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# Birds of Humaitá Forest Reserve, Acre, Brazil: an important forest fragment in south-west Amazonia

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**SUMMARY.**—Humaitá Forest Reserve (HFR) is a forest fragment in the state of Acre, Brazil. Between 2009 and 2019, this fragment has been inventoried by multiple ornithologists and birdwatchers. To provide a comprehensive list of the avifauna of HFR, we compiled all of the available data, including published reports and recent, unpublished surveys. The list includes 356 bird species belonging to 60 families and 23 orders. This species richness is the greatest recorded in those forest fragments that have been inventoried in eastern Acre. We found that HFR is an important site for the conservation of many threatened species, and migrants, as well as poorly known species with a restricted geographic distribution, such as Semi-collared Puffbird *Malacoptila semicincta*, Goeldi's Antbird *Akletos goeldii*, Rufous Twistwing *Cnipodectes superrufus* and Acre Tody-Tyrant *Hemitriccus cohnhafti*.

South-west Amazonia is one of the world's biologically richest regions in terms of birds, with more than 500 species at some localities (e.g. Terborgh *et al.* 1984, Parker *et al.* 1994, Brown & Freitas 2002, Whittaker *et al.* 2002). The avifauna of the Brazilian state of Acre, which borders Peru, Bolivia and the Brazilian states of Rondônia and Amazonas, is well known, with more than 700 species documented (Guilherme 2016). In addition to species richness, the region is also characterised by high endemism, with many species unique to the Inambari centre of endemism between the Solimões and Madeira Rivers (Haffer 1978, Cracraft 1985, Silva *et al.* 2019). In Acre, at least 23 species are confined to the Inambari centre, and 12 of these occur in Brazil only in Acre and adjacent parts of Amazonas (Guilherme 2012, 2016). Furthermore, some species are restricted to eastern Acre, including many bamboo specialists (Guilherme & Santos 2009, Guilherme 2012, 2016).

Eastern Acre is also the region most affected by anthropogenic impacts in south-west Amazonia, at the western extreme of the 'Arc of Deforestation' in southern Amazonia, where cattle-ranching and cash-cropping are expanding relentlessly (Fearnside 2017). Acre's capital, Rio Branco, is also in this region, which is characterised by a mosaic of many urban and rural forest fragments within an anthropogenic matrix dominated by cattle pasture (Guilherme 2016).

Fragmentation of forest not only impacts avian communities, in particular by eliminating certain ecological guilds (Stouffer & Bierregaard 1995, Bierregaard & Stouffer 1997, Stratford & Stouffer 1999), but may also affect the physiological integrity of individual birds (Hernández-Palma & Stouffer 2018). Long-term studies of bird communities in forest fragments may provide potentially valuable insights into the impacts of fragmentation on community structure vis-à-vis pristine habitats (Rutt *et al.* 2017).

Although the number of bird surveys has progressively increased in Amazonia, systematic long-term surveys of a given area are still rare (Rutt *et al.* 2017). We compiled a list of the avifauna of Humaitá Forest Reserve (HFR), a forest fragment owned by the Instituto Nacional de Colonização e Reforma Agrária (INCRA), but which has been ceded

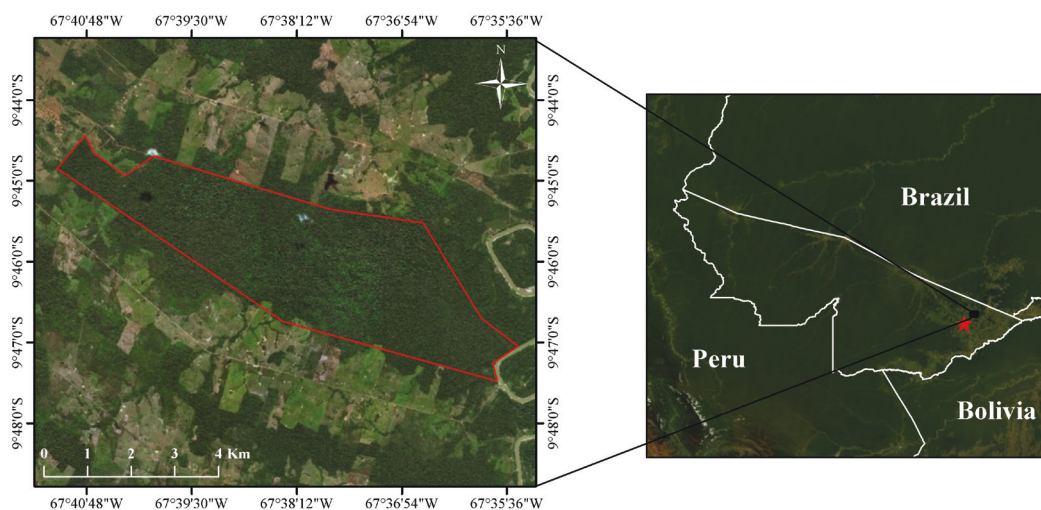
to the Universidade Federal do Acre (UFAC) for research purposes. Other inventories available for HFR include medium-sized and large mammals (Botelho *et al.* 2012) and palms (Pinheiro *et al.* 2015). In 2009, the ornithological database of the HFR was consolidated during doctoral research by EG (Guilherme 2009). Since then, further work has been conducted in HFR, including by TLS and colleagues (Silva *et al.* 2015), TNM & EG (Melo & Guilherme 2016), DP & EG (Pedroza & Guilherme 2019) and JL and colleagues (Lima *et al.* 2019). While ongoing research in HFR over the past ten years has produced an increasingly solid database on its avifauna, no comprehensive list of birds was available for the reserve, until the present study.

## Methods

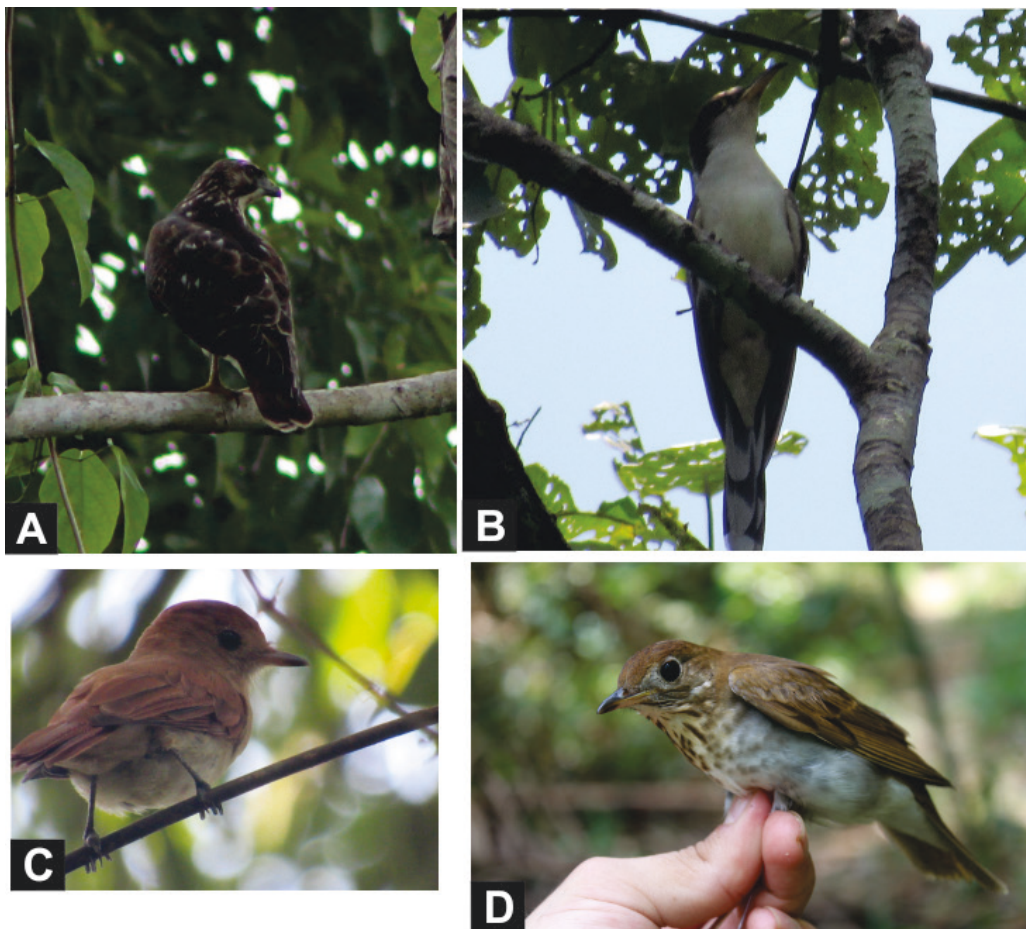
**Study area.**—Humaitá Forest Reserve (HFR) is in the municipality of Porto Acre (09°45'52"S, 67°38'02"W), Acre, Brazil (Fig. 1), and covers *c.*2,000 ha (Botelho *et al.* 2012). The fragment is surrounded by the Humaitá Settlement Project and farms, with the Acre River forming its eastern limit. Climate is tropical humid, with mean annual temperatures of 24–26°C (Alvares *et al.* 2013) and mean annual rainfall of 1,900 mm (Alvares *et al.* 2013). Vegetation is a mosaic of open forest with bamboo, and open forest with palms on *terra firme* and seasonally flooded (*várzea*) soils (Barroso *et al.* 2011).

**Data collection.**—The preliminary bird species list for HFR was based on three published inventories (Guilherme 2009, 2016, Silva *et al.* 2015). We added unpublished records by other observers, together with those on digital platforms such as Wikiaves and Xeno-canto. Registration numbers of records on Wikiaves (WA) and Xeno-canto are indicated in the species accounts and Appendix. Species were identified via captures in mist-nets, visual observations or their vocalisations. Specimens collected in HFR and deposited in the ornithology laboratory at UFAC, Rio Branco, and the Museu Paraense Emílio Goeldi (MPEG), Belém, were also examined. Voucher specimens and media identification numbers published online were considered as physical evidence of the species' occurrence in HFR.

**Species classification.**—The list was reviewed to identify migratory, endemic species, habitat specialists, cynegetic and threatened species. Migratory species were classified



**Figure 1.** Location of the Humaitá Forest Reserve (HFR) in the state of Acre, Brazil, near the city of Rio Branco (red star). The area that corresponds to the HFR, administered by the Federal University of Acre, is outlined by the red polygon.



**Figure 2.** Examples of migratory species recorded in the Humaitá Forest Reserve, Acre, Brazil. (A) Broad-winged Hawk *Buteo platypterus* (Diego Pedroza); (B) Yellow-billed Cuckoo *Coccyzus americanus* (David P. Guimarães); (C) Rufous Casiornis *Casiornis rufus* (David P. Guimarães). (D) Swainson's Thrush *Catharus swainsoni* (Diego Pedroza).



**Figure 3.** Three endemic species from the Inambari center associated with patches of *Guadua* bamboo recorded in the Humaitá Forest Reserve, Acre, Brazil. (A) Rufous-headed Woodpecker *Celeus spectabilis* (David P. Guimarães). (B) Rufous Twistwing *Cnipodectes superrufus* (Tomaz N. de Melo). (C) Acre Tody-Tyrant *Hemitriccus cohnhafti* (Ricardo Plácido).



using Somenzari *et al.* (2018), while bamboo forest specialists and species associated with patches of *Guadua* bamboo were identified based on Kratter (1997), Guilherme & Santos (2009), Lebbin (2013) and Guilherme (2012, 2016). Species endemic to the Inambari centre of endemism (*sensu* Silva *et al.* 2005, 2019) were identified using Haffer (1978), Cracraft (1985) and Guilherme (2012, 2016). Game (cynegetic) species targeted by subsistence hunters were classified following Ojasti (1993), Sick (1993) and Sigrist (2014). Conservation status follows IUCN (2019).

Feeding guild and foraging stratum of each species was also determined, based on Wilman *et al.* (2014). Scientific nomenclature follows that of the Comitê Brasileiro de Registros Ornitológicos (Piacentini *et al.* 2015). In some cases, voucher specimens were collected under ICMBio / SISBio authorisation no. 23269-1, and deposited either at UFAC, Rio Branco, or MPEG, Belém. Some birds were banded using numbered metal rings supplied by CEMAVE (Centro Nacional de Pesquisa e Conservação de Aves Silvestres), under the scope of project 1099, coordinated by EG (senior bird bander, reg. no. 324654).

## Results

Compilation of records made in HFR between 2009 and October 2019 revealed the presence of 356 bird species in 60 families and 23 orders (Appendix). Families represented by the largest numbers of species were Thamnophilidae ( $n = 37$  species, 10.3% of the total), Thraupidae ( $n = 28$  species, 7.9%), Tyrannidae ( $n = 26$  species, 7.3%), Rhynchocyclidae ( $n = 17$  species, 4.8%) and Psittacidae ( $n = 14$  species, 3.9%). Overall, 195 species (54.8%) are passerines and 161 (45.2%) non-passerines.

The most species-diverse foraging guilds (Appendix) were the insectivores (196 species), frugivores (56 species) and omnivores (42 species). Most birds forage in the midstorey (84 species), canopy (50 species) or alternate between the understorey and midstorey (40 species).

Thirteen bird species visit HFR on migration (Fig. 2). Slightly more than half of these (53.8%,  $n = 7$ ) are austral migrants, with the remainder 23.1% ( $n = 3$ ) being intra-tropical migrants and 23.1% ( $n = 3$ ) Nearctic migrants. Eleven species (3.1%) are endemic to the Inambari centre of endemism. Eighteen species (5.04%) are either bamboo forest specialists or possess some degree of association with tracts of *Guadua* bamboo in south-west Amazonia (Fig. 3). Twenty-nine species (8.1%) are considered to be cynegetic (Appendix), including Tinamidae ( $n = 9$  species, 2.5% of the total), Anatidae ( $n = 1$  species, 0.3%) and Cracidae ( $n = 3$  species, 0.8%). Sixteen (4.5%) species are included in higher categories of threat by the IUCN (2019), including nine Near Threatened (2.5%) and seven Vulnerable (2%) (Appendix). Below, we comment on aspects of the biology and distribution of selected species.

## Species accounts

### BROAD-WINGED HAWK *Buteo platypterus*

Nearctic migrant. Observed by DP at the edge of HFR on 9 November 2017 (WA2792378; Fig. 2A). Only the second record in Acre (Guilherme 2016). Stotz *et al.* (1992) reported the species' occurrence in neighbouring Rondônia between October and March. This indicates that the record at HFR was within its overwintering period in south-west Amazonia.

### ASH-COLOURED CUCKOO *Micrococcyx cinereus*

Austral migrant. Guilherme (2009) first reported the species in HFR. A female, collected on 20 July 2007, is deposited in Belém (MPEG 63485). The date of this record corresponds to the coldest part of the austral winter in southern Brazil, where the species breeds (Payne 2019a).

**YELLOW-BILLED CUCKOO** *Coccyzus americanus*

Nearctic migrant. One observed by DPG foraging for insects in the canopy on 30 October 2017 (WA3515980; Fig. 2B). Breeds in North and Middle America, and migrates to South America in the boreal winter (Payne 2019b). The date of this record indicates that *C. americanus* arrives in the region shortly before the start of the boreal winter. Only the third record in Acre (GBIF 2019, Wikiaves 2019).

**RUFOUS-HEADED WOODPECKER** *Celeus spectabilis*

Bamboo forest specialist. Common in HFR, where invariably observed in bamboo. The territorial song and drumming is audible over long distances, and evidence of its feeding behaviour is often observed on bamboo stalks. A pair with two juveniles observed by TNM on 12 August 2014, in bamboo near the reserve headquarters (Fig. 3A).

**BLUISH-SLATE ANTSHRIKE** *Thamnomanes schistogynus*

Endemic. Guilherme (2009) presented the first records in HFR. Specimens have been deposited in Belém (MPEG 59967, 59968). Subsequently, in 2018, DPG monitored the species. He found that *T. schistogynus* is a mixed-species flock leader in HFR, and occurs in bamboo forest and *terra firme* forest with palms.

**YELLOW-BREASTED WARBLING ANTbird** *Hypocnemis subflava*

Endemic; bamboo forest specialist. Silva *et al.* (2015) made the first record in HFR, and DP monitored the species in 2017. In HFR, the species occurs exclusively in bamboo forest, foraging for prey in bamboo culms and leaves. Population density was estimated in 16-ha grids, with some individuals being banded, at 0.55–0.66 pairs per ha in bamboo patches (Pedroza & Guilherme 2019). In DPG's 2018 study of mixed-species flocks, *H. subflava* was a constant presence in flocks led by *Thamnomanes schistogynus* and the flock's home range coincided with bamboo patches.

**RUFOUS TWISTWING** *Cnipodectes superrufus*

Endemic; bamboo forest specialist; Vulnerable. In August–September 2014, TNM observed one in bamboo patches near the reserve headquarters; see Melo *et al.* (2015) (Fig. 3B). On 5 June 2018, DPG trapped and ringed (CEMAVE F55386) one in a bamboo patch, and on 1 August 2018, JML trapped and ringed a second individual (CEMAVE F63509) in a part of the forest apparently without any major concentration of *Guadua* bamboo, whereas the species typically occurs in patches of dense bamboo (Tobias *et al.* 2008). HFR is the northernmost locality at which *C. superrufus* has been recorded (Melo *et al.* 2015, Guilherme 2016).

**ACRE TODY-TYRANT** *Hemitriccus cohnhafti*

Endemic; bamboo forest specialist; Near Threatened. Recently described species for which few natural history data are available (Zimmer *et al.* 2013, Melo *et al.* 2015). One was recorded in a bamboo patch at HFR on 19 November 2018, by R. Plácido (WA2376966) (Fig. 3C). The record extends the species' known range 95 km north of the nearest previously known locality, on the Transaccreana highway in Acre (Melo *et al.* 2015).

**LARGE-HEADED FLATBILL** *Ramphotrigon megacephalum*

Bamboo forest specialist. Silva *et al.* (2015) first recorded this species in HFR, and TNM subsequently studied its foraging behaviour, which is focused exclusively on bamboo leaves and branches (Melo & Guilherme 2016). Density of *R. megacephalum* along a 10-km transect in the study area was estimated 1.5 individuals/km<sup>2</sup>, with the species being exclusively

recorded in areas of bamboo. In the 2018 study of mixed-species flocks, DPG considered *R. megacephalum* to be a constant in flocks led by *Thamnomanes schistogynus*.

#### **DUSKY-TAILED FLATBILL** *Ramphotricon fuscicauda*

Species associated with bamboos. Guilherme (2009) was the first observer to record *R. fuscicauda* in HFR. Ecologically more flexible than *R. megacephalum*, it occurs in both bamboo-dominated habitats and areas without bamboo, although it is commonly found on bamboo, and is observed foraging close to *R. megacephalum* (Melo & Guilherme 2016). Density of *R. fuscicauda* along a 10-km transect in HFR was estimated at 0.8 individuals/km<sup>2</sup>. DPG considered this species to be another constant participant in mixed-species flocks led by *Thamnomanes schistogynus*.

## **Discussion**

Bird species richness recorded in HFR (356 species) corresponds to 50.4% of the 708 species currently documented in the state of Acre (Guilherme 2016). This is an impressive number of species, considering that the fragment covers just 2,000 ha. The number of bird species recorded in HFR has progressively increased since 2009, when just 120 species had been recorded in the area based solely on specimens in museums (Guilherme 2009). The increase is due to constant ornithological field work in this forest, together with sporadic visits by amateur birdwatchers in the last ten years. Surveys in HFR prior to 2019 indicate that the site has a similar bird species richness to that in areas of continuous forest inventoried in Acre during shorter term studies, including Rio Acre Ecological Station (Guilherme & Aleixo 2010) and Chico Mendes Extractive Reserve (Mestre *et al.* 2010). Bird species richness in HFR is also considerably greater than that recorded in isolated fragments inventoried over the long term, e.g., Catuaba Experimental Farm (Rasmussen *et al.* 2005) (c.36 km from HFR) and the UFAC Zoobotanical Park (Guilherme 2001, 2016) (c.31 km from HFR).

Both of these sites are in eastern Acre and administered by UFAC. Prior to 2001, 150 bird species had been recorded in the Zoobotanical Park (Guilherme 2001), an area of c.100 ha (Meneses-Filho 1995), although this total increased to 196 species over the next 15 years (Guilherme 2016). In the Catuaba Experimental Farm fragment of 1,200 ha (Medeiros *et al.* 2013), 257 bird species were recorded by Rasmussen *et al.* (2005), and this number rose to 275 over the next 11 years (Guilherme 2016). Despite the increasing inventory, total richness at both sites is still lower than at HFR. The Zoobotanical Park is a small fragment within an urban matrix and has virtually no connectivity to other forested areas (Guilherme 2001), whereas Catuaba Experimental Farm is much larger, located within a rural matrix, and surrounded by properties with private reserves of forest (as mandated under current Brazilian environmental legislation). In contrast to these sites, HFR is a much larger area of forest, relatively distant from populated areas, and lies within a matrix of pasture and numerous private forest reserves that together with HFR form a single fragment. Although these areas are not directly comparable due to differences in the size and configuration of the fragments, their history of isolation and characteristics of the matrix (Ferraz *et al.* 2007), the progressive increase in number of species recorded at each site over time indicates that additional species will be recorded in HFR by further surveys.

Approximately 5% of bird species in HFR are associated with bamboo forests of south-west Amazonia (Kratter 1997, Guilherme & Santos 2009, Guilherme 2012, 2016). These species include two of the rarest birds at HFR, Rufous Twistwing and Acre Tody-Tyrant (Tobias *et al.* 2008, Zimmer *et al.* 2013, Harvey *et al.* 2014, Melo *et al.* 2015). The presence of ecological guilds most sensitive to fragmentation, such as mixed-species flocks

of understory insectivores, terrestrial insectivores and army ant followers, reflects the conservation potential of HFR for birds. The presence of several gamebirds, especially Razor-billed Curassow *Pauxi tuberosa*, Spix's Guan *Penelope jacquacu* and large tinamids such as Grey Tinamus *Tao* and Great Tinamous *T. major*, indicates the viability of their local populations, despite hunting (DP & TNM pers. obs.). These findings are similar to those of Botelho *et al.* (2012) for medium and large mammals in HFR. Although they tend to become rarer, large cracids appear to be able to persist in areas with moderate hunting pressure (Barrio 2011, Kattan *et al.* 2016). The presence of Crested *Morphnus guianensis* and Harpy Eagles *Harpia harpyja*, which are also targeted by hunters (Trinca *et al.* 2007, Muñiz-López 2017) is a further indication of the favourable conditions. HFR is almost completely surrounded by cattle pastures, which environment lacks resources for the majority of migratory birds (Saab & Petit 1992), making HFR an important site for migratory species from different regions of the Americas during the year.

HFR is a potentially important area for bird conservation in eastern Acre, given that it has the highest bird species richness recorded anywhere in the state. In addition, it harbours important endemics and habitat specialists, and serves as a strategic stopover for migratory species. Birdwatching, which was initiated in 2013 at HFR by TNM, has attracted people from elsewhere in Brazil and other countries. This type of sustainable tourism has the potential to yield important economic benefits for the region. The proximity to the capital, Rio Branco, and the presence of rare birds such as Ash-throated Gnatcatcher *Conopophaga peruviana*, *Cnipodectes superrufus* and *Hemitriccus cohnhafti*, should attract growing numbers of birders, who in turn can continue to monitor bird populations and add new species to the site list. Some rare species, such as *Morphnus guianensis*, were already found at HFR by hobby birders. Supervision by competent authorities (e.g., Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA) of this important reserve and continued monitoring of its avifauna should guarantee its role as a safe haven for the biodiversity of a region under increasing anthropogenic pressure.

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### Appendix

Bird species recorded in the Humaitá Forest Reserve between 2009 and 2019, in Acre, Brazil. Guilds: FR = frugivore; INS = insectivore; INV = invertebrates; NEC = nectarivore; O = omnivore; PS = granivore; VS = vertebrate scavenger. Strata: AE = aerial; W = water; C = canopy; G = ground; G/C = ground/canopy; G/UND/MID = ground/understorey/mid-high; G/UND = ground/understorey; MID = mid-high; MID/C = mid-high/canopy; MID/C/AE = mid-high/canopy/aerial; UND = understorey; UND/AE = understorey/aerial; UND/MID = understorey/mid-high; UND/MID/C = understorey/mid-high/canopy. Conservation status: \* = Near Threatened, \*\* = Vulnerable. Ecological characteristics (see first column): B = Bamboo forest specialist or associated with bamboo, NM = Nearctic migrant; AM = austral migrant; IM = intra-tropical migrant; E = endemic; C = cynegetic (gamebird). Voucher: MPEG = Museu Paraense Emílio Goeldi, Belém; AC = ornithology laboratory at Universidade Federal do Acre; WA = Wikiaves; XC = Xeno-canto; CEMAVE = ringed.

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<b>TINAMIDAE</b>					
<i>Tinamus tao</i> **,C	Grey Tinamou	FR	G	Present study	
<i>Tinamus major</i> *,C	Great Tinamou	FR	G	Guilherme (2009)	MPEG 63461
<i>Tinamus guttatus</i> *,C	White-throated Tinamou	FR	G	Present study	
<i>Crypturellus cinereus</i> C	Cinereous Tinamou	FR	G	Present study	
<i>Crypturellus soui</i> C	Little Tinamou	O	G	Present study	
<i>Crypturellus obsoletus</i> C	Brown Tinamou	FR	G	Present study	
<i>Crypturellus undulatus</i> C	Undulated Tinamou	FR	G	Guilherme (2009)	MPEG 63460, WA3325303
<i>Crypturellus strigulosus</i> C	Brazilian Tinamou	FR	G	Present study	
<i>Crypturellus atrocapillus</i> *,C,E	Black-capped Tinamou	O	G	Present study	
<b>ANATIDAE</b>					
<i>Amazonetta brasiliensis</i> C	Brazilian Teal	O	G	Present study	
<b>CRACIDAE</b>					
<i>Penelope jacquacu</i> C	Spix's Guan	FR	MID	Present study	
<i>Ortalis guttata</i> C	Speckled Chachalaca	FR	MID/C	Guilherme (2009)	MPEG 63462, WA3334008
<i>Pauxi tuberosa</i> C	Razor-billed Curassow	FR	G	Present study	
<b>ODONTOPHORIDAE</b>					
<i>Odontophorus stellatus</i>	Starred Wood Quail	O	G	Present study	
<b>CICONIIDAE</b>					
<i>Mycteria americana</i> MI	Wood Stork	VS	G	Present study	
<b>ARDEIDAE</b>					
<i>Tigrisoma lineatum</i>	Rufescent Tiger Heron	INV	W	Guilherme (2009)	MPEG 63463
<i>Cochlearius cochlearius</i>	Boat-billed Heron	INV	G	Guilherme (2009)	MPEG 63464
<i>Bubulcus ibis</i>	Cattle Egret	INV	G	Present study	
<i>Ardea alba</i>	Great Egret	VS	W	Present study	

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<b>THRESKIORNITHIDAE</b>					
<i>Mesembrinibis cayennensis</i>	Green Ibis	INV	G	Guilherme (2009)	MPEG 63611
<b>CATHARTIDAE</b>					
<i>Cathartes aura</i>	Turkey Vulture	VS	G	Present study	
<i>Cathartes melambrotus</i>	Greater Yellow-headed Vulture	VS	G	Present study	WA1371809
<i>Coragyps atratus</i>	Black Vulture	VS	G	Present study	WA1371808
<i>Sarcoramphus papa</i>	King Vulture	VS	G	Present study	WA1371810
<b>ACCIPITRIDAE</b>					
<i>Leptodon cayanensis</i>	Grey-headed Kite	O	UND/MID	Present study	
<i>Elanoides forficatus</i> <sup>MN</sup>	Swallow-tailed Kite	INV	MID	Present study	
<i>Harpagus bidentatus</i>	Double-toothed Kite	INV	C	Present study	
<i>Ictinia plumbea</i>	Plumbeous Kite	INV	AE	Present study	
<i>Buteogallus schistaceus</i>	Slate-coloured Hawk	VS	G	Present study	
<i>Urubitinga urubitinga</i>	Great Black Hawk	VS	C	Present study	WA3324073
<i>Rupornis magnirostris</i>	Roadside Hawk	VS	G/UND/MID	Guilherme (2009)	MPEG 63471, WA3334003
<i>Pseudastur albicollis</i>	White Hawk	VS	C	Present study	
<i>Buteo nitidus</i>	Grey-lined Hawk	VS	UND/MID/C	Present study	
<i>Buteo albonotatus</i>	Zone-tailed Hawk	VS	G	Present study	
<i>Buteo platypterus</i> <sup>MN</sup>	Broad-winged Hawk	VS	G	Present study	WA2792378
<i>Morphnus guianensis</i> *	Crested Eagle	VS	MID/C/AE	Present study	WA959961
<i>Harpia harpyja</i> *	Harpy Eagle	VS	MID/C	Present study	WA3158637, WA5138635
<i>Spizaetus tyrannus</i>	Black Hawk-Eagle	VS	MID	Present study	
<i>Spizaetus ornatus</i> *	Ornate Hawk-Eagle	VS	MID	Present study	
<b>EURYPYGIDAE</b>					
<i>Eurypyga helias</i>	Sunbittern	VS	W	Present study	XC468211
<b>RALLIDAE</b>					
<i>Aramides cajaneus</i>	Grey-necked Wood Rail	O	W	Present study	WA3325007, 1460974
<i>Laterallus viridis</i>	Russet-crowned Crake	INV	G	Present study	
<i>Laterallus exilis</i>	Grey-breasted Crake	INV	G	Guilherme (2009)	MPEG 63612
<i>Porphyrio martinicus</i>	Purple Gallinule	PS	G/UND	Guilherme (2009)	MPEG 59901
<b>CHARADRIIDAE</b>					
<i>Vanellus cayanus</i>	Pied Lapwing	INV	G	Guilherme (2009)	MPEG 63613
<i>Vanellus chilensis</i>	Southern Lapwing	INV	G	Present study	
<b>JACANIDAE</b>					
<i>Jacana jacana</i>	Wattled Jacana	INV	W	Guilherme (2009)	MPEG 63621
<b>STERNIDAE</b>					
<i>Phaetusa simplex</i>	Large-billed Tern	VS	W	Present study	
<b>COLUMBIDAE</b>					
<i>Columbina talpacoti</i> <sup>C</sup>	Ruddy Ground Dove	PS	G	Present study	



Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Patagioenas plumbea</i> <sup>C</sup>	Plumbeous Pigeon	O	C	Guilherme (2009)	MPEG 63473, WA969204, 969193
<i>Patagioenas subvinacea</i> <sup>C,**</sup>	Ruddy Pigeon	FR	MID/C	Guilherme (2016)	WA3324169
<i>Leptotila verreauxi</i>	Grey-fronted Dove	PS	G	Present study	
<i>Leptotila rufaxilla</i> <sup>C</sup>	White-tipped Dove	PS	G	Guilherme (2009)	MPEG 63622, 63623
<i>Geotrygon montana</i>	Ruddy Quail-Dove	O	G	Guilherme (2009)	MPEG 59906, 59907, 59908, 59909, WA3333994
<b>CUCULIDAE</b>					
<i>Coccyzua minuta</i>	Little Cuckoo	INV	UND/MID	Present study	AC 186, MPEG 63484, 64562, WA1461971
<i>Micrococcyx cinereus</i> <sup>MA</sup>	Ash-coloured Cuckoo	INV	MID	Guilherme (2009)	MPEG 63485
<i>Piaya cayana</i>	Squirrel Cuckoo	INV	C	Guilherme (2009)	
<i>Piaya melanogaster</i>	Black-bellied Cuckoo	INV	C	Present study	
<i>Coccyzus melacoryphus</i>	Dark-billed Cuckoo	INV	G	Present study	
<i>Coccyzus americanus</i> <sup>MN</sup>	Yellow-billed Cuckoo	INV	MID/C	Present study	WA3515980
<i>Coccyzus euleri</i>	Pearly-breasted Cuckoo	INV	G	Present study	
<i>Crotophaga major</i>	Greater Ani	O	G/C	Present study	
<i>Crotophaga ani</i>	Smooth-billed Ani	O	G	Present study	
<i>Dromococcyx pavoninus</i> <sup>B</sup>	Pavonine Cuckoo	INV	G/UND	Present study	WA3325305
<b>TYTONIDAE</b>					
<i>Tyto furcata</i>	American Barn Owl	VS	G	Present study	
<b>STRIGIDAE</b>					
<i>Megascops choliba</i>	Tropical Screech Owl	INV	UND	Present study	
<i>Megascops usta</i>	Austral Screech Owl	INV	UND	Guilherme (2009)	MPEG 63692, WA1832511
<i>Lophotrix cristata</i>	Crested Owl	INV	UND/MID	Present study	WA951066
<i>Pulsatrix perspicillata</i>	Spectacled Owl	VS	G	Present study	WA3324168
<i>Strix huhula</i>	Black-banded Owl	INV	C	Present study	WA960060, WA988215
<i>Glaucidium hardyi</i>	Amazonian Pygmy Owl	INV	G	Silva <i>et al.</i> (2015)	
<i>Glaucidium brasilianum</i>	Ferruginous Pygmy Owl	INV	G	Present study	WA2798994, WA2798993
<i>Athene cunicularia</i>	Burrowing Owl	VS	G	Present study	
<b>NYCTIBIIDAE</b>					
<i>Nyctibius grandis</i>	Great Potoo	INV	MID	Present study	WA1462134
<i>Nyctibius aethereus</i>	Long-tailed Potoo	INV	MID	Present study	
<i>Nyctibius griseus</i>	Common Potoo	INV	MID	Present study	
<b>CAPRIMULGIDAE</b>					
<i>Nyctiphrynus ocellatus</i>	Ocellated Poorwill	INV	AE	Present study	WA1435565, WA1456885, WA1456880
<i>Antrostomus sericeocaudatus</i>	Silky-tailed Nightjar	INV	MID	Present study	XC430737, WA2301402

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Lurocalis semitorquatus</i>	Short-tailed Nighthawk	INV	MID	Present study	
<i>Nyctidromus albicollis</i>	Pauraque	INV	G	Present study	WA3325281
<i>Hydropsalis parvula</i>	Little Nightjar	INV	MID	Guilherme (2009)	MPEG 63493
<i>Hydropsalis climacocerca</i>	Ladder-tailed Nightjar	INV	G/UND/MID	Guilherme (2009)	MPEG 63614
<b>APODIDAE</b>					
<i>Chaetura cinereiventris</i>	Grey-rumped Swift	INV	AE	Present study	
<i>Chaetura brachyura</i>	Short-tailed Swift	INV	AE	Present study	
<i>Tachornis squamata</i>	Fork-tailed Palm Swift	INV	MID	Present study	
<b>TROCHILIDAE</b>					
<i>Glaucis hirsutus</i>	Rufous-breasted Hermit	NEC	UND	Guilherme (2016)	AC 591
<i>Threnetes leucurus</i>	Pale-tailed Barbthroat	NEC	UND	Silva <i>et al.</i> (2015)	AC 581
<i>Phaethornis ruber</i>	Reddish Hermit	NEC	UND	Guilherme (2009)	MPEG 64565, AC 585
<i>Phaethornis hispidus</i>	White-bearded Hermit	NEC	UND	Silva <i>et al.</i> (2015)	AC 584, WA1460980
<i>Phaethornis philippii</i>	Needle-billed Hermit	NEC	UND	Present study	
<i>Phaethornis bourcieri</i>	Straight-billed Hermit	NEC	UND	Guilherme (2009)	MPEG 59922, 59923
<i>Phaethornis malaris</i>	Great-billed Hermit	NEC	UND	Silva <i>et al.</i> (2015)	AC 582
<i>Campylopterus largipennis</i>	Grey-breasted Sabrewing	NEC	MID	Guilherme (2009)	MPEG 59924, 64563
<i>Anthracothonax nigricollis</i>	Black-throated Mango	NEC	C	Present study	
<i>Chlorostilbon mellisugus</i>	Blue-tailed Emerald	NEC	MID	Present study	
<i>Thalurania furcata</i>	Fork-tailed Woodnymph	NEC	UND/MID/C	Silva <i>et al.</i> (2015)	WA1371286
<i>Hylocharis cyanus</i>	White-chinned Sapphire	NEC	UND/MID/C	Present study	
<i>Amazilia lactea</i>	Sapphire-spangled Emerald	NEC	UND/MID/C	Guilherme (2009)	MPEG 63626
<b>TROGONIDAE</b>					
<i>Trogon melanurus</i>	Black-tailed Trogon	FR	C	Guilherme (2009)	MPEG 59928, WA3325343, 1462101, 1462097
<i>Trogon viridis</i>	Green-backed Trogon	FR	C	Guilherme (2009)	MPEG 63624
<i>Trogon ramonianus</i>	Amazonian Trogon	FR	UND	Guilherme (2009)	MPEG 63491, WA1462029
<i>Trogon curucui</i>	Blue-crowned Trogon	INV	UND/MID/C	Guilherme (2009)	MPEG 63492, WA3325342, 1371334
<i>Trogon collaris</i>	Collared Trogon	INV	MID	Present study	
<i>Pharomachrus pavoninus</i>	Pavonine Quetzal	FR	MID	Present study	WA1429156, 1433571
<b>ALCEDINIDAE</b>					
<i>Chloroceryle americana</i>	Green Kingfisher	VS	W	Present study	
<i>Chloroceryle aenea</i>	American Pygmy Kingfisher	VS	W	Present study	
<i>Chloroceryle inda</i>	Green-and-rufous Kingfisher	VS	W	Silva <i>et al.</i> (2015)	
<b>MOMOTIDAE</b>					
<i>Electron platyrhynchum</i>	Broad-billed Motmot	INV	MID	Guilherme (2009)	MPEG 59929

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Momotus momota</i>	Amazonian Motmot	O	G/UND/MID	Silva <i>et al.</i> (2015)	WA952369
<b>GALBULIDAE</b>					
<i>Galbula cyanicollis</i>	Blue-necked Jacamar	INV	UND/MID	Present study	
<i>Galbula cyanescens</i>	Bluish-fronted Jacamar	INV	MID	Guilherme (2009)	MPEG 63486, 63625, WA3325279, 1460992, 1460987
<i>Galbula dea</i>	Paradise Jacamar	INV	C	Present study	
<b>BUCCONIDAE</b>					
<i>Notharchus hyperrhynchus</i>	White-necked Puffbird	INV	C	Present study	WA3324232
<i>Bucco macrodactylus</i>	Chestnut-capped Puffbird	INV	G/UND/MID	Guilherme (2009)	MPEG 63490, 63489, WA1460963
<i>Nystalus obamai</i>	Western Striolated Puffbird	INV	MID/C	Present study	
<i>Malacoptila semicincta</i> <sup>E</sup>	Semi-collared Puffbird	INV	UND	Present study	WA2787704
<i>Nonnula sclateri</i> <sup>B, E</sup>	Fulvous-chinned Nunlet	INV	G/UND	Present study	WA3229536, WA1371821, WA3249105
<i>Nonnula ruficapilla</i> <sup>B</sup>	Rufous-capped Nunlet	INV	G/UND/MID	Present study	
<i>Monasa nigrifrons</i>	Black-fronted Nunbird	INV	G/UND	Guilherme (2009)	MPEG 63488, WA3325029, 1326323
<i>Monasa morphoeus</i>	White-fronted Nunbird	INV	G/UND/MID	Present study	WA952320
<i>Chelidoptera tenebrosa</i>	Swallow-winged Puffbird	INV	AE	Guilherme (2009)	MPEG 63487
<b>CAPITONIDAE</b>					
<i>Capito auratus</i>	Gilded Barbet	FR	MID	Guilherme (2009)	MPEG 63501, 64566
<b>RAMPHASTIDAE</b>					
<i>Ramphastos tucanus</i> <sup>**C</sup>	White-throated Toucan	FR	C	Present study	WA3058758, WA3325334
<i>Ramphastos vitellinus</i> <sup>**C</sup>	Channel-billed Toucan	FR	MID	Present study	WA3325333, WA3204945
<i>Aulacorhynchus atrogularis</i>	Black-throated Toucanet	O	MID	Present study	
<i>Pteroglossus inscriptus</i>	Lettered Aracari	FR	C	Guilherme (2009)	MPEG 64564
<i>Pteroglossus mariae</i>	Chestnut-eared Aracari	FR	C	Guilherme (2009)	MPEG 59935
<i>Pteroglossus castanotis</i>	Brown-mandibled Aracari	FR	MID	Guilherme (2009)	MPEG 59934, WA3325332, WA2757307
<i>Pteroglossus beauharnaisii</i>	Curl-crested Aracari	FR	C	Guilherme (2009)	MPEG 63502, 63503, 63504, WA3325331, WA3206900
<b>PICIDAE</b>					
<i>Picumnus rufiventris</i> <sup>B</sup>	Rufous-breasted Piculet	INV	UND/MID	Present study	
<i>Melanerpes cruentatus</i>	Yellow-tufted Woodpecker	O	C	Guilherme (2009)	AC 190, 191, MPEG 63634
<i>Veniliornis affinis</i>	Red-stained Woodpecker	INV	MID	Silva <i>et al.</i> (2015)	
<i>Veniliornis passerinus</i>	Little Woodpecker	INV	UND/MID/C	Silva <i>et al.</i> (2015)	
<i>Piculus leucolaemus</i>	White-throated Woodpecker	INV	MID/C	Present study	
<i>Piculus laemostictus</i>	Spot-throated Woodpecker	INV	MID/C	Present study	

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Celeus flavus</i> <sup>C</sup>	Cream-coloured Woodpecker	INV	MID	Present study	
<i>Celeus torquatus</i> <sup>*,C</sup>	Ringed Woodpecker	O	MID	Present study	WA972554
<i>Celeus spectabilis</i> <sup>B,E,C</sup>	Rufous-headed Woodpecker	INV	MID	Present study	WA3158715
<i>Dryocopus lineatus</i>	Lineated Woodpecker	INV	MID	Present study	
<i>Campephilus rubricollis</i>	Red-necked Woodpecker	INV	MID	Present study	WA3325286
<i>Campephilus melanoleucus</i>	Crimson-crested Woodpecker	INV	MID	Guilherme (2009)	MPEG 63632, WA3325285, 1460966

## FALCONIDAE

<i>Daptrius ater</i>	Black Caracara	VS	MID	Guilherme (2016)	
<i>Ibycter americanus</i>	Red-throated Caracara	INV	MID	Present study	WA3325284
<i>Milvago chimachima</i>	Yellow-headed Caracara	VS	G	Present study	
<i>Herpetotheres cachinnans</i>	Laughing Falcon	VS	G/UND/MID	Present study	
<i>Micrastur ruficollis</i>	Barred Forest Falcon	VS	G	Guilherme (2009)	MPEG 63472, WA3325023
<i>Micrastur mirandollei</i>	Slaty-backed Forest Falcon	VS	UND/MID	Present study	
<i>Micrastur semitorquatus</i>	Collared Forest Falcon	VS	G	Present study	

## PSITTACIDAE

<i>Ara macao</i> <sup>C</sup>	Scarlet Macaw	PS	MID	Present study	XC430740, WA3212607, WA3110803
<i>Ara chloropterus</i> <sup>C</sup>	Red-and-green Macaw	PS	MID	Present study	
<i>Ara severus</i> <sup>C</sup>	Chestnut-fronted Macaw	PS	MID	Present study	WA3334010, WA3058781, WA3331032
<i>Primolius couloni</i> **	Red-bellied Macaw	O	MID/C	Present study	WA3325323, WA3061151
<i>Orthopsittaca manilatus</i>	Blue-headed Macaw	FR	C	Present study	
<i>Psittacara leucophthalmus</i>	White-eyed Parakeet	PS	MID	Guilherme (2009)	MPEG 63475, 63476, 63461, WA3325330
<i>Aratinga weddellii</i>	Dusky-headed Parakeet	FR	C	Present study	WA3324083
<i>Pyrrhura rupicola</i> <sup>*,E</sup>	Black-capped Parakeet	FR	UND/MID	Present study	WA3333977
<i>Brotogeris cyanoptera</i>	Cobalt-winged Parakeet	FR	MID	Guilherme (2009)	MPEG 6361
<i>Brotogeris sanctithomae</i>	Tui Parakeet	FR	UND/MID	Present study	
<i>Pionites leucogaster</i>	White-bellied Parrot	PS	UND/MID	Guilherme (2009)	MPEG 63620
<i>Pionus menstruus</i>	Blue-headed Parrot	PS	MID	Present study	WA3325314
<i>Amazona farinosa</i> ** <sup>C</sup>	Southern Mealy Amazon	O	MID	Present study	WA3324079
<i>Amazona ochrocephala</i> <sup>C</sup>	Yellow-crowned Amazon	PS	G/UND/MID	Guilherme (2009)	MPEG 63474, WA3324081

## THAMNOPHILIDAE

<i>Pygiptila stellaris</i>	Spot-winged Antshrike	INV	MID	Guilherme (2009)	MPEG 63545, 63637, 63638
<i>Microrhopias quixensis</i> <sup>B</sup>	Dot-winged Antwren	INV	MID	Silva <i>et al.</i> (2015)	
<i>Epinecrophylla leucophthalma</i>	White-eyed Antwren	INV	UND	Guilherme (2009)	MPEG 63635, 63636



Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Epinecrophylla amazonica</i>	Madeira Stipple-throated Antwren	INV	UND	Present study	
<i>Epinecrophylla ornata</i> <sup>B</sup>	Ornate Antwren	INV	MID	Guilherme (2009)	MPEG 59986, WA2301406, WA3064167
<i>Myrmophylax atrothorax</i>	Black-throated Antbird	INV	G	Present study	
<i>Myrmotherula brachyura</i>	Pygmy Antwren	INV	MID	Present study	
<i>Myrmotherula axillaris</i>	White-flanked Antwren	INV	MID	Guilherme (2009)	AC 196, MPEG 59976, 59977, 59978, 59979, 59980, 63542, 63543
<i>Myrmotherula longipennis</i>	Long-winged Antwren	INV	UND/MID	Guilherme (2009)	MPEG 59987, 59988, 59989
<i>Isleria hauxwelli</i>	Plain-throated Antwren	INV	G/UND	Guilherme (2009)	MPEG 59981, 59982, 59983, 59984, 59985
<i>Thamnomanes ardesiacus</i>	Dusky-throated Antshrike	INV	MID	Guilherme (2009)	MPEG 59969, 59972, 59973
<i>Thamnomanes schistogynus</i> <sup>E</sup>	Bluish-slate Antshrike	INV	MID	Guilherme (2009)	MPEG 59967, 59968
<i>Dichrozona cincta</i>	Banded Antbird	INV	G	Present study	
<i>Thamnophilus doliatus</i>	Barred Antshrike	INV	MID	Silva <i>et al.</i> (2015)	XC430732
<i>Thamnophilus schistaceus</i>	Plain-winged Antshrike	INV	MID	Guilherme (2009)	MPEG 63540, 63544, XC430733, WA1371282
<i>Thamnophilus aethiops</i>	White-shouldered Antshrike	INV	UND/MID	Guilherme (2009) Guimarães (2017)	AC 192, 193, 194, 195, 588, 590, MPEG 59961, 59962, 59963, 59964, 59965, WA146
<i>Cymbilaimus lineatus</i>	Bamboo Antshrike	INV	MID	Present study	
<i>Cymbilaimus sanctaemariae</i> <sup>B</sup>	Fasciated Antshrike	INV	MID	Present study	WA3058776, WA3212570
<i>Taraba major</i>	Great Antshrike	INV	G/UND	Present study	
<i>Hylophylax naevius</i>	Spot-backed Antbird	INV	UND	Guilherme (2009)	MPEG 59998, 59999
<i>Sclateria naevia</i>	Silvered Antbird	INV	G	Guilherme (2016)	MPEG 60012, WA969802
<i>Myrmelastes hyperythrus</i>	Plumbeous Antbird	INV	G/UND	Guilherme (2009)	MPEG 64567, WA3324194
<i>Myrmelastes humaythae</i>	Humaitá Antbird	INV	G	Guilherme (2009)	XC468213
<i>Myrmoborus myotherinus</i>	Black-faced Antbird	INV	G/UND	Guilherme (2009)	MPEG 60005, 60006, 60007, 60008, 60009, WA951093
<i>Myrmoborus leucophrys</i>	White-browed Antbird	INV	G	Guilherme (2009)	MPEG 60010
<i>Akletos goeldii</i> <sup>B, E</sup>	Goeldi's Antbird	INV	G/UND	Guilherme (2009)	MPEG 60011, XC430741, WA3324076
<i>Hafferia fortis</i>	Sooty Antbird	INV	G	Guilherme (2009)	MPEG 63539, 63639, 63640, WA3334071

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Sciaphylax hemimelaena</i>	Southern Chestnut-tailed Antbird	INV	G/UND	Guilherme (2009)	AC 199, MPEG 60013, 60014
<i>Cercomacra cinerascens</i>	Grey Antbird	INV	MID	Present study	WA961150
<i>Cercomacroides fuscicauda</i>	Riparian Antbird	INV	G/UND	Present study	
<i>Cercomacroides seroa</i>	Black Antbird	INV	UND	Guilherme (2009)	MPEG 63549
<i>Hypocnemis subflava</i> <sup>B, E</sup>	Yellow-breasted Warbling Antbird	INV	UND	Silva <i>et al.</i> (2015)	WA3223640, WA2943326, WA3382943
<i>Hypocnemis peruviana</i>	Peruvian Warbling Antbird	INV	UND	Guilherme (2009)	AC 200, 201, 202, 586, MPEG 63547, 63548
<i>Willisornis poecilotus</i>	Common Scale-backed Antbird	INV	G	Guilherme (2009)	MPEG 59990, 59991, 59992, 59993, 59994, 59995, 59996, 59997
<i>Phlegopsis nigromaculata</i>	Black-spotted Bare-eye	INV	G	Guilherme (2009)	AC 204, MPEG 60022, 60023, 60024, 60025
<i>Oneillornis salvini</i> <sup>E</sup>	White-throated Antbird	INV	G	Guilherme (2009)	AC 203, MPEG 60019, 6002, 63546, WA1371811
<i>Rhegmatorhina melanosticta</i>	Hairy-crested Antbird	INV	G	Guilherme (2009)	MPEG 60021
<b>CONOPOPHAGIDAE</b>					
<i>Conopophaga peruviana</i>	Ash-throated Gnatcatcher	INV	G	Present study	CEMAVE E152474
<b>GRALLARIDAE</b>					
<i>Hyllopezus berlepschi</i>	Amazonian Antpitta	INV	G	Present study	
<i>Myrmothera campanisona</i>	Thrush-like Antpitta	INV	G	Present study	WA1371814, 1371815
<b>FORMICARIIDAE</b>					
<i>Formicarius analis</i>	Black-faced Anthrush	INV	G	Present study	WA1371813
<i>Formicarius colma</i>	Rufous-capped Anthrush	INV	G	Silva <i>et al.</i> (2015)	
<b>SCLERURIDAE</b>					
<i>Sclerurus mexicanus</i>	Tawny-throated Leaf-tosser	INV	G	Present study	
<i>Sclerurus caudacutus</i>	Black-tailed Leaf-tosser	INV	G	Guilherme (2009)	MPEG 59959
<b>DENDROCOLAPTIDAE</b>					
<i>Dendrocincla fuliginosa</i>	Plain-brown Woodcreeper	INV	G/UND/MID	Guilherme (2009)	MPEG 63522, 63523
<i>Dendrocincla merula</i>	White-chinned Woodcreeper	INV	G/UND	Guilherme (2016)	AC 205, MPEG 59936, 63521
<i>Deconychura longicauda</i>	Long-tailed Woodcreeper	INV	MID	Present study	
<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper	INV	MID/C	Present study	
<i>Glyphorhynchus spirurus</i>	Wedge-billed Woodcreeper	INV	C	Guilherme (2009)	MPEG 59942
<i>Xiphorhynchus elegans</i>	Elegant Woodcreeper	INV	MID	Guilherme (2009)	MPEG 59943, 59944, 59945, 59946, 63524
<i>Xiphorhynchus guttatoides</i>	Lafresnaye's Woodcreeper	INV	MID	Guilherme (2009)	MPEG 63525, WA961216
<i>Campylorhamphus trochilirostris</i> <sup>B</sup>	Red-billed Scythebill	INV	UND	Guilherme (2009)	MPEG 59949, WA3061123

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Dendroplex picus</i>	Straight-billed Woodcreeper	INV	MID	Present study	
<i>Lepidocolaptes fatimalimae</i>	Inambari Woodcreeper	INV	C	Present study	
<i>Dendrexetastes rufigula</i>	Cinnamon-throated Woodcreeper	INV	MID/C	Present study	WA1326333
<i>Dendrocolaptes certhia</i>	Amazonian Barred Woodcreeper	INV	MID	Present study	
<i>Dendrocolaptes picumnus</i>	Black-banded Woodcreeper	INV	G/UND	Present study	
<b>XENOPIIDAE</b>					
<i>Xenops minutus</i>	Plain Xenops	INV	UND/MID	Guilherme (2009)	MPEG 59960, 63526, AC 208, 209, 595
<i>Xenops rutilans</i>	Streaked Xenops	INV	MID	Present study	WA973883
<b>FURNARIIDAE</b>					
<i>Furnarius leucopus</i>	Pale-legged Hornero	INV	G	Present study	
<i>Automolus rufipileatus</i>	Chestnut-crowned Foliage-gleaner	INV	UND	Silva <i>et al.</i> (2015)	
<i>Automolus melanopezus</i> <sup>B</sup>	Brown-rumped Foliage-gleaner	INV	UND	Present study	
<i>Automolus subulatus</i>	Striped Woodhaunter	INV	UND/MID	Guilherme (2009)	MPEG 59958
<i>Automolus ochrolaemus</i>	Buff-throated Foliage-gleaner	INV	UND	Guilherme (2009)	MPEG 59954, 59955, 59956, 59957, WA1460958, 952365
<i>Anabacerthia ruficaudata</i>	Rufous-tailed Foliage-gleaner	INV	MID/C	Silva <i>et al.</i> (2015)	
<i>Philydor erythrocerum</i>	Rufous-rumped Foliage-gleaner	INV	MID/C	Present study	
<i>Philydor erythropterum</i>	Chestnut-winged Foliage-gleaner	INV	MID/C	Present study	WA1326311
<i>Synallaxis rutilans</i>	Ruddy Spinetail	INV	G/UND	Guilherme (2009)	MPEG 59950, WA2455713
<b>PIPRIDAE</b>					
<i>Pipra fasciicauda</i>	Band-tailed Manakin	FR	UND/MID	Guilherme (2009)	MPEG 60040, 60041, 60042, 60043, 60044, 60045, 60046, 60047, 60048, 60049, WA1371299
<i>Ceratopipra rubrocapilla</i>	Red-headed Manakin	FR	UND/MID	Guilherme (2009)	MPEG 60051
<i>Lepidothrix coronata</i>	Blue-crowned Manakin	FR	UND/MID	Guilherme (2009)	MPEG 63656, 63590, WA1460975
<i>Machaeropterus pyrocephalus</i>	Fiery-capped Manakin	FR	UND/MID	Guilherme (2009)	MPEG 63589, 63655
<b>ONYCHORHYNCHIDAE</b>					
<i>Onychorhynchus coronatus</i>	Amazonian Royal Flycatcher	INV	UND/MID	Guilherme (2009)	MPEG 60037, 60038
<i>Terenotriccus erythrurus</i>	Ruddy-tailed Flycatcher	INV	UND/MID	Guilherme (2009)	MPEG 60039, 63573, AC 583
<i>Myiobius atricaudus</i>	Black-tailed Flycatcher	INV	UND/MID	Present study	WA1460982
<b>TITYRIDAE</b>					
<i>Laniocera hypopyrra</i>	Cinereous Mourner	INV	UND/MID	Present study	

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Tityra inquisitor</i>	Black-crowned Tityra	FR	MID	Present study	
<i>Tityra cayana</i>	Black-tailed Tityra	FR	UND/MID	Present study	
<i>Pachyramphus castaneus</i>	Chestnut-crowned Becard	INV	MID	Present study	
<i>Pachyramphus polychopterus</i>	White-winged Becard	O	MID	Present study	WA3324215
<i>Pachyramphus marginatus</i>	Black-capped Becard	O	MID	Present study	AC 593
<i>Pachyramphus minor</i>	Pink-throated Becard	O	UND/MID	Present study	
<i>Pachyramphus validus</i>	Crested Becard	INV	UND/MID	Present study	
<b>COTINGIDAE</b>					
<i>Querula purpurata</i>	Purple-throated Fruitcrow	O	UND/MID	Present study	
<i>Lipaugus vociferans</i>	Screaming Piha	O	UND/MID	Present study	XC430739
<i>Gymnoderus foetidus</i>	Bare-necked Fruitcrow	FR	UND/MID	Guilherme (2009)	MPEG 63591, 64576
<i>Conioptilon mcilhennyi</i> <sup>E</sup>	Black-faced Cotinga	FR	UND/MID	Guilherme (2009)	MPEG 63657, 64575, XC430736, WA1648888
<b>PIPRITIDAE</b>					
<i>Piprites chloris</i>	Wing-barred Piprites	INV	C	Guilherme (2009)	MPEG 64586, WA1371295, 951289
<i>Platyrrinchus coronatus</i>	Golden-crowned Spadebill	INV	UND	Present study	
<i>Platyrrinchus platyrhynchos</i>	White-crested Spadebill	INV	MID	Present study	
<b>RHYNCHOCYCLIDAE</b>					
<i>Cnipodectes superrufus</i> <sup>**B, E</sup>	Rufous Twistwing	INV	UND	Present study	WA2236547, 1462008, 1621627
<i>Mionectes oleagineus</i>	Ochre-bellied Flycatcher	FR	UND/MID	Guilherme (2009)	MPEG 60035, 60036, 63572, AC 594
<i>Leptopogon amaurocephalus</i>	Sepia-capped Flycatcher	INV	UND/MID	Guilherme (2009)	MPEG 60032, 60033, 63574, 64572, 600, AC 589
<i>Corythopsis torquatus</i>	Ringed Antpipit	INV	G	Present study	WA3325302
<i>Rhynchocyclus olivaceus</i>	Olivaceous Flatbill	INV	UND/MID	Present study	
<i>Tolmomyias sulphurescens</i>	Yellow-olive Flycatcher	INV	MID	Guilherme (2016)	AC 587
<i>Tolmomyias assimilis</i>	Yellow-margined Flycatcher	INV	MID	Guilherme (2009)	MPEG 64569
<i>Tolmomyias poliocephalus</i>	Grey-crowned Flatbill	INV	MID/C	Present study	
<i>Tolmomyias flaviventris</i>	Ochre-lore Flatbill	INV	C	Present study	
<i>Todirostrum maculatum</i>	Spotted Tody-Flycatcher	INV	MID	Present study	
<i>Todirostrum chrysocrotaphum</i>	Yellow-browed Tody-Flycatcher	INV	C	Guilherme (2009)	MPEG 64568, 64574
<i>Poecilatriccus latirostris</i>	Rusty-fronted Tody-Flycatcher	INV	UND	Present study	AC 592, WA1829296
<i>Myiornis ecaudatus</i>	Short-tailed Pygmy Tyrant	INV	C	Present study	
<i>Hemitriccus cohnhafti</i> <sup>*B, E</sup>	Acre Tody-Tyrant	INV	MID	Present study	WA2376966
<i>Hemitriccus flammulatus</i> <sup>B</sup>	Flammulated Bamboo Tyrant	INV	MID	Silva <i>et al.</i> (2015)	AC 722
<i>Hemitriccus iohannis</i>	Johannes's Tody-Tyrant	INV	MID	Silva <i>et al.</i> (2015)	



Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Lophotriccus eulophotes</i> <sup>B, E</sup>	Long-crested Pygmy Tyrant	INV	MID	Guilherme (2009)	MPEG 60030, 60031, 63641, AC 425, 426, WA952327
<b>TYRANNIDAE</b>					
<i>Zimmerius gracilipes</i>	Slender-footed Tyrannulet	INV	C	Present study	
<i>Ornithion inermis</i>	White-lored Tyrannulet	INV	C	Present study	
<i>Myiopagis gaimardii</i>	Forest Elaenia	INV	C	Present study	
<i>Myiopagis flavivertex</i>	Yellow-crowned Elaenia	INV	C	Guilherme (2009)	MPEG 64571
<i>Tyrannulus elatus</i>	Yellow-crowned Tyrannulet	INV	C	Guilherme (2009)	MPEG 63644, 64573
<i>Capsiempis flaveola</i>	Yellow Tyrannulet	INV	MID	Present study	WA2879673, WA3315889
<i>Phaeomyias murina</i>	Mouse-colored Tyrannulet	INV	UND/MID/C	Present study	
<i>Attila spadiceus</i>	Bright-rumped Attila	O	MID/C	Guilherme (2009)	MPEG 63571, WA951253
<i>Legatus leucophaeus</i>	Piratic Flycatcher	INS	C	Present study	
<i>Ramphotrigon megacephalum</i> <sup>B</sup>	Large-headed Flatbill	INS	UND/MID	Silva <i>et al.</i> (2015)	WA1586489
<i>Ramphotrigon fuscicauda</i> <sup>B</sup>	Dusky-tailed Flatbill	INS	UND/MID	Guilherme (2009)	MPEG 63570, 63646, 63647, WA1462130, 1371338
<i>Myiarchus tuberculifer</i>	Dusk-capped Flycatcher	INS	UND/MID/C	Guilherme (2009)	MPEG 63642, 63643
<i>Myiarchus ferox</i>	Short-crested Flycatcher	O	C	Guilherme (2009)	MPEG 64570
<i>Sirystes albocinereus</i>	White-rumped Sirystes	INV	UND	Present study	WA1374005, 1462118, 1374005
<i>Rhytipterna simplex</i>	Greyish Mourner	INV	UND/MID	Guilherme (2009)	MPEG 63648, 63649, WA3325337, 1461000
<i>Casiornis rufus</i> <sup>MA</sup>	Rufous Casiornis	INS	UND	Guilherme (2009)	MPEG 63645
<i>Pitangus sulphuratus</i>	Great Kiskadee	O	G	Present study	
<i>Myiodynastes maculatus</i>	Sulphur-bellied Flycatcher	O	MID	Guilherme (2009)	MPEG 63650
<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	O	MID	Present study	
<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher	INV	G	Present study	
<i>Myiozetetes similis</i>	Social Flycatcher	O	MID	Present study	
<i>Tyrannus melancholicus</i>	Tropical Kingbird	INV	MID/C	Present study	
<i>Tyrannus savana</i> <sup>MA</sup>	Fork-tailed Flycatcher	INV	G/UND	Present study	
<i>Myiophobus fasciatus</i> <sup>MA</sup>	Bran-coloured Flycatcher	INV	UND	Present study	
<i>Pyrocephalus rubinus</i> <sup>MA</sup>	Vermilion Flycatcher	INV	UND/MID	Present study	
<i>Cnemotriccus fuscatus</i>	Fuscos Flycatcher	INV	G/UND	Present study	
<b>VIREONIDAE</b>					
<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike	INV	UND/MID	Present study	
<i>Vireolanius leucotis</i>	Slaty-capped Shrike-Vireo	INV	C	Present study	
<i>Tunchiornis ochraceiceps</i>	Tawny-crowned Greenlet	INV	UND	Guilherme (2009)	MPEG 60052, 60053

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Vireo chivi</i> <sup>MA</sup>	Chivi Vireo	INV	C	Present study	
<b>HIRUNDINIDAE</b>					
<i>Atticora fasciata</i>	Wing-banded Swallow	INV	UND/AE	Present study	
<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Swallow	INV	MID	Guilherme (2009)	MPEG 63658
<b>TROGLODYTIDAE</b>					
<i>Microcerculus marginatus</i>	Southern Nightingale-Wren	INV	G/UND	Present study	WA951261
<i>Troglodytes musculus</i>	House Wren	INV	UND	Present study	
<i>Campylorhynchus turdinus</i>	Thrush-like Wren	INV	UND/MID	Present study	
<i>Pheugopedius genibarbis</i>	Moustached Wren	INV	UND	Silva <i>et al.</i> (2015)	
<i>Cantorchilus leucotis</i>	Buff-breasted Wren	INV	UND	Present study	
<b>POLIOPTILIDAE</b>					
<i>Poliophtila plumbea</i>	Tropical Gnatcatcher	INV	UND/MID/C	Present study	
<b>TURDIDAE</b>					
<i>Catharus swainsoni</i> <sup>MN</sup>	Swainson's Thrush	INV	G/UND	Present study	
<i>Turdus ignobilis</i>	Hauxwell's Thrush	O	UND/MID	Present study	
<i>Turdus hauxwelli</i>	Creamy-bellied Thrush	O	G	Guilherme (2009)	MPEG 60058, WA3324213
<i>Turdus amaurochalinus</i> <sup>MA</sup>	Black-billed Thrush	FR	MID/C	Present study	
<b>PASSERELLIDAE</b>					
<i>Ammodramus aurifrons</i>	Grassland Sparrow	PS	G	Present study	
<i>Arremon taciturnus</i>	Pectoral Sparrow	O	G/UND	Guilherme (2009)	MPEG 63607, 6360, WA1371289
<b>PARULIDAE</b>					
<i>Myiothlypis fulvicauda</i>	Buff-rumped Warbler	INV	G	Silva <i>et al.</i> (2015)	AC 719, WA1341374
<b>ICTERIDAE</b>					
<i>Psarocolius decumanus</i> <sup>C</sup>	Crested Oropendola	FR	MID	Present study	XC430735
<i>Psarocolius bifasciatus</i> <sup>C</sup>	Olive Oropendola	O	MID/C	Guilherme (2009)	MPEG 63668, XC430734
<i>Cacicus cela</i>	Yellow-rumped Cacique	FR	C	Guilherme (2009)	MPEG 63610
<i>Icterus croconotus</i>	Orange-backed Troupial	FR	MID/C	Present study	WA3324227
<i>Molothrus oryzivorus</i>	Giant Cowbird	FR	G/C	Present study	
<i>Sturnella militaris</i>	Red-breasted Meadowlark	O	G	Guilherme (2009)	MPEG 63667
<b>MITROSPINGIDAE</b>					
<i>Lamprospiza melanoleuca</i>	Red-billed Pied Tanager	O	C	Present study	
<b>THRAUPIDAE</b>					
<i>Cissopis leverianus</i>	Magpie Tanager	FR	UND/MID	Present study	
<i>Paroaria gularis</i>	Red-capped Cardinal	INV	UND	Guilherme (2009)	MPEG 63669
<i>Tangara schrankii</i>	Green-and-gold Tanager	FR	MID	Guilherme (2009)	MPEG 63662
<i>Tangara mexicana</i>	Turquoise Tanager	O	C	Guilherme (2009)	MPEG 64577, 64578, 64579
<i>Tangara chilensis</i>	Paradise Tanager	FR	C	Guilherme (2009)	MPEG 63662

Family/Species/ Conservation status	English name	Guild	Stratum	Source	Voucher
<i>Tangara callophrys</i>	Opal-crowned Tanager	FR	C	Present study	
<i>Tangara episcopus</i>	Blue-grey Tanager	O	MID	Silva <i>et al.</i> (2015)	
<i>Tangara palmarum</i>	Palm Tanager	FR	C	Present study	
<i>Tangara nigrocincta</i>	Masked Tanager	FR	C	Present study	
<i>Hemithraupis flavicollis</i>	Yellow-backed Tanager	INV	C	Present study	
<i>Hemithraupis guira</i>	Guira Tanager	INV	C	Present study	
<i>Volatinia jacarina</i>	Blue-black Grassquit	O	G	Silva <i>et al.</i> (2015)	
<i>Eucometis penicillata</i>	Grey-headed Tanager	INV	UND	Present study	
<i>Lanio versicolor</i>	White-winged Shrike-Tanager	INV	C	Present study	
<i>Lanio luctuosus</i>	White-shouldered Tanager	INV	MID	Guilherme (2009)	MPEG 60054, 63660, 63661, WA1456768
<i>Ramphocelus nigrogularis</i>	Masked Crimson Tanager	O	MID	Present study	
<i>Ramphocelus carbo</i>	Silver-beaked Tanager	O	UND	Silva <i>et al.</i> (2015)	WA3333978
<i>Tersina viridis</i>	Swallow Tanager	FR	MID	Guilherme (2009)	MPEG 64580
<i>Cyanerpes nitidus</i>	Short-billed Honeycreeper	O	C	Present study	
<i>Dacnis flaviventer</i>	Yellow-bellied Dacnis	FR	MID	Guilherme (2009)	MPEG 63663, 64585
<i>Dacnis lineata</i>	Black-faced Dacnis	FR	C	Guilherme (2009)	MPEG 63664
<i>Dacnis cayana</i>	Blue Dacnis	O	C	Guilherme (2009)	MPEG 63605
<i>Sporophila caerulescens</i> <sup>MI</sup>	Double-collared Seedeater	PS	G	Present study	
<i>Sporophila castaneiventris</i>	Chestnut-bellied Seedeater	PS	UND	Present study	
<i>Sporophila angolensis</i>	Chestnut-bellied Seed Finch	PS	G	Silva <i>et al.</i> (2015)	
<i>Saltator coerulescens</i>	Greyish Saltator	INV	UND	Present study	
<i>Saltator maximus</i>	Buff-throated Saltator	INV	UND	Silva <i>et al.</i> (2015)	
<i>Saltator grossus</i>	Slate-coloured Grosbeak	INV	C	Guilherme (2009)	MPEG 63609, 63665, 63666, XC467605
<b>CARDINALIDAE</b>					
<i>Habia rubra</i>	Scarlet-throated Ant Tanager	INV	MID	Guilherme (2009)	MPEG 60055, 60056
<i>Cyanoloxia rothschildii</i>	Rothschild's Grosbeak	FR	G	Guilherme (2009)	MPEG 60057, 63606, WA2454852
<b>FRINGILLIDAE</b>					
<i>Euphonia chlorotica</i>	Purple-throated Euphonia	FR	C	Present study	
<i>Euphonia lanirostris</i>	Thick-billed Euphonia	FR	MID	Guilherme (2009)	MPEG, 64582, 64583, 64584
<i>Euphonia chrysopasta</i>	Golden-bellied Euphonia	O	C	Present study	
<i>Euphonia xanthogaster</i>	Orange-bellied Euphonia	FR	MID	Guilherme (2009)	MPEG 63670
<i>Euphonia rufiventris</i>	Rufous-bellied Euphonia	FR	MID	Present study	