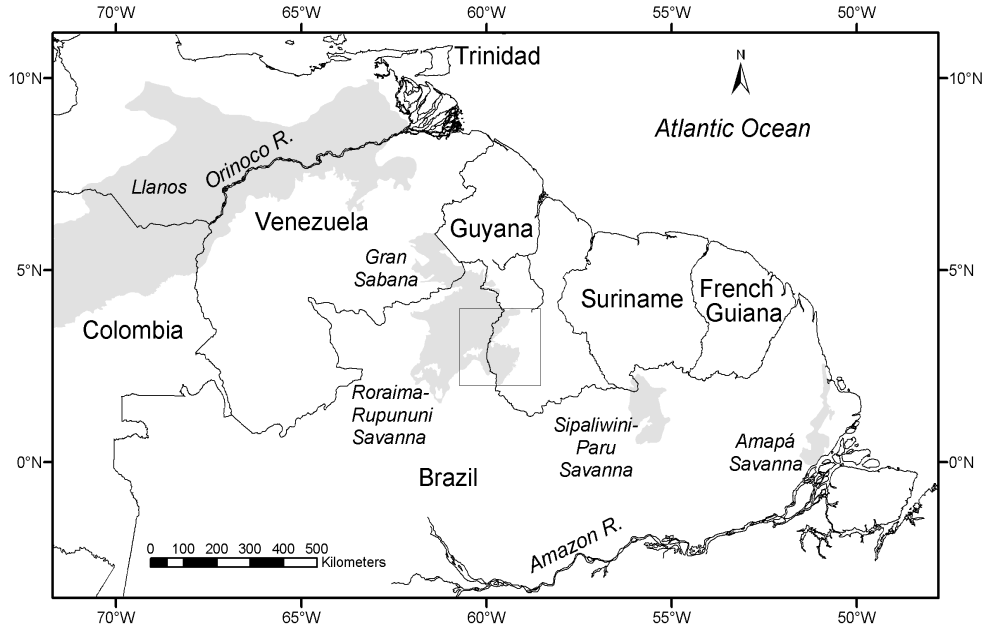

FIG. 1. Regional map of northern South America with major savanna regions shaded. Inset quadrangle outlines map of Figure 2. Smaller coastal savannas also exist in northern Guyana, Suriname, French Guiana and on Marajó Island at the mouth of the Amazon (not shown). Maps drawn with ArcMap 8.2 (ESRI Corp. 2002). Savanna distributions from World Wildlife Fund Ecoregions data, available in ArcMap.

Ilha de Maracá, only general comments on savanna birds in this region are included in Snyder (1966) and Sick (1993). Oren & Albuquerque (1991) identified much of the Roraima savanna in Brazil as one of the highest priority areas in need of new ornithological collections. Indeed, their update of Haffer's (1974) catalog of collecting localities for this region of Brazil did not include a single new site.

The adjoining Rupununi savanna of Guyana is divided into northern and southern subregions by the western extension of the Kanuku Mountains (Figs 1 and 2). Virtually all ornithological collecting localities are in the north Rupununi (see p. 97 in Stephens & Traylor 1985), and only a few of these localities are represented by more than a handful of 19th century specimens. The only published avifaunal work on the south Rupununi is that of Mees & Mees-Balchin (1990) and Mees (2000), who spent a total of about three months in the region in 1989 and 1992.

The savanna woodland/grassland community is one of the most impacted biomes in South America (Silva 1995c, Stotz *et al.* 1996). Fortunately, the Roraima-Rupununi region has not yet experienced the devastating conversion of grassland to cropland that has occurred over such broad areas of Brazil (Cavalcanti 1988, Klink *et al.* 1993). However, the extensive, annual use of fire during the dry season has undoubtedly had a negative impact on a number of grassland and forest edge species in this region.

Here we present results from five intensively surveyed sites in the southern Rupununi of Guyana, list noteworthy observations

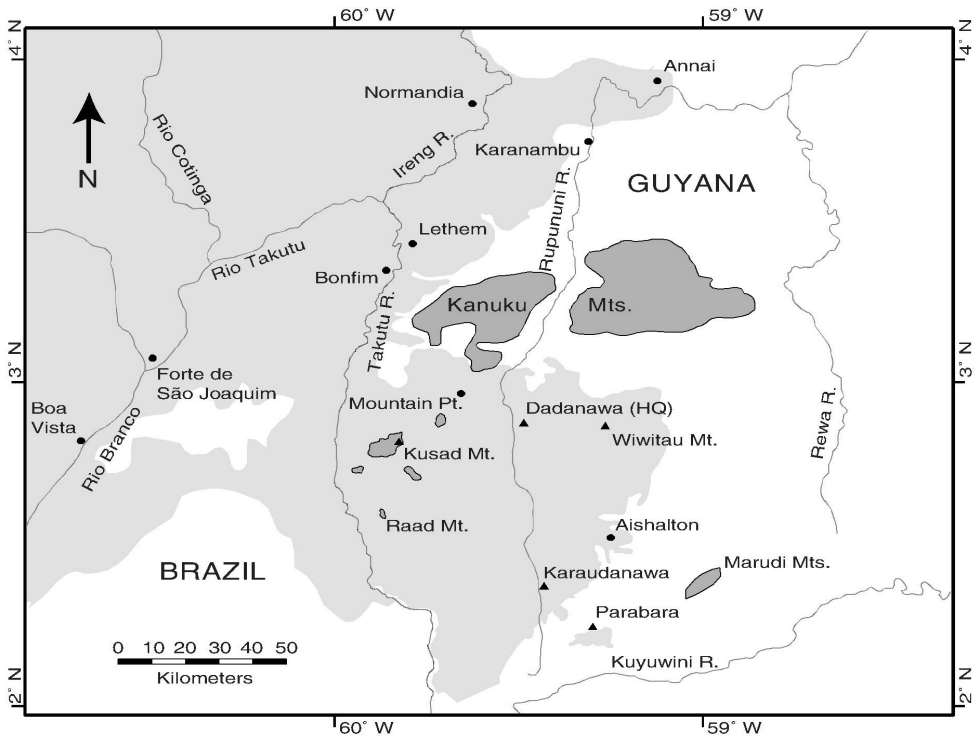

FIG. 2. Map of study area in southwestern Guyana with savannas shaded light gray, mountains dark gray. Triangles indicate main study sites. Circles mark other localities mentioned in text. Savanna distributions from World Wildlife Fund Ecoregions data, available in Huber *et al.* (1995).

of several species elsewhere in the Guyana Rupununi, and compare the southern Rupununi with other savannas of northern South America. Highlights include the discovery of a previously unknown population of the endangered Red Siskin (*Carduelis cucullata*; Robbins *et al.* 2003), and an unrecognized cryptic species of flycatcher (in prep.). These discoveries along with a number of other surprises, contribute considerably to the ornithological interest of this region.

STUDY AREA AND METHODS

The Rupununi savanna of southwestern Guyana is a vast low-lying plain, 100–200 m in elevation and c. 13,000 km^2 in extent (Hills 1976). The savanna extends for many kilometers to the west in the Brazilian state of Roraima, where it is known as the Rio Branco savanna. Indeed, the total area of savanna there is considerably greater than in Guyana (Eden 1964, Cole 1986). The rolling plains are covered by grasses, dominated by the perennial bunch grass *Trachypogon plumosus* (Poaceae), interspersed with the dominant savanna tree, *Curatella americana* (Dilleniaceae; known in Guyana by the Brazilian name "caimbé" or as "sandpaper tree"). Scattered throughout the southern Rupununi, and continuing in adjacent Brazil, are isolated granite mountains that range from small dome-like hills with sparse semi-humid vegetation to relatively tall mountains such as Kusad (800 m)

that cover several square kilometers with more mesic forest. Within the savanna are isolated patches of forest ranging in size from several square meters to a few square kilometers, and known as "bush islands". Most stream courses are also lined with bush and/or stands of the moriche or ité palm (*Mauritia flexuosa*). Numerous small ponds and marshes dot low-lying areas. The entire fringe of the savanna interdigitates with extensive humid forest. Eden (1973) provides details on Rupununi savanna geomorphology and vegetation.

A prolonged dry season typically begins in September and continues into April. The rainy season extends from late April through August (83% of the annual rainfall occurs during this period; Eden 1973) and routinely floods much of the savanna from June through early September. Not surprisingly, very little ornithological work has been conducted during this period. Average rainfall at Dadanawa (02°49'N, 59°31'W) for 1984–1995 was 1475 mm (Welle & Jansen-Jacobs 1995) and, just to the north at St. Ignatius (near Lethem 03°23'N, 59°48'W), average rainfall was 1621 mm (Eden 1973).

With the arrival of humans, presumably thousands of years before present, the frequency of fire in this region increased. In 1842, the Schomburgks (Roth 1922–1923) noted extensive fires set by Amerindians throughout the Rupununi. Fires have become ever more frequent with the dramatic increase in cattle ranching in the late 1800s coupled with an increase in the human population from c. 5000 to 15,000 since 1950 (Hills 1976, Bureau of Statistics 1993). As is the case in grasslands throughout the world, there is extensive burning throughout the dry season, leaving grass only a few centimeters high in much of the region until the rainy season. At least as early as the 1960s, and probably much earlier, some areas were burned as many as three times a year (September, December/January, and late March/April; Hills 1976). This fire frequency continues today (D. deFreitas pers. com.; pers. observ.).

We surveyed four sites intensively during 2000 (see below; Fig. 2; Appendix 1), with general observations made throughout much of this region between 17 March–22 April and 14 October–13 November. In addition, Finch made 10 trips to Dadanawa Ranch, which we treat as a fifth study site (Appendix 1).

Karaudanawa. This camp was located along the upper reaches of the Rupununi River (02°22'N, 59°27'W), c. 4 km south of the village of Karaudanawa, and was surveyed from 18 to 27 March 2000. We worked the narrow riparian corridor and the adjacent savanna. When we arrived the river was no more than a few meters across and was quite shallow except for a few deeper pools. However, on 22 March, heavy rains fell and the river rose rapidly and became impassable for three days. Several shallow ponds were present just to the east of camp. *Mauritia* palms dominated along low-lying areas and pond edges. Primarily as a result of burning, the grass was short throughout the area and there was an abrupt interface between savanna and woodland. There was very little topographical relief at this site. From 20 to 25 12-m mist-nets were opened from dawn until mid-morning in riparian vegetation and bush islands.

Parabara Savanna. Our camp was at the north end of this isolated savanna (02°12'N, 59°22'W), just inside a belt of humid forest. This tongue of forest was 5–7 km wide where a wagon track passed through. We surveyed savanna and forest habitats here from 28 March to 9 April 2000. The savanna had been burned within a month prior to our arrival, and thus there was a very sharp demarcation at the savanna/forest interface. In contrast, at the north end of the forest belt where burn-

ing had been less intense, there was a transition zone of scrubby woodland between the forest and the extensive Rupununi savanna. Most of the time we had 29 mist-nets deployed, primarily at the south end of the forest belt and in bush islands and riparian strips in the savanna. Finch *et al.* also visited this site on the following dates: 24–25 April 1995, 13–14 April 1997, 3 November 1999, and 14 April 2001.

Wiwitau Mountain. The forest on the slopes and foot of this and adjacent granite mountains (02°52'N, 59°16'W) was semi-deciduous, and was surveyed from 9 to 22 April, and from 15 to 17 October 2000. The summit rises to 450 m. As elsewhere, most of the grassland had been burned, leaving a sharp demarcation between forest and savanna. From 20 to 25 mist-nets were placed in riparian vegetation, bush islands, and forest at the foot of the granite hills.

Kusad Mountain. Our camp was situated at the base of the northeast flank of this relatively high (800 m), isolated mountain (02°49'N, 59°49'W), which was surveyed from 31 October to 13 November 2000. The forest at the base and the lower slopes was semi-deciduous, becoming more humid in the upper elevations and in narrow ravines. Most of the surrounding savanna and some of the lower slopes of Kusad had been extensively burned. The extent of the burning was even greater on adjacent mountains, where burns had reached more than half way up the slopes, destroying much of the semi-deciduous forest. From 20 to 25 mist-nets were placed in riparian vegetation, bush islands, and in forest at the base of the mountain.

Dadanawa Ranch. The area which was surveyed during 10 trips by Finch from 30 August to mid-April 1989–2001 was c. 5 km in radius from the headquarters (02°49'N, 59°31'W). Habitat is diverse, ranging from riparian forest/scrub along the Rupununi River to savanna with few scattered trees. There is one semi-permanent pond at the headquarters. Like our Karaudanawa camp, there is relatively little topographical relief at this site. We did no mist-netting or collecting here, but extensive observation and tape recording over several years have produced a reasonably complete list. Mees (2000) recorded 13 species that we did not encounter at Dadanawa Ranch, all either water-inhabiting or forest species except for Long-winged Harrier (*Circus buffoni*).

Specimens are deposited at University of Kansas Natural History Museum (KUNHM), U.S. National Museum of Natural History, Smithsonian Institution (USNM), and the University of Guyana, Georgetown. Tissue samples are at USNM. Robbins and Finch sound recordings are at Macaulay Library of Natural Sounds, Cornell University (MLNS). Taxonomy and nomenclature mostly follow Hilty (2002), except for caprimulgids and hummingbirds where we follow del Hoyo *et al.* (1999).

RESULTS AND DISCUSSION

A total of 456 species was recorded at the five localities. Of that total, 217 (referred to as uniques) were recorded at only one of the five localities. The Parabara site was significantly more diverse in total (n = 335, 73%) and unique (n = 165, 76%) species than the other four sites (Appendix 1). The principal factor accounting for Parabara's richness was the presence of rain forest. Most of the unique Parabara species are widespread Guiana shield rain forest inhabitants. For example, 94% of the total suboscine uniques (n = 111 species) were found at Parabara. Suboscines constituted 51% of the uniques among the five sites. Species totals at all sites would be increased by additional surveys, particularly if conducted

TABLE 1. Savanna/forest edge species sharing Peri-Atlantic pattern of distribution in selected northern South America savannas. Excludes species found in all six savannas. Sources: Haverschmidt & Mees (1994), Silva (1995a,1995b), Silva *et al.* (1997), Mees (2000), Hilty (2002), David Ascanio (pers. com.), and data presented in this paper.

	Llanos	Roraima-Rupununi	Gran sabana	Sipaliwini	Amapá	Cerrado
Falco sparverius	X	X	X			X
Burhinus bistriatus	X	X			X	
Zenaida auriculata	X	X			X	X
Columbina passerina	X	X		X	X	
Uropelia campestris					X	X
Aratinga solstitialis		X				
Aratinga aurea				X	X	X
Athene cunicularia	X	X	X			X
Chordeiles pusillus	X	X	X		X	X
Hydropsalis torquata				X	X	X
Phaethornis augusti	X	X	X			
Phaethornis rupurumii	X	X	X			
Eupetomena macroura				X	X	X
Heliactin bilopha				X	X	X
Picumnus cirratus		X			X	X
Melanerpes candidus					X	X
Colaptes campestris				X	X	X
Furnarius leucopus		X				X
Lepidocolaptes angustirostris				X	X	X
Formicivora rufa				X	X	X
Myrmeciza longipes	X	X				
Myiopagis viridicata	X	X				X
Suiriri suiriri				X	X	X
Sublegatus sp.	X	X			X	X
Euscarthmus rufomarginatus				X	X	X
Lophotriccus pilaris	X	X				
Poecilotriccus sylvia	X	X			X	
Pyrocephalus rubinus	X	X				X
Xolmis cinerea				X	X	X
Xenopsaris albinucha	X	X				X
Neopelma pallescens		X			X	X
Alopochelidon fucata			X			X
Campylorhynchus griseus	X	X	X			
Mimus saturninus				X	X	X
Phaeothlypis flaveola		X				X
Piranga flava		X		X	X	X
Euphonia finschi		X		X		
Neothraupis fasciata					X	X
Cypsnagra hirundinacea				X	X	X
Sporophila intermedia	X	X				
Sporophila leucoptera				X	X	X
Sporophila bouvreuil				X	X	X

TABLE 1. Continuation.

	Llanos	Roraima-Rupununi	Gran sabana	Sipaliwini	Amapá	Cerrado
Sturnella magna	X	X	X		X	
Carduelis cucullata		X				
Species total	18	26	8	17	27	31

during the rainy and migratory seasons. Kusad Mountain in particular would benefit from visits done during the breeding season at higher elevations, as few species were vocalizing there during our October–November survey.

During March-April 2000, we were able to document the breeding of about 37% of the avifauna (Appendix 1). At the three sites that we surveyed during March–April 2000, 147 of 397 (excluding migrants, n = 9, and species recorded at the Parabara site in other years) species were documented breeding based on specimen gonad data, behavior (displays, carrying nesting material), and location of active nests. This is a very conservative estimate of breeding as only 218 of the 397 species were collected (excludes migrants and taxa represented by only fluid-preserved specimens where gonads were not examined), and many taxa were represented by only a single specimen. Moreover, for some species for which we had reasonable sample sizes (n >10 individuals), only two or three individuals were in unequivocal breeding condition (e.g., *Sakesphorus*, *Formicivora*). Thus, larger sample sizes for other species undoubtedly would have furnished additional evidence of breeding. Finally, a number of species that were not collected but were persistently singing, e.g., Amazonian Barred-Woodcreeper (*Dendrocolaptes certhia)*, Ochre-bellied Flycatcher (*Mionectes oleagineus)*, Ringed Antpipit (*Corythopis torquata)*, Bright-rumped Attila (*Attila spadiceus*), and Blue-black Grosbeak (*Cyanocompsa cyanoides)*, presumably were breeding; these were not included in our tally of documented breeding species.

With the exception of the ground-doves (see Species accounts), very few species were singing during our October–November field work. Nonetheless, we were able to document breeding by 78 of 178 (44 %) species (see Kusad locality in Appendix 1).

Below we provide details for the first occurrences of ten species for Guyana and the first definite Guyana breeding records for White-throated Kingbird (*Tyrannus albogularis*). The Sun Parakeet (*Aratinga solstitialis*) now appears extirpated in the country and the Crestless Curassow (*Crax tomentosa*) has disappeared from much of the southern Rupununi.

Intersavanna comparisons

In Silva's (1995a) biogeographic analysis of the cerrado avifauna, species composition is compared across six major savanna regions of northern South America that shared what Silva termed the Peri-Atlantic pattern of distribution. In that analysis, he lumped the Sipaliwini savanna of southern Suriname with the savannas of southeastern Venezuela [Gran Sabana; see Hilty (2002) for description and distribution of this area] and contiguous Brazil and Guyana (Roraima-Rupununi). However, with a detailed study of the avifauna at an Amapá savanna, one of the largest savanna islands in Brazilian Amazonia, Silva *et al.* (1997) documented the first occurrence for many species in the Amapá savanna/forest edge. Their analysis of the

distribution patterns of the savanna-inhabiting component demonstrated that the Amapá region's avifauna is largely derived from the cerrado, whereas the Roraima-Rupununi avifauna is more influenced by the llanos of Colombia and Venezuela (Silva 1995b, 1998).

Haverschmidt & Mees (1994) first recognized that the Sipaliwini savanna avifauna was composed mostly of cerrado species. Mees (2000) pointed out in his comparison of the Guyana Rupununi and Sipaliwini that a number of species are known from the Sipaliwini and not from the Rupununi and vice versa. Indeed, excluding water-inhabiting, strictly riparian species, humid forest species, and migrants, 14 species found in the Sipaliwini and the Amapá savanna of northeastern Brazil (Fig. 1) are not known from the Roraima-Rupununi or the Gran Sabana savannas (Table 1). Twenty-three species are recorded for the Roraima-Rupununi savanna and not for the Sipaliwini, with 16 of those also unrecorded for Amapá (Table 1).

Of the species included in Table 1, not a single species is shared by the Gran Sabana and Sipaliwini. In contrast, the Sipaliwini avifauna is entirely a subset of the Amapá avifauna and except for the Tawny-headed Swallow [*Alopochelidon* (*Stelgidopteryx*) *fucata*] the Gran Sabana avifauna is a subset of the Roraima-Rupununi (Table 1). Nineteen species are known from Roraima-Rupununi, but unrecorded in the Gran Sabana [Table 1; three species known only from Santa Elena de Uairén in Venezuela (Hilty 2002) are excluded from the Gran Sabana list].

Thus, our results from the Guyana Rupununi further support Silva's (1995b, 1998) assertion that the Roraima-Rupununi region's avifauna is most closely associated with the Gran Sabana and llanos (Table 1; also see *Galbula* Species account). In contrast, the avifauna of the Sipaliwini savanna [considered by Silva *et al.* (1997) and others as part of the larger Parú-Trombetas savanna complex of northern Brazil] has closer affinities with the Amapá savanna and hence the cerrado (Table 1).

Species accounts (* new for Guyana)

**Broad-winged Hawk* (Buteo platypterus). An adult bird was seen circling low over a ridge at Kusad Mt. on 1 November 2000 by Robbins. Although no specimen or photographic documentation exist for Guyana, there is an additional sight record. Finch, T. MacClendon, and T. Thorne observed an immature on 3 March 1994 c. 16 km west of Mango Landing, W bank Essequibo River (c. 05°16'N, 59°00'W). Although not accepted by Haverschmidt & Mees (1994), there are reliable observations for Suriname. In addition to the two 1981 observations given by Donahue (1985), Finch and S. Allen observed an adult at close range at Browns Berg Reserve (04°53'N, 55°13'W) on 11 November 1982.

Black-and-white Hawk-Eagle (Spizastur melanoleucus). Even in large expanses of lowland and foothill forest this is a low-density species, thus we were surprised to find it in the isolated, relatively small forested hills in the savannas. An adult was seen and heard at Raad Mountain (02°35'N, 59°51'W) on 26 October 2000 by Robbins, and another adult was present at our Kusad camp in Nov 2000. Two additional observations at the savanna/woodland interface were made by Finch in 1994 near the mouth of the Ireng River (c. 03°34'N, 59°52'W) and just south of Lethem.

**Merlin* (Falco columbarius). We saw two at Karaudanawa in late March 2000, and two others at Kusad in November 2000. Although specimen or photographic documentation is still lacking for Guyana, we have encountered this species on no fewer than 12 occasions at both coastal and inland localities, on dates

ranging from 4 November to 21 April. Snyder (1966) questioned the only previous published report, a seemingly very early sight record on 6 August 1959. With a single exception, all Venezuela records are from north of the Río Orinoco (Hilty 2002).

Crestless Curassow (Crax tomentosa). Mees (2000) did not find this species in the south Rupununi, nor did we. This is somewhat surprising in light of reports by Schomburgk and party (Roth 1922–1923), who mentioned that this cracid was common in savanna woodland and riparian forest. Presumably this decline is the result of hunting pressure. It still persists at least locally in Guyana, as Finch has repeatedly heard and recorded (MLNS 78004, 87581, 106490) this cracid from mid-September through April in the Karanambu area as far down the Rupununi River as the Rewa Village (03°52.1'N, 58°53.6'W), and it was found in low stature, seasonally flooded forest in the Iwokrama reserve (Anonymous 1999).

Ocellated Crake (Micropygia schomburgkii). This often-overlooked species was uncommon in the same low-lying, unburned grass where *Polystictus* was found at our Karaudanawa camp, and in wet savanna at Parabara. At the latter locality at least seven individuals were heard. In addition to the Rupununi records, this secretive crake was flushed and heard calling daily in unburned grassland with scattered shrubs at Dubulay Ranch, west bank of the Berbice River (05°40'N, 57°53'W), in late March–early April 1996 (Robbins, C. Milensky, N. Rice, and B. Schmidt). This species is a good indicator of high quality wet grassland and it undoubtedly was more common and widespread in this region prior to the advent of extensive, annual burning. Cavalcanti (1988) identified this crake as a grassland species of particular conservation concern.

**Hudsonian Godwit* (Limosa haemastica). The only Guyana record is of a single bird observed and heard in flight over Musu Lake, near the Ireng River, north of Lethem on 23 September 1995 by Finch *et al.*

**Stilt Sandpiper* (Calidris himantopus). Two birds were observed at Dadanawa Ranch on 26 September 1995 by Finch. There is only one other record for Guyana, an observation of two birds on coastal mudflats at Windsor Forest, west bank Demerara River, on 17 September 1994 by Finch *et al.*

Plain-breasted Ground-Dove (Columbina minuta). Interestingly, we failed to encounter this species during March–April 2000, but in October–November 2000 it was ubiquitous and breeding throughout the south Rupununi savanna, as were the other three ground-doves and Eared Dove (*Zenaida auriculata*).

Sun Parakeet (Aratinga solstitialis). Discouragingly, we failed to find this species which is under pressure from the pet trade. Apparently it was once common, at least in the north Rupununi and adjacent Brazil (Roth 1922–1923, Joseph 1992), but now it is almost certainly extirpated from Guyana. Rupununi bird trappers related to us in 2000 that the species was once common and persisted in the north Rupununi through the 1970s. Purportedly, 223 individuals were exported from Guyana in 1979 (Niles 1981). However, these birds may well have been trapped in Brazil and brought across the largely unpoliced border at Bonfim/Lethem. As recently as 2000, we observed relatively large numbers of parrots (*Ara*, *Amazona, Pionus*) being transported from this border to Georgetown.

None of the trappers recalled having found the bird in the south Rupununi, nor did any of a number of long-term residents seem to know the bird. However, given that it is found in a wide range of habitats, including

habitat very similar to what is found throughout much of the south Rupununi, and is known to move seasonally (Joseph 1992), we suspect that it was once there. This species is now of great conservation concern since, under continuing pressure from trappers, it has disappeared from much of its former range.

Amazonian Pygmy-Owl (Glaucidium hardyi). This often-overlooked owl was found in the narrow strip of humid forest at our Parabara camp. At least 6 individuals were heard and two were netted (KUNHM 90816; USNM 616218). The species is now known from many Guyana localities: Kamakusa (Griscom 1931), Kanuku Mts. (Parker *et al.* 1993, Finch), Iwokrama (Anonymous 1999), and along the Rewa, Kuyuwini, Kassikaityu, Essequibo, and Kwitaro rivers in southwestern Guyana (Finch *et al.*).

Least Nighthawk (Chordeiles pusillus). This poorly known nighthawk was common in much of the south Rupununi from at least October through April. Males collected in March–April had small testes, but at least two females taken during this period had recently laid eggs. Males were recorded singing and displaying from rocky hillside savanna in October (MLNS 111864). Birds foraging over savanna during March–April evenings were in loosely associated groups numbering up to 20 individuals. Although there has been very little work during the rainy season, there is a specimen from Annai taken on 9 July 1889 (American Museum of Natural History, 476961) that is referable to *septentrionalis*, the only subspecies documented for Guyana. So, we presume the species is a resident in the country.

Although Dickerman [1988; repeated by Cleere (1998)] described this species' range as including most of Guyana and other vast areas of inappropriate habitat in Venezuela, Brazil, and Suriname (where it is still unknown; Haverschmidt & Mees 1994), within Guyana this species is known only from the Rupununi region. Unless one or more populations of this species are migratory, as suggested by Friedmann (1948), the distributions that Dickerman (1988) summarized for the subspecies *septentrionalis* and *esmeraldae* make no sense biogeographically. The type localities are only c. 250 km apart and a specimen identified by Dickerman as belonging to *septentrionalis* (Sanariapo, Amazonas, Venezuela) was taken within 100 km of the type of *esmeraldae*. Clearly, more material is needed to determine if some populations are migratory.

Streak-throated Hermit (Phaethornis rupurumii). Although this species was not found at any of the five sites, Finch recorded displaying males in November and April (MLNS 106313-4) at Waurepau (Wmbitun) Creek (02°20.5'N, 59°26.9'W), just south of our Karaudanawa camp. Males sang an incessant "eesee-eesee-eesee, eesee-eesee-eesee-swur" from perches 1–1.5 m high in a dense, largely leafless, streamside thicket within a narrow tongue of riparian woodland surrounded by savanna. Snyder (1966) mentions that Whitely collected the species at Annai and along the Rupununi River. Meyer de Schauensee (1966) treated this taxon as a subspecies of Dusky-throated Hermit (*P. squalidus)*, but Hinkelmann & Schuchmann (1997) demonstrated, based on external morphological characters, that *rupurumii* deserves species status and is more closely allied with Little Hermit (*P. longuemareus*) and Minute Hermit *(P. idaliae)* than with Dusky-throated.

[*]*Versicolored Emerald* (Amazilia versicolor). This species was recorded at four of our sites at the edge of shrubby forest. Snyder (1966) did not list this species for Guyana, but Braun collected the first specimen for the country at

Gunn's Strip (01°39'N, 58°37'W) in March 1999 (USNM 625395). Moskovits *et al.* (1985) considered the species to be common in adjacent Brazil.

Jacamars (Galbula sp.). Green-tailed Jacamar (*Galbula galbula*) was recorded at three of our study sites (Appendix 1) and along the Takutu River (02°44'N, 59°59'W) and Little Sand Creek, Takutu drainage (02°54'N, 59°51'W), whereas Rufous-tailed (*G. ruficauda*) was recorded only from the mouth of the Ireng River (multiple observations by Finch *et al.*). Within the Rupununi, Snyder (1966) mentions *galbula* from Annai, Kanuku Mts., and the Rupununi River, and Mees (2000) considered it "moderately common and widely-distributed" in tall scrub and riparian woodland in the south Rupununi. Haffer (1974) listed specimen records for both species in adjacent Brazil, to which may be added a report of *galbula* west of Boa Vista, along the Uraricoera River (Moskovits *et al.* 1985), and two sightings by Finch: *galbula* at Fazenda Santa Cecilia, c. 20 km southeast of Boa Vista on 19 July 1992, and *ruficauda* near the Takutu River bridge on the road between Normandia and Bonfim, 22 July 1992. Haffer (1974) found no evidence of hybridization where the ranges of *galbula* and *ruficauda* meet, and our recent specimens (n = 6) of *galbula* from the above south Rupununi localities also show no signs of hybridization.

The largely complementary ranges of Green-tailed and Rufous-tailed jacamars were cited as an example of competitive exclusion by Haffer (1974), although he noted that they were sympatric in the Rio Branco drainage of the Roraima-Rupununi region. However, our Guyana observations revealed no syntopy and the above Brazilian records are consistent with the possibility that *ruficauda* replaces *galbula* in the upper Rio Branco drainage. The only site attributed to both species is the old collecting locality of Forte de São Joaquim (= Forte do Rio Branco; 03°01'N, 60°28'W; Fig. 2). It may be that *ruficauda* occurs only to the north and *galbula* only to the south of this site. Haffer (1974) postulated that the presence of the nominate form of the Rufous-tailed Jacamar in this region was the result of past savanna connections with coastal Venezuela and Guyana. Indeed, like nominate *ruficauda,* a number of other avian taxa in Roraima-Rupununi have disjunct populations or sister taxa in northern Venezuela and/or coastal Guyana and Suriname (Silva 1998, Mees 2000, Hilty 2002, Robbins *et al.* 2003).

**Hoary-throated Spinetail* (Poecilurus kollari). This Rio Branco drainage-restricted species was recorded on seven occasions, from 1993 through 1996, by Finch *et al.*, while floating c. 4–5 river km along the Guyana side of the Ireng River down to its confluence with the Takutu River. They encountered a maximum of 5 individuals during a float, with all birds found along the riverbank in dense, tangled vines that were leafless up to c. 4 m above the water surface (MLNS 63925, 63927, 77957, 78014). The species was again recorded at the confluence when Braun collected an individual on 14 November 2000 (USNM 627354). An earlier, unpublished Guyana record is that of an unsexed individual collected along the Takutu River by D. Vesey-Fitzgerald on 17 December 1932 (USNM 333145).

**Streak-headed Woodcreeper* (Lepidocolaptes souleyetii). Phelps (1938) pointed out that earlier authors had mistakenly included Guyana within this species' range, based on specimens that were actually taken on the Venezuelan side of Mt. Roraima. Thus, the first record for Guyana was when Finch found it in riparian forest near the mouth of the Ireng River (c. 03°34'N, 59°52'W), just north of Lethem on 21 January 1993. At this same locality, the first specimens were obtained on 14 November 2000 (KUNHM 91507, USNM 627537). In

2002, this species also was found to be fairly common in extreme northwestern Guyana (08°15'N, 59°44'W; 08°24'N, 59°45'W) by Robbins, Milensky, and B. Benz. The Ireng specimens appear indistinguishable from the series (n = 4) taken in northwestern Guyana. This species is known from adjacent Brazil (Sick 1993).

**Rufous-winged Antwren* (Herpsilochmus rufomarginatus). This antwren was uncommon in riparian forest canopy along the Rupununi River (Karaudanawa camp) and the Takutu River (from 02°39'N, 59°58'W to 02°55'N, 59°58'W) and fairly common in humid, higher elevation forest at Kusad. Snyder (1966) did not list this species for Guyana, nor are there published records for adjacent Venezuela (Hilty 2002) and the Roraima state of Brazil (Sick 1993). However, this species does in fact occur not far to the west of Guyana, as Finch recorded it along Ruta 10 at the Río Cuyuní in Bolívar, Venezuela, in 1991 and 1992, and at Fazenda Santa Cecilia, about 20 km southeast of Boa Vista, on 19 July 1992. We first recorded this species for Guyana in August 1998, when it was found to be fairly common in montane forest in the Acari Mountains along the country's southern border.

**Rio Branco Antbird* (Cercomacra carbonaria). Restricted to the Rio Branco drainage, this species was not known for Guyana until found by Finch and T. MacClendon along the lower Ireng River on 21 January 1993. Here it occurred in dense, low shrubby vegetation extending out over the river, and one or two individuals were found on five of six subsequent visits (MLNS 63928-9, 68483, 78012-3; see *Poecilurus* account).

Greenish Elaenia (Myiopagis viridicata). This species was unknown in Guyana prior to September 1989, when G. Mees found it at Dadanawa and along the Takutu River (Mees 2000). It appears to be widespread and uncommon to fairly common in semi-deciduous woodland, bush islands, and gallery forest throughout much of the south Rupununi. North of the Kanuku Mountains its range extends at least as far as Karanambu.

Bearded Tachuri (Polystictus pectoralis). We found this inconspicuous tyrannid only at our Karaudanawa camp, where it was uncommon in wet, low-lying grassland (one of the few unburned areas). Birds were in nonbreeding condition in March. Finch recorded this species in the southern Rupununi at Mountain Point (02°58'N, 59°39'W) and between Dadanawa and Parabara, and in the north Rupununi just north of Pirara (03°37'N, 59°40'W). On 11 April 1997, birds at Mountain Point were in song and tape-responsive (Finch pers. observ.).

Collar & Wege (1995) listed only three Guyana localities, but in addition to the above recent records, Robbins, Milensky, Rice, and Schmidt found it to be uncommon in unburned grassland with scattered scrubs at the Dubulay Ranch in late March–early April 1996. At the Dubulay site breeding apparently had occurred in the past few months as immatures with bursa of Fabricius up to 4 x 2 mm were collected. Interestingly, an apparent adult female (KUMNH 88210; no bursa, skull ossified, ovary mass 5 x 4 mm) had black streaking on the upper throat and below the eye, not unlike an adult male. We presume that this was an old female that had acquired male-like characters, as other adult females taken in Guyana lack any black in the throat and face.

As Parker & Willis (1997) pointed out, this species has suffered considerably over much of its range as a result of the burning of grassland and its conversion to cropland. Presumably it was more widespread and common in the Rupununi before burning became

a widespread and annual practice.

Yellow-olive Flatbill (Tolmomyias sulphurescens). We found this species to be uncommon to fairly common in riparian and foothill semi-deciduous forest at several sites. Prior to our south Rupununi work and surveys by Academy of Natural Sciences of Philadelphia personnel (ANSP) at Iwokrama, where the species was found to be uncommon in seasonally flooded forest (Anonymous 1999), the status and distribution of this species was unknown in Guyana (Snyder 1966).

Bran-colored Flycatcher (Myiophobus fasciatus). This local species was recorded at four of our sites, where it was uncommon. Breeding was documented during the March/April work (KUNHM 90774-5 – adult male; immature, bursa 3 x 1 mm). Snyder (1966) listed the species as hypothetical for Guyana, however, the first definite record was obtained when a female was mist-netted on 4 July 1970, near the coast at Ituni, West Demerara District by J. Dick (Dick & Barlow 1972). In addition, we mist-netted an adult male in breeding condition (USNM 610189) on 8 April 1996 at Dubulay Ranch. The species is known from the Roraima savanna in adjacent Brazil (Moskovits *et al*. 1985).

Variegated Flycatcher (Empidonomus varius). The northern breeding limits of this enigmatic flycatcher are poorly understood as a result of austral migrants (nominate subspecies) appearing in the northern half of the continent from March through September (Zimmer 1937, Ridgely & Tudor 1994). Ridgely and Tudor mentioned that it is resident from Venezuela south, but Hilty (2002) stated "Not yet reported breeding in Venezuela." The only prior breeding record for Guyana is of a nest that was found on 20 April (unspecified year and locality) (Beebe *et al*. 1917). Snyder (1966) remarked that austral migrants "should occur" in Guyana, but virtually all of the localities that she listed are at inappropriate breeding sites. Thus, we suspect that most of those records pertain to austral migrants. We are unaware of any breeding records for the Roraima state of Brazil. In Suriname, the resident subspecies, *rufinus*, apparently is found only in open savannas and has not been recorded breeding along the coast (Haverschmidt & Mees 1994).

We documented breeding in the southern Rupununi when, on 19 March 2000, a male was collected at Karaudanawa with testes 11 x 4.5 mm (KUNHM 90782) and, the following day, a female (USNM 625961) with an ovary mass of 8 x 5 mm with largest ovum 2 mm was taken; based on plumage characters both were assignable to resident *rufinus*. In addition, a presumed male was recorded singing daily at dawn from the same tree at our Parabara camp (MBR recording; MLNS 105897). A nest was found under construction and nearing completion at the Parabara camp on 14 April 2001 by Finch, J. Green, and R. Branson. A male collected on 9 April 1996 at Dubulay Ranch (see Ocellated Crake account; KUNHM 88221) is clearly the nominate subspecies. As many as 10 individuals were seen in a day at the latter locality; we presume that most were austral migrants.

**Crowned Slaty Flycatcher* (Griseotyrannus aurantioatrocristatus). A single bird was photographed by Finch and P. Rothstein on 22 April 1995, just south of the Sawariwau River at Mountain Point. This is the only record for Guyana, and although it is apparently a regular austral migrant to Venezuela (Hilty 2002), it is still unknown from Suriname (Haverschmidt & Mees 1994) and Sick (1993) lists no records for Roraima savannas.

White-throated Kingbird (Tyrannus albogularis). Although Ridgely & Tudor (1994) indicate that this species is a permanent resident

across almost all of Guyana, southeastern-Venezuela, and the Brazilian state of Roraima, there is no concrete evidence that this kingbird, whose southern populations are migratory and reach northern South America, breeds in these areas (Snyder 1966, Sick 1993, Silva 1998, Hilty 2002). However, in March and April 2000, we documented that the species does indeed breed in at least the southern Rupununi savanna. Males, with presumed mates, had enlarged testes, e.g., 10.5 x 5.5 mm, 17 x 7 mm (KUNHM 90783; USNM 625784, respectively), and a female taken on 20 April at Wiwitau had recently laid eggs, as she had an enlarged oviduct (10 mm in diameter) and three collapsed follicles. Finch, R. Branson, and J. Green observed one carrying nest material to a moriche palm c. 10 km south of Aishalton on 13 April 2001.

We did not detect this species at Dubulay Ranch (see Ocellated Crake account) in late March–early April 1996, so the species may be restricted as a breeder in Guyana to the Rupununi savanna. Based on our Rupununi data, this species presumably breeds in savannas of adjacent Roraima, Brazil, and Hilty (2002) is almost certainly correct in assuming that it breeds in the vicinity of Santa Elena de Uairén, in extreme southeastern Venezuela at the Roraima, Brazil border.

White-naped Xenopsaris (Xenopsaris albinucha). We found this species during October–November 2000 in mesic, low-lying areas in the savanna. Apparently breeding had occurred in the past couple of months, as we collected recently fledged young and the adults were in very worn plumage. There are three prior Guyana records, all from the Rupununi: Finch *et al.* studied an individual at Mountain Point on 23 April 1995; one was collected in seasonally flooded savanna near Annai in July 1997 (ANSP 187776); and another was observed just north of Surama, north Rupununi on 2 March 1998 (Anonymous 1999). The species is known from contiguous Brazilian savanna (Sick 1993).

Amazonian Umbrellabird (Cephalopterus ornatus). A single bird was observed by Finch, L. Ignacio, J. Green, and R. Branson on 14 April 2001 in scrubby transitional forest bordering the big patch of bush at the north end of the Parabara savanna. The only other record for Guyana is of a specimen that was collected in the Kanuku Mountains (Cabanis 1848), but Parker *et al.* (1993) did not encounter it in the Kanukus. Moskovits *et al.* (1985) recorded the species in adjacent Roraima, Brazil.

White-fronted Manakin (Lepidothrix serena). This species was found to be uncommon in the narrow belt of humid forest at our Parabara camp. This appreciably extends the known range of the species to the west of the distribution outlined by Prum (1994). With this discovery, the White-fronted Manakin and its sister species, the Orange-bellied (Tepui) Manakin (*L. suavissima*), which is known from the Pakaraima Mountains of western Guyana, are now documented to occur within c. 150 km of each other.

Pale-bellied Tyrant-Manakin (Neopelma pallescens). A totally unexpected addition to the Guyana avifauna occurred when Mees (2000) netted a male, in nonbreeding condition, on 31 January 1992 in tall riparian scrub at Dadanawa. Finch has found the bird at the above locality on several occasions as well as in the north Rupununi at Karanambu. We netted two additional individuals (KUNHM 90896; USNM 626218) at Wiwitau in March 2000 that were in nonbreeding condition; no birds were heard vocalizing nor responded to tape playback during that period. These records represent a range extension from the north bank of the Rio Amazonas near the Rio Tapajós area (Sick 1993).

Saffron Finch (Sicalis flaveola). Finch *et al.* observed a single individual at the Dadanawa headquarters in November 1999 and J. Green and R. Branson found another at Mountain Point in April 2001. Snyder (1966) mentioned that Schomburgk and Quelch found the bird along the coast in the 1800s, and prior to the Finch record, P. Peberdy was the last to record the species for Guyana when in 1938 he reported it from the Marudi Mountains, just to the southeast of the Rupununi. It is unknown from adjacent Brazil (Sick 1993) and the Gran Sabana (Hilty 2002).

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APPENDIX 1. Relative abundance and breeding status of Rupununi birds of five sites. Relative abundance: C = common, more than 20 individuals/day; F = fairly common, 5–20 individuals/day; U = uncommon, present in small numbers (< 5 individuals/day) but not encountered daily, even in prime habitat; S = scarce, only occasionally encountered in small numbers; X = Single record. Asterisk indicates breeding during March/April; # indicates breeding during October/November period.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Tinamidae						
Tinamus major		F		X		
Crypturellus cinereus	S	U				
Crypturellus soui	S	U				
Crypturellus undulatus					S	
Crypturellus erythropus		F				
C. erythropus/undulatus				U		
Crypturellus variegatus		U				
Phalacrocoracidae						
Phalacrocorax brasilianus					F	
Anhingidae						
Anhinga anhinga	X				U	
Ardeidae						
Botaurus pinnatus					S	
Ixobrychus exilis			S			
Ardea cocoi	X		X	S	F	
Ardea alba	S		S		F	
Egretta thula					U	

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Egretta caerulea					S	
Bubulcus ibis	X				C	
Butorides striatus	X		X	F	U	
Pilherodius pileatus	X				X	
Nycticorax nycticorax					U	
Threskiornithidae						
Cercibis oxycerca					U	
Theristicus caudatus	S		U		F	*
Mesembrinibis cayennensis					F	
Ciconiidae						
Jabiru mycteria			U	X	F	#
Mycteria americana			U			
Cathartidae						
Coragyps atratus	F	U	C	U	C	
Cathartes aura	F	F	F	F	F	
Cathartes burrovianus	U		F	U	F	
Cathartes melambrotus		U				
Sarcoramphus papa	S	U	F	S	U	
Anatidae						
Dendrocygna viduata					U	
Cairina moschata	S		U		F	*
Amazonetta brasiliensis					U	
Oxyura dominica	X	X				
Accipitridae						
Pandion haliaetus	X				U	
Leptodon cayanensis	X					*
Elanoides forficatus	X	F				
Gampsonyx swainsonii			S	U	X	#
Elanus leucurus			S		U	
Ictinia plumbea	U	U			X	
Busarellus nigricollis	S			S	U	
Accipiter bicolor			S	U	U	
Geranospiza caerulescens	X		S			
Leucopternis albicollis		X		S		
Buteogallus urubitinga	X		S	S	U	
Buteogallus meridionalis	U	U	U	F	F	
Buteo nitidus	X		S	S		*
Buteo magnirostris	U	F	U	F	F	*
Buteo platypterus				X		
Buteo brachyurus			S			
Buteo albicaudatus	S	U	F	U	U	*
Buteo albonotatus			U	X		
Spizastur melanoleucus		X		X		
Spizaetus tyrannus	X	S				
Falconidae						
Micrastur ruficollis		U		S		

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Micrastur gilvicollis		S		S		
Micrastur semitorquatus					U	
Daptrius ater		S				
Ibycter americanus	X	F				
Caracara cheriway	F	F	F	U	F	
Milvago chimachima	F	U	S	S	F	
Herpetotheres cachinnans	U	U	U	F	X	#
Falco sparverius	U		S	U	F	*
Falco columbarius	S			S		
Falco femoralis	S	S	S	S	U	*
Falco rufigularis	S	S	S	S	U	
Falco deiroleucus					X	
Falco peregrinus	X				S	
Cracidae						
Ortalis motmot	S	C	C	F	C	*
Pipile cumanensis		U				*
Crax alector				S		
Odontophoridae						
Colinus cristatus	C	S	C	F	F	*,#
Odontophorus gujanensis		U				
Rallidae						
Micropygia schomburgkii	U	U				*
Anurolimnas viridis		S				
Aramides cajanea	S	S				
Porzana albicollis	U	U		S		*
Porphyrio martinica			X			
Porphyrio flavirostris			S			
Eurypygidae						
Eurypyga helias		S		S	S	
Aramidae						
Aramus guarauna			X		S	
Psophidae						
Psophia crepitans		X				
Burhinidae						
Burhinus bistriatus	U	U	U	S	F	*
Charadriidae						
Hoploxypterus cayanus					F	
Vanellus chilensis	U	S	F		C	*
Pluvialis dominica					U	
Charadrius collaris					U	
Jacanidae						
Jacana jacana	F		F	C	F	
Scolopacidae						
Tringa melanoleuca					U	
Tringa flavipes					U	
Tringa solitaria	S				U	

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Actitis macularia	S				U	
Bartramia longicauda		X				
Calidris minutilla					U	
Calidris fuscicollis					U	
Calidris melanotos					U	
Calidris himantopus					X	
Gallinago paraguaiae	S	F	U		U	*
Gallinago undulata	U		X			*
Columbidae						
Columba speciosa		U				*
Columba cayennensis	C	C	C	U	C	*
Columba plumbea		F				
Columba subvinacea		U				
Zenaida auriculata	U	F		C	C	#
Columbina passerina	F	C	C	C	C	#
Columbina minuta				C	U	#
Columbina talpacoti				U		#
Claravis pretiosa		X		S		#
Leptotila verreauxi	U	U	F	C	F	*,#
Leptotila rufaxilla		U				
Geotrygon montana		F				*
Psittacidae						
Aratinga pertinax	C	C	F	F	C	*,#
Ara chloroptera		F	X			
Ara macao		U				
Ara ararauna		X		S		
Orthopsittaca manilata	U	C	F	S	C	*,#
Diopsittaca nobilis	C	C	C	S	C	*,#
Brotogeris chrysopterus		F				
Touit sp.		C				
Pionites melanocephala		F				
Pionopsitta caica		U				
Pionus menstruus		F			S	
Pionus fuscus		U				
Amazona ochrocephala	U	C	F	S	F	
Amazona amazonica	U	C	U		U	
Deroptyus accipitrinus		U				
Cuculidae						
Piaya cayana	U	U	U	U	F	
Tapera naevia	U	S	U	U	U	
Crotophaga ani	F	F	F	F	C	#
Strigidae						
Otus choliba	U	F	U	U	U	*
Otus watsonii		F				*
Lophostrix cristata		U				
Pulsatrix perspicillata		U		S		

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Bubo virginianus	U		U	U	U	
Glaucidium hardyi		U				
Glaucidium brasilianum	F	U	U	F	F	*
Athene cunicularia			U		F	
Strix sp.		X				
Asio stygius				X		
Caprimulgidae						
Chordeiles pusillus	C	C	C		C	*,#
Chordeiles acutipennis					C	
Podager nacunda	U				F	*
Nyctidromus albicollis	U	U	S	U	F	*
Caprimulgus cayennensis	U	U	U	F	F	*
Nyctibiidae						
Nyctibius grandis		S				
Nyctibius griseus		U	S	U	U	*
Apodidae						
Streptoprogne zonaris			U			*
Chaetura brachyura	F	F	F	C	U	*
Chaetura spinicauda		X				
Chaetura cinereiventris		S			X	
Panyptila cayennensis		X				
Tachornis squamata	F	C	F	C	F	
Trochilidae						
Phaethornis superciliosus	U	U				
Phaethornis bourcieri		S				
Phaethornis augusti			U	F		
Phaethornis ruber		U				
Florisuga mellivora	U	U				
Anthracothorax nigricollis	F	X		F	U	
Chrysolampis mosquitus	U	S			U	
Lophornis ornatus		S				
Chlorestes notatus	U					
Chlorostilbon mellisugus			F	U	F	
Thalurania furcata		U		S		
Hylocharis sapphirina	X	U				
Hylocharis cyanus	S	U				
Polytmus guainumbi	X	X		U	U	
Polytmus theresiae		X				
Amazilia versicolor	U	U	X	F		
Amazilia fimbriata	F	F	F	C	F	*
Amazilia cupreicauda	U		X			
Heliothryx aurita	X	U				
Heliomaster longirostris				U		
Calliphlox amethystina	U					
Trogonidae						
Trogon viridis		F		F		

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Trogon violaceus		U				
Trogon rufus		X				
Trogon melanurus		F				
Momotidae						
Momotus momota		F				*
Alcedinidae						
Ceryle torquata	U		X	U	F	
Chloroceryle amazona	X		X	S	F	
Chloroceryle americana	U		X	S	U	
Chloroceryle inda	X			S		
Bucconidae						
Capito niger		U				*
Notharchus macrorhynchos		X				
Notharchus tectus		X				
Bucco tamatia	U	U				*
Bucco capensis		X				
Malacoptila fusca		U				*
Monasa atra		U		U		
Chelidoptera tenebrosa	U	C				
Galbulidae						
Brachygalba lugubris		U				
Galbula albirostris		X				
Galbula galbula	U			S	F	*
Galbula leucogastra	X	F				
Galbula dea		U				
Jacamerops aureus		U				
Ramphastidae						
Pteroglossus viridis		S				*
Pteroglossus aracari		F				*
Ramphastos vitellinus		F				*
Ramphastos tucanus		F		S		
Picidae						
Picumnus cirratus	U	S	U	F	F	
Dryocopus lineatus	U	U	U	U	U	
Melanerpes cruentatus		U				
Veniliornis passerinus	X				U	
Veniliornis cassini		U				*
Piculus flavigula		U				
Piculus chrysochloros		U				*
Celeus elegans		U		S		*
Celeus undatus		S				
Celeus flavus		X				
Celeus torquatus		U				*
Campephilus rubricollis		U				
Campephilus melanoleucos			X	S	U	

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Furnariidae						
Furnarius leucopus	S				F	*
Synallaxis albescens	U	U	F	C	U	*
Certhiaxis cinnamomea	X		X		U	
Philydor pyrrhodes		U				
Philydor erythrocercus		U				
Automolus ochrolaemus		U				*
Automolus infuscatus	U	U				*
Automolus rubiginosus		X				
Automolus rufipileatus		X				
Xenops minutus	U	U				
Sclerurus rufigularis		X				
Dendrocolaptidae						
Dendrocincla fuliginosa		U				*
Glyphorynchus spirurus		U				*
Dendrocolaptes certhia		F				
Dendrocolaptes picumnus		S				*
Xiphorhynchus picus	F	U		U	F	*
Xiphorhynchus pardalotus		U				*
Xiphorhynchus guttatus	F	F	U	F	F	*,#
Lepidocolaptes albolineatus		U				*
Campylorhamphus procurvoides		X				
Thamnophilidae						
Cymbilaimus lineatus		U				
Frederickena viridis		X				
Taraba major	U	U			U	*
Sakesphorus canadensis	C	U	F	C	F	*,#
Thamnophilus doliatus	F	U	U	C	F	*
Thamnophilus murinus		F		X		*
Thamnophilus punctatus		U	U	S		*
Thamnophilus amazonicus		U				
Thamnomanes ardesiacus	U	F				*
Thamnomanes caesius	U	F				
Myrmotherula brachyura		U				
Myrmotherula guttata		X				
Myrmotherula gutturalis		F				
Myrmotherula axillaris		F				
Myrmotherula longipennis		F				
Myrmotherula menetriesii		U				
Herpsilochmus sticturus		F				
Herpsilochmus stictocephalus		F				
Herpsilochmus rufomarginatus	U			F		
Formicivora grisea	F	F	F	C	F	*
Terenura spodioptila		U				
Cercomacra cinerascens		F		X		
Cercomacra tyrannina	U	F			U	

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Cercomacra laeta		X				
Myrmoborus leucophrys	F	F				
Hypocnemis cantator	U	F				*
Percnostola rufifrons		F				*
Myrmeciza ferruginea		U				
Hylophylax naevia		U				
Hylophylax poecilinota		U				*
Myrmornis torquata		U				
Pithys albifrons		F				
Gymnopithys rufigula		U				*
Formicariidae						
Formicarius colma		U				*
Formicarius analis		F				
Hylopezus macularius		U				*
Myrmothera campanisona		F				*
Tyrannidae						
Ornithion inerme	U	S				
Camptostoma obsoletum	U		U	F	F	*
Phaeomyias murina	F	U	C	C	F	*
Capsiempis flaveola				X		#
Tyrannulus elatus	X	U				
Myiopagis viridicata	U	U	C	X	U	*
Myiopagis gaimardii	F	U	U	U	U	
Elaenia flavogaster	F	F	F	F	F	*
Elaenia cristata	F	F	F	U	F	*,#
Elaenia ruficeps		U				
Elaenia chiriquensis	F	F	F	C	F	*
Inezia caudata					F	
Mionectes oleagineus		F				
Polystictus pectoralis	U					
Sublegatus sp.			U	F	F	*,#
Zimmerius gracilipes		F				
Myiornis ecaudatus		F				
Lophotriccus vitiosus		S				
Lophotriccus galeatus		F				
Lophotriccus pilaris			F	F	U	*
Hemitriccus josephinae		U				
Poecilotriccus sylvia	U			F	U	*,#
Todirostrum cinereum	F	F	X	F	F	
Todirostrum pictum		F				
Corythopis torquata		U				
Ramphotrigon ruficauda		U				
Rhynchocyclus olivaceus		X				
Tolmomyias sulphurescens	U		U	F		
Tolmomyias assimilis		U				*

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Tolmomyias poliocephalus		F				*
Tolmomyias flaviventris	F	F	F	F	F	*,#
Platyrinchus saturatus		U				
Onychorhynchus coronatus		U				
Myiobius barbatus	X	U				
Myiophobus fasciatus	U	X	U	U		*
Hirundinea ferruginea			X			
Lathrotriccus euleri		U				
Contopus cinereus		U				*
Pyrocephalus rubinus	C	U	F	F	F	*,#
Arundinicola leucocephala	U		F	F	F	*
Colonia colonus		U				
Attila cinnamomeus		X				
Attila spadiceus		U		U		
Rhytipterna simplex		U				
Rhytipterna immunda		S				
Sirystes sibilator		S				
Myiarchus tuberculifer		S				
Myiarchus swainsoni	U	U	U	U	U	*,#
Myiarchus ferox					F	
Myiarchus tyrannulus	U	X	F	F	F	*,#
Philohydor lictor	X			U	U	
Pitangus sulphuratus	C	F	F	F	F	*
Megarynchus pitangua	U	F	F	C	U	#
Myiozetetes cayanensis	F	F	U	C	F	#
Conopias parva	X	U				*
Myiodynastes maculatus	U	U	U	U	U	*
Legatus leucophaius	U	F	X			*
Empidonomus varius	U	F	U	U	U	*
Tyrannopsis sulphurea	U	U		X		*
Tyrannus albogularis	F	U	U	F	U	*,#
Tyrannus melancholicus	U	C	F	C	F	*
Tyrannus savana	C	F	F	F	C	*
Schiffornis turdinus		X				
Piprites chloris		U				
Lipaugus vociferans		C				
Laniocera hypopyrra		X		X		
Xenopsaris albinucha				U		#
Pachyramphus polychopterus	U	U	U	U	U	*
Pachyramphus marginatus		U				
Pachyramphus rufus	U			X		*
Pachyramphus minor		U				*
Tityra cayana		U		S		#
Tityra inquisitor		X				
Cotingidae						
Cotinga cotinga		X				

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Cotinga cayana		X				
Xipholena punicea		X				
Gymnoderus foetidus		X				
Haematoderus militaris		U				*
Querula purpurata		U				
Cephalopterus ornatus		X				
Perissocephalus tricolor				F		#
Procnias alba				X		
Pipridae						
Xenopipo atronitens		F				
Manacus manacus	X	X				*
Chiroxiphia pareola			S	F	U	*
Pipra pipra		U				
Pipra erythrocephala	X	U				
Lepidothrix serena		U				*
Tyranneutes virescens		U				
Neopelma pallescens			S		U	
Vireonidae						
Vireo olivaceus	F	F	C	F	F	*,#
Hylophilus thoracicus		U				
Hylophilus pectoralis	F	U	F	U	F	
Hylophilus muscicapinus		F				
Vireolanius leucotis		U				
Cyclarhis gujanensis	U	U		U	F	*,#
Corvidae						
Cyanocorax cayanus		U		U		
Hirundinidae						
Progne chalybea		U	X	U	F	*
Progne tapera	U	U	U	F	F	*
Tachycineta albiventer	U	U		F	U	*
Stelgidopteryx ruficollis		U			U	
Riparia riparia		S				
Hirundo rustica	F	C	U		U	
Troglodytidae						
Campylorhynchus griseus	C	X	U	F	F	*,#
Thryothorus coraya		U				
Thryothorus leucotis	F		F	C	F	*
Troglodytes musculus	U	U	F	C	F	*
Henicorhina leucosticta		U				
Microcerculus bambla		U				
Cyphorhinus arada		U				
Sylviidae						
Microbates collaris		X				
Ramphocaenus melanurus	U	F				
Polioptila plumbea	F	U	F	F	F	*,#

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Turdidae						
Catharus fuscescens		U	X			
Catharus minimus				X		
Turdus leucomelas	C	C	C	F	F	*
Turdus nudigenis	U		U	F	U	*,#
Turdus albicollis		U		U		*
Mimidae						
Mimus gilvus	F	U	F	C	F	#
Motacillidae						
Anthus lutescens	F	F	U	F	F	*
Parulidae						
Parula pitiayumi			U	F	X	
Dendroica petechia					F	
Geothlypis aequinoctialis				U		#
Basileuterus culicivorus			S	U		*
Phaeothlypis flaveola			C	U	F	*
Phaeothlypis rivularis		U			S	
Granatellus pelzelni		S				
Coerebidae						
Coereba flaveola	F	F	C	C	F	*,#
Thraupidae						
Conirostrum speciosum	X				F	#
Schistochlamys melanopis	X	U				*
Lamprospiza melanoleuca		U				
Hemithraupis guira		U				
Nemosia pileata	U		U	U	U	*,#
Lanio fulvus		U				
Tachyphonus cristatus		U				
Tachyphonus surinamus		U				*
Tachyphonus rufus	S					
Tachyphonus phoenicius		F				
Piranga flava	F		U	U	S	*,#
Piranga rubra				S		
Ramphocelus carbo	F	U			F	*
Thraupis episcopus	C	C	F	F	F	*
Thraupis palmarum	C	C	F	C	C	*
Cyanicterus cyanicterus		U				
Euphonia chlorotica		U				
Euphonia finschi	F	F	C	F	F	*
Euphonia violacea	X	X				
Euphonia chrysopasta		U				
Tangara chilensis		S				
Tangara punctata		S				
Tangara cayana	C	C	C	F	F	*,#
Tangara velia		S				
Dacnis lineata				X		

APPENDIX 1. Continuation.

	Karaudanawa	Parabara	Wiwitau	Kusad	Dadanawa	Breeding status
Dacnis cayana	X	U				
Chlorophanes spiza		C				
Cyanerpes nitidus		U				
Cyanerpes caeruleus		C				
Cyanerpes cyaneus		C		X		
Emberizidae						
Volatinia jacarina	F		F	C	U	
Sporophila intermedia	U		U	C	U	*
Sporophila plumbea	F	C	F	F	U	
Sporophila nigricollis	X		U	F		*
Sporophila minuta	F	U	F	S	F	*
Oryzoborus crassirostris			X	U		#
Oryzoborus angolensis	U	F	U	F		*,#
Dolospingus fringilloides		X				
Sicalis flaveola					S	
Sicalis luteola			F	U	F	*
Emberizoides herbicola	F	F	F	U	X	*
Paroaria gularis					U	
Arremon taciturnus		U				*
Ammodramus humeralis	F	C	F	C	F	*
Cardinalidae						
Pitylus grossus		U				
Saltator coerulescens	U	U	U	U	F	*
Caryothraustes canadensis		U				
Cyanocompsa cyanoides		U				
Icteridae						
Sturnella militaris	S	X	U	F	F	*,#
Sturnella magna	C	C	C	F	F	*
Molothrus bonariensis	U	S			F	
Molothrus oryzivorus		U				
Icterus chrysocephalus				U		
Icterus cayanensis	U	U		U		#
Icterus nigrogularis	F	U	F	U	F	*
Cacicus cela		C			F	*
Cacicus haemorrhous		U				
Psarocolius decumanus		F				*
Psarocolius viridis		U				
Fringillidae						
Carduelis cucullata						*,#
Total species	188	335	149	178	185	
Uniques/site	6	165	7	13	26	