A preliminary survey and rapid ecological assessment of the avifauna of Amana National Forest (Itaituba and Jacareacanga, Pará, Brazil)

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ABSTRACT: Amana National Forest (FLONA Amana) is located on the left bank of the middle Tapajós River, in the interfluve of the Tapajós and Madeira Rivers, state of Pará, Brazil. I performed a "Rapid Ecological Assessment" (REA) on the bird communities of the park to identify important areas for avian conservation and areas where activities could impact bird communities. Field surveys were carried out at the end of the rainy season and at the beginning of the dry season. Nine points distributed among five sites were sampled within Amana or very close to its borders. Three approaches were used to survey the avifauna of each point: (a) a quantitative approach using mist nets, (b) a qualitative approach using field observations with binoculars, and (c) interviews with local residents. With a sampling effort of 3,320 net hours, interviews with local residents, and approximately 60 additional hours of visual observations, 247 species of birds were recorded belonging to 51 families. Eight taxa are considered endemic to the interfluve of the Tapajós/Madeira Rivers. Two species are on IUCN’s Red List of endangered birds (Penelope pileata and Guaruba guarouba), and the known distribution of two species (Topaza pella and Discosura longicaudus) is extended by our surveys. Two activities within Amana were detected to have possible negative impacts on avifauna, specifically hunting and gold and cassiterite mining.

KEYWORDS: birds, Amana National Forest, Amazon, conservation.

INTRODUCTION

Although the Brazilian Amazon has been subject to scientific study for many decades, due to its large expanse, it is still considered under studied by ornithologists (Oren & Albuquerque 1991). For example, the region between the lower and middle Tapajós River in Pará State has been visited and studied for over 100 years by Brazilian and foreign ornithologists (Snethlage 1908; Oren & Parker 1997; Pacheco & Olmos 2005; Santos et al. 2011; Lees et al. 2013a). It is estimated that more than 2,000 specimens have been collected from the lower and middle Tapajós River, the area that contains Amazonia National Park (Parque Nacional da Amazônia) and Amana National Forest (Floresta Nacional do Amana). The study of birds in this region over the past 100 years has resulted in the description of 16 new species and records for over 400 bird species in the area between the city of Itaituba and the southern boundary of Amazonia National Park (Oren & Parker 1997). Even recently, new bird species have been described to the interfluve of the Madeira and Tapajós Rivers, the most recent ones being the Bald Parrot (Pyrrhula aurantioccephala); Roosevelt Stipple-throated Antwren (Epinecrophylla denti); Alta Floresta Antpitta (Hylopezus whittakeri); Chico’s Tyrannulet (Zimmerius chicomendesi); and Sucunduri Yellow-margined Flycatcher (Tolmomyias sucunduri) (Gaban-Lima et al. 2002; Whitney et al. 2013a; Carneiro et al. 2012; Whitney et al. 2013b; Whitney et al. 2013c).

Amana National Forest was created by the Brazilian Government by an unnumbered decree on 13 February 2006, and has an area of 540,417.17 ha (DOU 2009). Amana was created to promote sustainable multiple-use management of forest resources; maintain and protect water resources and biodiversity; and support development of methods for the sustainable use of natural resources (DOU 2009).

The goal of this study was to conduct a preliminary survey of the local avifauna to identify potential anthropogenic impacts on and important areas for conservation of bird communities within Amana. I performed a “Rapid Ecological Assessment” (REA; Sayre et al. 2003) of Amana. The REA is an integrated methodology used to direct the efforts of conservation planning sites and contributes to the inventories of biodiversity (Sayre et al. 2003). Together with information...
from other taxa, this survey will enable the creation of a management plan for Amana National Forest.

METHODS

Location of Sites and Sampling Period

Field surveys were performed at the end of the rainy season, from 24 April to 6 May 2008 and at the beginning of the dry season from 21 July to 8 August 2008. Nine points distributed among five sites were sampled within Amana (Table 1, Figure 1). Four sampled sites were visited during both sampling periods, and one (Site 5 - Igarapé Preto) during only the second sampling period (Table 1). Two additional locations along the Transamazonian Highway were also partially sampled during the sampling period (Sites 6 and 7; Table 1, Figure 1). General information is shown in Table 1, including habitat present at every studied point.

FIGURE 1. Location of the Amana National Forest and sampling sites. 1 - Igarapé Montanha (Montanha stream); 2 - JML Gold Mining; 3 – Maranhense Landing Strip; 4 - São Pedro Landing Strip; 5 – Igarapé Preto (Preto stream); 6 - Amana surrounding area (Km 180); 7 - Amana surrounding area (Km 275, Rabelo).
TABLE 1. Sites and points of observation and collection of birds during the two campaigns of Rapid Ecological Assessment in Amana National Forest, Pará, Brazil.

| Site                                      | Point | Coordinates       | Sampling Days     | Habitat                                      |
|-------------------------------------------|-------|-------------------|-------------------|----------------------------------------------|
|                                           |       | W                 | S                 |                                              |
| 1 - Montanha Stream                       | 01    | 56°58’10.1”W      | 04°52’58.7”S      | 25-27 April 2008 Plateau of *terra-firme* forest |
|                                           | 02    | 56°58’07.0”W      | 04°52’55.9”S      | 22-24 July 2008 Lowland alluvial forest        |
| 2 - JML Gold Mining                       | 03    | 57°32’14.9”W      | 05°06’35.7”S      | 29-30 April 2008 *Terra-firme* forest with palm trees |
|                                           | 04    | 57°32’07.8”W      | 05°06’28.3”S      | 30 July to 01 August 2008 Secondary forest with bamboo |
| 3 - Maranhense                             | 05    | 57°28’32.0”W      | 05°21’10.7”S      | 01-03 May 2008 *Terra-firme* forest with palm trees |
|                                           | 06    | 57°28’27.0”W      | 05°21’04.7”S      | 02-04 August 2008 Submontane forest with palm trees |
| 4 - São Pedro                             | 07    | 57°28’24.7”W      | 04°46’41.1”S      | 05-06 May 2008 Vegetation on white sand soil (*campina*) |
|                                           | 08    | 57°28’28.4”W      | 04°46’43.4”S      | 26-29 April 2008 Edge of floodplain forest, sandy beaches, and *campina* |
| 5 - Southern Portion of FLONA (Igarapê Preto) | 09    | 57°42’29.1”W      | 05°54’31.9”S      | 06-08 August 2008 Edge of *terra-firme* forest |
| 6 - FLONA Surrounding                      |       | 56°55’29.0”       | 04°58’32.7        | 24 April 2008 and 21 July 2008 Km 180 - anthropogenically influenced area (open area) |
| 7 - FLONA Surrounding                      |       | 57°18’10.8”       | 05°35’07.1”       | 05 August 2008 Km 275 – Rabelo - anthropogenically influenced area (open area) |

Species Survey

Three approaches were used to survey the avifauna of each point: (a) quantitative, with mist nets, (b) qualitative, through field observations with binoculars, and (c) interviews with local residents. Scientific nomenclature is in accordance with the Comitê Brasileiro de Registros Ornitológicos (CBRO 2014).

(a) Mist-net surveys: Eighteen mist nets were used, 12 x 2 m in length with 36-mm mesh (Rosaminas®). The nets were placed in pre-existing transects at each point where they remained on average for two days. The opening of nets took place soon after sunrise, from 0530 to approximately 1600 h in order to maximize catches. Individuals were identified, photographed, and released. To monitor recaptures during each campaign,
individuals released were marked by cutting the tip of two rectrices. Some individuals were collected and prepared as specimens to document occurrence at the study area. Voucher specimens were taken with the permission of Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis-IBAMA (Brazilian Institute of Environment and Renewable Natural Resources). All collected specimens are currently deposited for further studies at the Museu Paraense Emílio Goeldi, Belém, Pará.

(b) Observations: Observations were performed daily with binoculars (Eagle Optics, 8 x 42) from 0600-0900 h. Trails inside the forest, roads, and open areas around the main localities were censused. Occasionally, I made boat trips along rivers and streams near the sites to maximize the observation of riverside species. Since I did not use recording devices, I was unable to identify all vocalizations heard during censuses. I report our observations of the portion of the avian community I was able to positively identify.

(c) Interviews: Some local residents, mostly miners, were interviewed about which bird species are best known in the region. In order to minimize the confusion generated by common bird names (which vary from one region to another), books containing photos of Amazonian birds with their species names were shown. This methodology allowed us to check in loco whether the species mentioned in the interviews were expected to occur in this region of study.

Data Analysis

Aiming to understand the degree of similarity among bird communities at different sites surveyed in this study, similarity analysis was performed. A Jaccard index was calculated based on the presence and absence of species at each site (Magurran 1988). Cluster analysis was performed using the MVSP 3.1 software package (Kovach 2003).

RESULTS

Two hundred forty-seven species of birds belonging to 51 families were recorded (Appendix). The capture effort consisted of 3,320 hours/net and approximately 60 additional hours of visual observation. The most representative families were Thraupidae, Thamnophilidae, Tyrannidae and Psittacidae, with 21, 20, 18, and 14 species, respectively (Appendix). More than 300 individuals were captured by mist net and 130 specimens were collected for further study.

Similarity Analysis among Sampling Sites

All sites located within the FLONA had an average similarity above 0.3 (30%), making them more similar to each other when compared to sites located outside the National Forest (Table 2, Figure 2). The dendrogram (Figure 2) resulting from hierarchical cluster analysis showed the formation of two distinct groups: the first group was formed by sites 6 and 7, and the second one by the other sites.

Endemic Species

We recorded eight interfluve endemics taxa (Cracraft 1985) in Amana, including Red-throated Piping-Guan (Aburria cujubi nattereri), Bar-breasted Piculet (Picumnus aurifrons borbae), Hoffmann’s Woodcreeper

![Figure 2](image-url)

FIGURE 2. Hierarchical clustering analysis for avian survey sites in Amana National Forest using Jaccard similarity distances.
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(Dendrocolaptes hoffmannsi), Ferruginous-backed Antbird (Myrmoderus ferrugineus elatus), Long-winged Antwren (Myrmotherula longipennis ochrogyna), White-eyed Antwren (Epinecphyllia leucophthalma pheonota), Harlequin Antbird (Rhegmatatorhina berlepschi), and Pale-faced Antbird (Phlegopsis borbae).

Threatened Species

Among the species observed within the FLONA, at least two deserve special attention because they are on red lists of threatened birds.

White-crested Guan (Penelope pileata): Although this species is not included by IBAMA on the list of threatened birds in Brazil, White-crested Guan is on the IUCN’s Red List in the Vulnerable category (Birdlife International 2014a). Due to the prospects of future deforestation in the Amazon region, where this species occurs, and its sensitivity to hunting and fragmentation, the conservation status of this species has received considerable attention. This species, as well as other cracids, is used as a source of protein by traditional residents (Brooks et al. 2006). During the survey, a single individual of P. pileata (Appendix) was observed and photographed on 31 July 2008 (Guilherme 2008).

Golden Parakeet (Guaruba guarouba): This psittacid has been recently reclassified as Vulnerable by Birdlife International (2014b). The threat to this species lies mainly in its habitat loss and offspring capture by illegal bird traders (Oren & Novaes 1986; Laranjeiras & Cohn-Haft 2009). In Amana, I observed several flocks of 18 to 22 individuals, flying daily over the camps of sites 3, 4, 5, 6, and 7. Fortunately, residents raising individuals of this species as pets were not detected in Amana or its surroundings. Therefore, in a preliminary assessment, it seems that populations of this species are in good condition within Amana.

Species of Regional Relevance

During this Rapid Ecological Assessment of Amana National Forest, three important records were made: Bald Parrot (Pyrrilia aurantioccephala), Crimson Topaz (Topaza pella), and Racket-tailed Coquette (Discosura longicaudus). Crimson Topaz and Racket-tailed records represent an extension of their known geographic ranges; Bald Parrot was only recently described and is poorly known.

Bald Parrot (Pyrrilia aurantioccephala): These parrots with a bare and orange head were for many years considered to be the young of the Vulturine Parrot (Pyrrilia vulturina; Sick 1997). Now recognized as its own species (Gaban-Lima et al. 2002), it is endemic to the Brazilian Amazon, with its entire geographical distribution restricted to a narrow band of the southeastern Amazon within interfluvies of the Madeira, Tapajós, and Xingu Rivers (InfoNatura 2007; del Hoyo et al. 2013). Because it was only described a few years ago, virtually nothing is known about its biology. It is highly recommended that a study be made on its populations including preferential habitat, feeding, and reproductive biology. Gaban-Lima et al. (2002) suggest that the preferential habitat of this species is “campinarana.” Based on our observations in Amana National Forest, the species seems to occur in the canopy of the floodplain forests, where an individual was collected at site 2 (Figure 4; Appendix). This habitat has been one of the most impacted by mining in Amana National Forest. As this species occurs only in a very restricted area that has been suffering intense anthropogenic pressure, the Bald Parrot was recently included on the IUCN’s Red List in the Near Threatened category (Birdlife International 2014c).

Crimson Topaz (Topaza pella): This magnificent hummingbird is well known from the northeastern Amazon (from Guyana to the region around Belém, Brazil; Schuchmann 1999). Until recently, only two

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### TABLE 2. Similarity matrix of Jaccard coefficients among sites surveyed in Amana National Forest.

|       | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 |
|-------|--------|--------|--------|--------|--------|--------|--------|
| Site 1| 1      |        |        |        |        |        |        |
| Site 2| 0.427  | 1      |        |        |        |        |        |
| Site 3| 0.373  | 0.427  | 1      |        |        |        |        |
| Site 4| 0.391  | 0.408  | 0.356  | 1      |        |        |        |
| Site 5| 0.357  | 0.415  | 0.39   | 0.374  | 1      |        |        |
| Site 6| 0.184  | 0.279  | 0.252  | 0.262  | 0.351  | 1      |        |
| Site 7| 0.193  | 0.254  | 0.237  | 0.25   | 0.388  | 0.66   | 1      |
records of Crimson Topaz had been made in the southern basin of the middle and lower Amazon River, between the cities of Parintins in Amazonas and Santarém in Pará (Hu et al. 2000). Davis & Olmstead (2010) reported a compilation of scattered records of this species made in the southern basin of the Amazon River, including the states of Pará, Amazonas, Mato Grosso, and Rondônia. The few records of this species from the southern bank of the Amazon River indicate that it appears to be rare at least in this region. The female specimen of Crimson Topaz collected during this study in Site 3 (Appendix) extends this species’ distribution a few kilometers west of the “Trairão” locality, the previous southernmost record of this species from state of Pará (Pacheco & Olmos 2005).

Racket-tailed Coquette (Discosura longicaudus): In Amazonia, the occurrence of this species is restricted to a portion of the northeastern basin and the mouth of the Amazon River (Venezuela, Guyana, states of Amazonas, Amapá, and Pará, in Brazil; Schuchmann 1999; Daffonseca 2010). There are also a few records of this species in the Brazilian Atlantic Forest (Schuchmann 1999, InfoNatura 2007, Albano 2012). During the first field campaign at Site 3, one individual of this species was photographed at the forest edge (Figure 5). We observed the species and collected one individual in the same place three months later (Appendix). These records considerably extend the geographical distribution of this species, so that it reaches the southern Brazilian Amazon. Surely, this species must be quite rare in the region, which would explain the fact that no record of it has been made until now.

Black-bellied Thorntail (Discosura langsdorffi): This little hummingbird was known only from the western Amazon (Colombia, Ecuador, Peru, Bolivia, and Brazil) and the Brazilian Atlantic Forest (Schuchmann 1999). The first records of this species in the southern portion of the eastern Amazon were made in Alta Floresta, Mato Grosso (Zimmer et al. 1997). More recently the Black-bellied Thorntail was recorded in the Carajás region (Pacheco et al. 2007) and Parauapebas, southeastern Pará (Endrigo 2011). It seems to be a rare species whose populations in the Atlantic Forest (states of Bahia, Espírito Santo, and Rio de Janeiro) are endangered, mainly due to deforestation (IBAMA 2003; Olmos 2005). There is no information on the conservation status of this species in the eastern portion of the Amazon, a region that has suffered enormous anthropogenic pressures (Capobianco et al. 2001). There is urgent need to carry out a study on the distribution and abundance of this taxon within Amana National Forest. During the two field campaigns, this species was only seen and photographed (Figure 3) at forest edge in Site 3 (Maranhese; Appendix, Figure 3). Further study of this species should work to identify its preferred habitats in the region, so that they can be protected within Amana.

**FIGURE 3.** Black-bellied Thorntail (Discosura langsdorffi). Species recorded in secondary forest edge within Amana National Forest. Besides being a species of interest for conservation, this record extends its known geographical distribution in the Brazilian Amazon.
FIGURE 4. Bald Parrot (*Pyrilia aurantioccephala*). Species present in Amana National Forest; still little known regarding its geographical distribution and ecological requirements. This record adds important information for this species.

FIGURE 5. Racket-tailed Coquette (*Discosura longicaudus*). The record of this species in Amana National Forest extends its distribution in the Brazilian Amazon.
Species Associated with Specific Habitats

Besides terra-firme and floodplain forests, in Amana National Forest there is a vegetation type known as campina, which is found on white sand soil. Campina vegetation has a low height, with a high density of small and thin trees, and scarcity of emergent trees. Campina shelters a number of species that are closely associated with this habitat (Oren 1981; Borges 2004; Guilherme & Borges 2011). Even after obtaining information by local residents regarding the presence of several spots of campina and campinarana in Amana National Forest, it was only possible to inventory a small portion of this habitat at site 4.

Below are comments on some recorded species associated with this vegetation type:

Red-shouldered Tanager (Tachyphonus phoenicius): This species is associated with campina and campinarana throughout the Amazon (Oren 1981; Borges 2004). One individual was collected in April 2008 (Appendix) during the first field campaign.

Flame-crowned Manakin (Heterocercus linteatus): This is an uncommon species associated with sandy soil vegetation, mostly near black water rivers and streams (Polleto & Aleixo 2005). It was observed on the banks of Igarapé Porquinho at Site 3 and Igarapé Preto at Site 5. One individual was collected in a campina spot at Site 4 (Appendix).

White-bearded Manakin (Manacus manacus): Although this species is found in many types of environments within the Amazon, including terra-firme forest and secondary vegetation, referred to as capoeira, (Sick 1997), its abundance seems to increase significantly in campina (pers. obs.). Throughout the field campaign, 12 individuals of White-bearded Manakin were captured. All observed and captured individuals were along the stretch of campina at Site 4.

Environmental Impacts

Two types of impacts on the environment of Amana were identified: one that affects the ecosystem as a whole (mining), and another that directly affects the populations of game birds (hunting).

Mining - Environmental changes caused by mining, either gold or cassiterite, were detected at all sites (Figure 6) except for Site 1.

FIGURE 6. Washing soil to extract gold within Amana National Forest. Note the crater formed in the woods due to soil leaching.
Evidence of Hunting - Bird hunting activity, especially for food, was detected at all surveyed points within Amana, except Site 1, which had no homes nearby. The bird families most affected appear to be Cracidae (Curassows and Guans) and Anatidae (Table 3; Figure 7).

| Location               | Hunted Species                          | Evidence               |
|------------------------|-----------------------------------------|------------------------|
| Site 2 (JML Gold Mining)| Crestless Curassow (*Pauxi tuberosa*)   | feathers               |
|                        | Scarlet Macaw (*Ara macao*)             | feathers               |
| Site 3 (Maranhense)    | Crestless Curassow (*Pauxi tuberosa*)   | feathers               |
|                        | Red-throated Piping-Guan (*Aburria cujubi*) | carcass           |
| Site 4 (São Pedro)     | Ornate Hawk-Eagle (*Spizaetus ornatus*) | carcass               |
|                        | Black-bellied Whistling-Duck (*Dendrocygna autumnalis*) | carcass (Figure 7) |
| Site 5 (Igarapé Preto) | Gray Tinamou (*Tinamus tao*)            | Witnessed eggs collected for consumption |

The number of species reported during this study is about 45% less than the number of expected species for the total area of Amana National Forest. Oren & Parker (1997) recorded 448 bird species in Amazonia National Park. As Amazonia National Park is limited to the south by Amana National Forest, it is plausible that many species found in this park are also present within Amana. Because the sampling effort of this Rapid Ecological Assessment was much smaller than the effort used in Amazonia National Park (Oren & Parker 1997), many species will be added to this preliminary list (Appendix) as more surveys are accomplished in Amana.

Similarity Analysis among Sampling Sites

The two distinct groups shown in the dendrogram (Figure 2) were expected. The separation of Sites 6 (Km 180) and 7 (Km 275; Figure 2) were expected since these sites were located in an open area and quite anthropogenically influenced. At these sites, most bird species are associated with open environments and/or forest edges, differentiating these communities from ones located in sites within Amana. The second group formed by sites 1, 2, 3, 4, and 5 have in common the fact that they are located in a predominantly forest-based habitat of Amana. Three subdivisions within this group can be noted. The first subdivision includes Sites 5 (southern portion of Amana) and 3 (Maranhense), in which the relative proximity and likeness among explored habitats explain similarities among their avian communities. The second subdivision groups Sites 1 (Montanha stream) and 2 (JML Gold Mining), which are highly similar to each other (Table 2). This resemblance can be explained due to the presence of terra-firme forest with plateaus and well-marked shallows. The third subdivision is formed only by Site 4 (São Pedro), located at an intermediate position between the first and second groups of sites (Figure 2). The most plausible explanation for this separation seems to be the presence of two types of environments within
the site, which were not sampled at other points. The first habitat type refers to the floodplain forest and sandy beaches along the Amana River passing through this site. The presence of this medium-sized river with a range of micro-aquatic habitats allowed observation of some species that were not detected at other sites (Appendix). However, the largest contributor to the separation of this site from the others was the presence of the white-sand "campina" forest (sensu, Anderson 1981; Guilherme & Borges 2011). I dedicated special attention to the campina spot in Site 4, and recorded some species typical of campina that were not found at other sampled sites (Appendix).

Endemic Species

According to Cracraft (1985), 21 taxa are considered endemic to the interfluve of the Tapajós and Madeira Rivers. Eight (38.0%) of these taxa were recorded in Amana. White-crested Guan (Penelope pileata), Crimson-bellied Parakeet (Pyrrhura perlata) and Snow-capped Manakin (Lepidothrix nattereri) are cited in the list by Cracraft (1985) as endemic in this interfluve and were recorded in this work (Appendix). However, later studies showed that White-crested Guan occur in almost the entire southern bank of the middle and lower Amazon River (InfoNatura 2007, Brooks et al. 2006) and Crimson-bellied Parakeet and Snow-capped Manakin have been recorded out of the interflupe of the Tapajós/ Madeira Rivers in Rondônia and Mato Grosso States (Cordasso 2014; Lees et al. 2013b; Zanon 2013).

Species Associated with Specific Habitats

The detection of species closely associated with campina and species with higher abundance in this habitat is a clear indication of its importance for the maintenance of local biodiversity. It is necessary to find strategies for preserving this ecosystem against anthropogenic alteration. It is important that biological studies be undertaken at these campinas, which likely hold other rare or geographically restricted species whose survival depends solely on maintaining this habitat intact. Despite not being as rich in species as other Amazonian environments (Oren 1981; Borges 2004), they contribute significantly to the increase of $\alpha$ (local) and $\beta$ (regional) diversity because some species are restricted only to this habitat (Oren 1981; Stotz et. al. 1996; Guilherme & Borges 2011). In the case of Amana National Forest, it was only possible to sample a small portion of campina located at Site 4. It is essential that the other areas of campina within Amana be identified, studied, and preserved. It is important not only to preserve the campinas intact, but also to maintain the matrix of trees around them. This maintenance may contribute significantly to the health of the environment.

Environmental impacts

Mining -- When gold mining is performed manually, the impacts are minimal. Mechanized operation, on other hand, causes huge changes in the environment. The problem lies in the fact that miners dissolve the forest floor with water jets as they search for small fragments of gold mixed with underground argillaceous rock (Figure 6). As a result of this procedure, damage is caused to fauna and flora on various levels: the first and most harmful is forest destruction (in general, the floodplain forest) in the operation area (Figure 6); the second is the transport of large amounts of sediment into rivers and streams, forming craters without vegetation at places of operation (Figure 6); third is the use of chemicals (e.g., mercury and diesel), the waste of which often remains in the area and is not disposed of properly. Mining, besides destroying the main habitats of shorebird species, can also cause the death of the birds, due to harmful, but commonly used, chemicals being released into the environment through seepage or accidents.

Hunting – Hunting, even for subsistence, may reduce the abundance of game species in the Amazon forest (Thiollay 2005). Avian species hunted as game are often naturally rare in tropical forests (Pizo 2001), exacerbating hunting's effects on their populations. If hunting is associated with deforestation or any other type human-caused habitat modification, populations of these species can be drastically reduced and become extinct at certain sites within a few years. Hunting in the FLONA is not yet considered as serious a problem as mining. However, it is necessary to conduct an awareness campaign with local residents. A good awareness campaign could prevent populations of the most persecuted species from being reduced to unsustainable levels. In combination, habitat management tactics like selective logging are essential to ensure persistence of game species' populations. An investigation into the combined effects of this type of forest management as well as hunting pressures on populations of game birds is recommended to understand how best to maintain game species' populations in the long term.

Final Considerations

Although I remained only four days (on average) at each point, and census methods did not sample the entire avian community, our results are useful. More than half (54.9%) of the expected species for the study area were detected, considering all 448 species recorded in Amazonia National Park and its vicinity (Oren & Parker, 1997). These data were sufficient for performing a Rapid Ecological Assessment (Sayre et al. 2003). The survey conducted was preliminary — just enough to compile the REA and identify important areas for biodiversity...
conservation in Amana National Forest. Detection of bird species in the Amazon demands an enormous effort of fieldwork. However, this effort is not normally used in rapid studies aimed at implementing Management Plans (Vasconcelos 2006).

Despite problems related to mining and hunting, the general state of Amana National Forest conservation is still satisfactory. The complications seem to be concentrated along major rivers and streams in Amana, which somehow has protected the terra-firme (upland) forests in interfluves. The terra-firme forests that are distant from areas where mining is more intense are well preserved and meet all the conditions to maintain viable populations of large birds, such as the Razor-billed Curassow (Pauxi tuberosa), as well as large birds of prey. In fact, several curassow flocks within Amana were observed, indicating no significant hunting activity in areas where there is no mining. Additionally, local residents have confirmed the presence of Harpy Eagle at almost all sampling points. The presence of the above listed species, coupled with the occurrence of other cracids such as the Red-throated Piping-Guan (Aburria cucujib) and guans (Penelope sp.), trumpeters (Porphia viridis), large Psittacidae (parrots), and Ramphastidae (toucans), indicate good environmental health of much of Amana.

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**APPENDIX:**

**List of bird species recorded in Amana National Forest and its surroundings, with information on habitat. Sites:**
1 - Right bank of Montanha Stream; 2 - JMS Gold Mining, right bank of Porquinho Stream; 3 - Maranhense; 4 - São Pedro, on the right bank of Amana River; 5 – Igarapé Preto, Southern FLONA point; 6 - FLONA surrounding area, km 180, at the banks of Transamazon Highway; and 7 - FLONA surrounding area, km 275, Rabelo Location. **Record Type:** I – interview, O - observation, P - photo published on WikiAves (www.wikiaves.org), S - specimen collected and deposited in the Museu Paraense Emílio Goeldi, V - recognized vocalization. **Habitats:** A - anthropogenic area; AE - aerial environment, ETF - edge of *terra-firme* rainforest; EFR - edge of floodplain rainforest, ESR - edge of second-growth forest, FR - floodplain rainforest, O - open area, R – banks of rivers and lakes, P - ponds of water along roads and highways, Pa – pasture, S - sandy soil vegetation, TF – *terra-firme* rainforest.

| Family and Species | English Name       | Habitat | Records Type | Sites                |
|--------------------|--------------------|---------|--------------|----------------------|
| **TINAMIDAE**      |                    |         |              |                      |
| Tinamus tao        | Gray Tinamou       | TF      | V (Recorded evidence (egg)) | 1, 2, 3, 4, 5        |
| Tinamus major      | Great Tinamou      | TF      | I¹            | 2, 3, 4              |
| Crypturellus cinereus | Cinerous Tinamou  | TF      | O, V         | 1, 2, 3, 4, 5        |
| Crypturellus soui  | Little Tinamou     | TF      | O, V         | 1, 2, 3, 4, 5        |
| Crypturellus variegatus | Variegated Tinamou | TF     | S (MPEG 65102) | 1                   |
| **ANATIDAE**       |                    |         |              |                      |
| Dendrocygna autumnalis | Black-bellied Whistling-Duck | R | O         | 1, 4                 |
| Cairina moschata   | Muscovy Duck       | R       | O            | 1, 5                 |
| **CRACIDAE**       |                    |         |              |                      |
| Pauci tuberosa     | Razor-billed Curassow | TF   | O, I¹, Recorded evidence (feathers) | 1, 2, 3, 4        |
| Penelope pileata   | White-crested Guan | TF      | O, P(WA436254) |                     |
| Aguerria cucubi    | Red-throated Piping-Guan | TF | O, S (MPEG 65593) | 1, 3               |
| **PHALACROCORIDAE**|                    |         |              |                      |
| Phalacrocorax brasilianus | Neotropic Cormorant | R     | O            | 4                    |
| **ANHINGIDAE**     |                    |         |              |                      |
| Anhinga anhinga    | Anhinga            | R       | O            | 1, 4                 |
| **ARDEIDAE**       |                    |         |              |                      |
| Tigrisoma lineatum | Rufescent Tiger-Heron | R     | O            | 1, 4                 |
| Cochlearius cochlearius | Boat-billed Heron   | R       | I¹            | 4                    |
| Butorides striata  | Striated Heron     | R       | O            | 1, 3, 4, 5           |
| Pilherodius pileatus | Capped Heron       | R       | O            | 1, 5                 |
| Babulcus ibis      | Cattle Egret       | O, Pa   | O, S (MPEG 65103) | 3, 4               |
| Ardea alba         | Great Egret        | R       | O            | 2, 4                 |
| Egretta thula      | Snowy Egret        | R       | O            | 2, 4                 |
| Ardea cocoi        | Cocoi Heron        | R       | O            | 1, 4                 |
| **CATHARTIDAE**    |                    |         |              |                      |
| Cathartes aura     | Turkey Vulture     | ETF, O  | O            | 2, 3, 4, 6           |
| Family and Species | English Name | Habitat | Records Type | Sites |
|--------------------|-------------|---------|--------------|-------|
| Cathartes burrovianus | Lesser Yellow-headed Vulture | ETF, O | O | 1, 2, 3, 4, 6, 5, 7 |
| Coragyps atratus | Black Vulture | O | O | 1, 2, 3, 4, 6, 5, 7 |
| Sarcoramphus papa | King Vulture | TF, O | O | 1, 3 |
| ACCIPITRIDAE | | | | |
| Elanoides forficatus | Swallow-tailed Kite | TF, O | O | 1, 2, 3, 4, 6, 7 |
| Ictinia plumbea | Plumbeous Kite | EFR | O | 1, 2, 3, 4, 6, 5, 7 |
| Geranospiza caeruleus | Crane Hawk | TF | O | 4 |
| Urubitinga urubitinga | Great Black-Hawk | EFR | O | 4 |
| Rapornis magnirostris | Roadside Hawk | ETF, FR, O | O | 1, 2, 3, 4, 6, 5, 7 |
| Buteo niitidus | Gray Hawk | EFR, O | O | 4 |
| Buteo brachyurus | Short-tailed Hawk | O | O | 6 |
| Harpia harpyja | Harpy Eagle | TF | O | 4 |
| Spizaetus tyrannus | Black Hawk-Eagle | EFR | O | 2 |
| Spizaetus ornatus | Ornate Hawk-Eagle | TF | I¹ | 4 |
| PSOPHIIDAE | | | | |
| Psophia viridis | Green-winged Trumpeter | TF | O | 1, 3, 4 |
| RALLIDAE | | | | |
| Aramides cajaneus | Gray-necked Wood-Rail | TF | O | 1, 2, 3, 4, 5 |
| EURYPYGIDAE | | | | |
| Eurypyga helias | Sunbittern | R | I¹ | 1, 2, 4, 5 |
| CHARADRIIDAE | | | | |
| Vanellus cayanus | Pied Lapwing | R | O, S (MPEG 65595) | 4 |
| Vanellus chilensis | Southern Lapwing | O | O | 4, 6, 5 |
| Charadrius collaris | Collared Plover | P | O | 6 |
| JACANIDAE | | | | |
| Jacana jacana | Wattled Jacana | R | O | 4, 5 |
| STERNIDAE | | | | |
| Sterna superciliaris | Yellow-billed Tern | R | O | 4 |
| COLUMBIDAE | | | | |
| Columbina passerina | Common Ground-Dove | O | O | 1, 2, 3, 4, 6, 5, 7 |
| Columba livia | Rock Pigeon | A | O | 6 |
| Patagioenas speciosa | Scaled Pigeon | ETF | O | 3, 4, 5 |
| Patagioenas cayennensis | Pale-vented Pigeon | TF | O | 2, 3, 4, 5 |
| Leptotila verreauxi | White-tipped Dove | TF | S (MPEG 65596) | 4, 5 |
| Leptotila rufaxilla | Gray-fronted Dove | TF | O | 2, 3 |
| Geotrygon montana | Ruddy Quail-Dove | TF | S (MPEG 65597) | 1, 4, 5 |
| OPISTHOCOMIDAE | | | | |
| Opisthocomus hoazin | Hoatzin | R | O | 1, 2, 4 |
### Family and Species | English Name | Habitat | Records Type | Sites
--- | --- | --- | --- | ---
**CUCULIDAE**
Piaia cayana | Squirrel Cuckoo | TF | O | 1, 2, 3, 4, 5
Crotophaga major | Greater Ani | R | O | 1, 2, 4
Crotophaga ani | Smooth-billed Ani | ESR, O | O | 2, 3, 4, 6, 5, 7
Neomorphus squamiger | Scaled Ground-Cuckoo | TF | O | 1
**STRIGIDAE**
Megascops choliba | Tropical Screech-Owl | ETF | V, O | 1, 3
Athene cunicularia | Burrowing Owl | O | O | 7
**NYCTIBIIDAE**
Nyctius griseus | Common Potoo | TF | V, O | 1, 5
**CAPRIMULGIDAE**
Chordeiles nacunda | Nacunda Nighthawk | O | O | 6
Hydropsalis albicollis | Pauraque | ETF | V, O | 1, 2, 3, 4, 6, 5, 7
Hydropsalis nigricans | Blackish Nightjar | S | S (MPEG 65600) | 4
Hydropsalis torquata | Scissor-tailed Nightjar | R | S (MPEG 65106) | 2
**APODIDAE**
Chaetura brachyura | Short-tailed Swift | AE | O | 2, 3
Tachornis squamata | Fork-tailed Palm-Swift | AE | O | 2, 3, 4, 5
Cypseloides senex | Great Dusky Swift | AE | O | 4
**TROCHILIDAE**
Threnetes leucurus | Pale-tailed Barbtroat | TF | S (MPEG 65604) | 3
Phaethornis ruber | Reddish Hermit | TF | O, V | 2, 5
Phaethornis philippii | Needle-billed Hermit | S, TF, ETF | S (MPEG 65104, 65605, 65606, 65607, 65110) | 1, 2, 4, 5
Phaethornis supervillosus | Long-tailed Hermit | TF | S (65609, 65610) | 1, 2, 3, 4, 5
Phaethornis malacis | Great-billed Hermit | TF | S (MPEG 65111) | 3
Campylopterus largipennis | Gray-breasted Sabrewing | ESR | S (MPEG 65112) | 3
Florisuga mellivora | White-necked Jacobin | ESR | O | 3, 5
Anthracothorax nigricollis | Black-throated Mango | ETF | O | 4
**TROGONIDAE**
Topaza pella | Crimson Topaz | TF | S (MPEG 65603) | 3
Discosura langsdorffi | Black-bellied Thorntail | ESR | O, P(WA784190) | 3
Discosura longicaudus | Racket-tailed Coquette | ESR | S (MPEG 65602), P(WA784194) | 3
Thalaranina furcata | Fork-tailed Woodnymph | TF | S (MPEG 65611, 65612) | 1, 2, 3, 5
Hylocharis sapphirina | Rufous-throated Sapphire | ESR | S (MPEG 65601) P(WA453732) | 3
Heliothryx auritus | Black-earred Fairy | ETF | S (MPEG 65608) | 5
**TROGONIDAE**
Trogon viridis | White-tailed Trogon | EFR | O | 2
Trogon curucui | Blue-crowned Trogon | EFR | O | 1, 2
| Family and Species | English Name               | Habitat | Records Type | Sites |
|-------------------|---------------------------|---------|--------------|-------|
| Trogon violaceus  | Violaceous Trogon         | TF      | O            | 1, 4  |
| Trogon collaris   | Collared Trogon           | TF      | O            | 3     |
| Trogon rufus      | Black-throated Trogon     | TF      | O            | 2     |
| Trogon melanurus  | Black-tailed Trogon       | TF      | O            | 1     |
| ALCEDINIDAE       |                           |         |              |       |
| Megaceryle torquata| Ringed Kingfisher         | R       | O            | 1, 2, 4|
| Chloroceryle amazona | Amazon Kingfisher     | R       | O            | 1, 2, 4|
| Chloroceryle aenea | American Pygmy Kingfisher | R       | O            | 1, 2, 4|
| Chloroceryle americana | Green Kingfisher  | R       | O            | 1, 2, 4|
| Chloroceryle inda | Green-and-rufous Kingfisher | TF  | O            | 1     |
| MOMOTIDAE         |                           |         |              |       |
| Electron platyrhynchum | Broad-billed Motmot  | EFR     | O            | 1     |
| Baryphthengus martii | Rufous Motmot           | TF      | S (MPEG 65594) | 1, 3, 5|
| Momotus momota    | Amazonian Motmot         | TF      | O            | 1     |
| GALBULIDAE        |                           |         |              |       |
| Galbula dea       | Paradise Jacamar         | FR      | O            | 1, 2  |
| BUCCONIDAE        |                           |         |              |       |
| Bucco tamatia     | Spotted Puffbird         | TF      | O, P (WA785084) | 1     |
| Malacoptila rufa  | Rufous-necked Puffbird   | TF      | S (MPEG 65613) | 1, 2, 5|
| Monasa nigrifrons | Black-fronted Nunbird    | TF, FR  | O            | 1, 2, 3, 4|
| Monasa morpoeus   | White-fronted Nunbird    | ETF     | O            | 1, 3  |
| Chelidoptera tenebrosa | Swallow-winged Puffbird | EFR     | O            | 1, 2, 4, 6, 5, 7|
| RAMPHASTIDAE      |                           |         |              |       |
| Ramphastos tucanus | White-throated Toucan    | TF      | O            | 1, 2, 3, 4, 6, 5, 7|
| Ramphastos vitellinus | Channel-billed Toucan   | TF      | O            | 1, 2, 3, 4, 6, 5, 7|
| Pteroglossus inscriptus | Lettered Aracari | EFR     | O            | 1     |
| Pteroglossus aracari | Black-necked Aracari    | TF      | O            | 1, 2, 3, 4, 5|
| PICIDAE           |                           |         |              |       |
| Picumnus aurifrons | Bar-breasted Piculet     | TF      | S (MPEG 65113) | 3     |
| Melanerpes cruentatus | Yellow-tufted Woodpecker | ETF    | O            | 1, 2, 3, 4|
| Piculus flavigula | Yellow-throated Woodpecker | TF    | O            | 1     |
| Celeus grammicus | Scaly-breasted Woodpecker | EFR    | O            | 1     |
| Dryocopus lineatus | Lineated Woodpecker      | EFR     | O            | 1, 2, 3, 4, 6, 5, 7|
| Campephilus rubicollis | Red-necked Woodpecker | ETF     | O            | 2     |
| FALCONIDAE        |                           |         |              |       |
| Daptrius ater     | Black Caracara           | ETF, FR | O            | 2, 4, 6|
| Ibycter americanus | Red-throated Caracara    | EFR     | O            | 1, 4  |
| Milvago chimachima | Yellow-headed Caracara   | ETF, O  | O            | 1     |
| Family and Species | English Name                  | Habitat | Records Type | Sites       |
|-------------------|-------------------------------|---------|--------------|-------------|
| Herpetotheres cachinnans | Laughing Falcon              | ETF, O  | O            | 1, 3, 4, 5  |
| Falco rufigularis   | Bat Falcon                    | EFR     | O            | 1, 4, 5     |
| PSITTACIDAE         |                               |         |              |             |
| Ara anarauna        | Blue-and-yellow Macaw         | TF      | I1           | 1, 2, 3, 4, 6, 5, 7 |
| Ara macao           | Scarlet Macaw                 | TF      | O            | 1, 2, 3, 4, 6, 5, 7 |
| Ara chloropterus    | Red-and-green Macaw           | TF      | I1           | 4           |
| Orthopsittaca manilatus | Red-bellied Macaw            | TF      | O            | 1, 2, 3, 4, 6, 5, 7 |
| Guaruba guarouba    | Golden Parakeet               | TF, FR  | O            | 2, 3, 4, 6, 5, 7 |
| Psittacara leucophthalma | White-eyed Parakeet          | TF, FR  | O            | 6, 5        |
| Pyrrhura perlata   | Crimson-bellied Parakeet      | EFR     | O            | 1, 4        |
| Brotogeris versicolurus | Canary-winged Parakeet       | EFR     | O            | 1, 4        |
| Brotogeris chrysoptera | Golden-winged Parakeet       | ETF     | O            | 1, 4, 5     |
| Pyrilia auranticopehala | Bald Parrot                 | EFR     | S (MPEG 65599) | 2          |
| Amazona ochrocephala | Yellow-crowned Parrot        | EFR     | O            | 4           |
| Amazona kawalli    | Kawall's Parrot               | EFR     | O            | 4           |
| Amazona amazonica  | Orange-winged Parrot          | ESR     | O            | 1, 4, 6, 5, 7 |
| Deroptyus accipitrinus | Red-fan Parrot               | EFR     | I1           | 4           |
| THAMNOPHILIDAE      |                               |         |              |             |
| Epinecrophylla leucophthalma | White-eyed Antwren           | FR      | S (MPEG 65127, 65128) | 1          |
| Myrmotherula multistriata | Amazonian Streaked-Antwren   | TF      | O, S (MPEG 65135) | 2, 3       |
| Myrmotherula axillaris | White-flanked Antwren        | TF      | S (MPEG 65625) | 3           |
| Myrmotherula longipennis | Long-winged Antwren          | TF      | S (MPEG 65622) | 3           |
| Isleria hauxwelli  | Plain-throated Antwren        | FR      | O            | 1           |
| Thamnomanes saturninus | Saturnine Antshrike          | TF      | O, S (MPEG 65125, 65126) | 1, 2, 3, 4, 5 |
| Thamnomanes caesius | Cinereous Antshrike           | TF      | O, S (MPEG 65124) | 1, 2, 3, 4, 5 |
| Thamnophilus deliatus | Barred Antshrike             | ESR     | O            | 2, 5        |
| Thamnophilus schistaceus | Plain-winged Antshrike      | TF      | S (MPEG 65123) | 2           |
| Thamnophilus aethiops | White-shouldered Antshrike   | TF      | O            | 3           |
| Thamnophilus stictocephalus | Natterer’s Slaty-Antshrike  | TF      | O            | 1           |
| Thamnophilus amazonicus | Amazonian Antshrike          | TF      | S (MPEG 65626) | 1           |
| Myrmoderus ferrugineus | Ferruginous-backed Antbird  | TF      | O, S (MPEG 65130) | 1, 2, 5    |
| Hylophylax naevius  | Spot-backed Antbird          | FR      | O            | 1           |
| Myrnoborus myotherinus | Black-faced Antbird          | TF      | O, S (MPEG 65129) | 1, 2        |
| Hypocnemis striata | Spix’s Warbling-Antbird      | TF      | O, S (MPEG 65628) | 1, 3, 5    |
| Willisornis pocilinotus | Scale-backed Antbird         | TF      | S (MPEG 65132) | 1, 2, 3, 5  |
| Phlegopsis nigromaculata | Black-spotted Bare-eye      | TF      | O, S (MPEG 65133) | 1, 2, 3, 5 |
| Phlegopsis orobae   | Pale-faced Antbird           | TF      | S (MPEG 65631, 65632) | 3         |
| Rhegnatorhina berlepschi | Harlequin Antbird           | TF      | S (MPEG 65131, 65134) | 1, 2, 3, 5 |
| Family and Species       | English Name               | Habitat | Records Type | Sites |
|--------------------------|---------------------------|---------|--------------|-------|
| FORMICARIIDAE            |                           |         |              |       |
| Formicarius analis       | Black-faced Antthrush     | TF      | O            | 1, 2, 3, 5 |
| DENDROCOLAPTIDAE         |                           |         |              |       |
| Dendrocincla fuliginosa  | Plain-brown Woodcreeper   | TF      | S (MPEG 65115, 65116, 65615) | 1, 4 |
| Dendrocincla merula      | White-chinned Woodcreeper  | TF      | S (MPEG 65614) | 3    |
| Deconychura longicauda   | Long-tailed Woodcreeper    | TF      | S (MPEG 65616) | 1    |
| Certhiasomus strictolaemus | Spot-throated Woodcreeper | TF      | S (MPEG 65617) | 1, 3 |
| Glyphorynchus spirurus   | Wedge-billed Woodcreeper   | TF      | S (MPEG 65121) | 1, 2, 3, 4, 5 |
| Dendrocolaptes hoffmannsi | Hoffmann's Woodcreeper    | TF      | S (MPEG 65117) | 1, 3 |
| Xiphorhynchus ocellatus  | Ocellated Woodcreeper      | FR      | S (MPEG 65119) | 1    |
| Xiphorhynchus elegans    | Elegant Woodcreeper        | TF      | S (MPEG 65120) | 1, 2 |
| Xiphorhynchus guttatus   | Buff-throated Woodcreeper  | FR      | S (MPEG 65118) | 1, 2, 3, 4, 5 |
| XENOPIDAE                |                           |         |              |       |
| Xenops tenuirostris      | Slender-billed Xenops     | FR      | O            | 1    |
| Xenops minutus           | Plain Xenops              | FR      | O            | 1    |
| FURNARIIDAE              |                           |         |              |       |
| Philydor pyrrhodes       | Cinnamon-rumped Foliage-gleaner | FR | S (MPEG 65122) | 1, 2 |
| Philydor erythropterum   | Chestnut-winged Foliage-gleaner | FR | O            | 1    |
| Automolus paraensis      | Para Foliage-gleaner      | FR      | S (MPEG 65620) | 1, 2, 3 |
| Automolus ochrolaemus    | Buff-throated Foliage-gleaner | FR | O            | 2    |
| Synallaxis gujanensis    | Plain-crowned Spinetail    | EFR     | S (MPEG 65621) | 4    |
| PIPRIDAE                 |                           |         |              |       |
| Pipra fasciacauda        | Band-tailed Manakin       | FR      | S (MPEG 65152) | 2, 3 |
| Ceratopipra rubrocapilla | Red-headed Manakin        | FR      | O, S (MPEG 65645, 65153) | 1, 2, 3, 4 |
| Lepidothrix nattereri    | Snow-capped Manakin       | FR      | S (MPEG 65149, 65150, 65151) | 1, 3, 4 |
| Manacus manacus          | White-bearded Manakin     | S,      | S (MPEG 65148) | 4    |
| Heterorhina lutea       | Flame-crowned Manakin     | FR, S   | O, S (MPEG 65158), P(WA784186) | 2, 4, 6 |
| Chiroxiphia pareola      | Blue-backed Manakin       | FR      | S (MPEG 65644) | 1    |
| ONYCHORHYNCHIDAE         |                           |         |              |       |
| Onychorhynchus coronatus | Royal Flycatcher          | FR      | O            | 2, 5 |
| Myiobius barbatus        | Whiskered Flycatcher      | FR      | S (MPEG 65634) | 3, 4 |
| TITYRIDAE                |                           |         |              |       |
| Laniocera hypopyra       | Cinereous Mourner         | FR      | S (MPEG 65154) | 4    |
| Tityra inquisitor        | Black-crowned Tityra      | S       | S (MPEG 65642) | 4    |
| Tityra cayana            | Black-tailed Tityra       | TF, S   | O, S (MPEG 65641) | 1, 2, 3, 4, 6, 5, 7 |
| Tityra semifasciata      | Masked Tityra             | EFR     | O            | 4    |
## Family and Species

| Family and Species | English Name            | Habitat | Records Type | Sites          |
|--------------------|-------------------------|---------|--------------|----------------|
| **Cotingidae**     |                         |         |              |                |
| Lipaugus vociferans| Screaming Piha          | TF,FR   | O, V         | 1, 2, 3, 4, 5  |
| Xipholena lamellipennis| White-tailed Cotinga  | FR      | O            | 3              |
| Gymnoderus foetidus | Bare-necked Fruitcrow   | FR      | O            | 2              |
| **Tyrannidae**     |                         |         |              |                |
| Mionectes olegineus| Ochre-bellied Flycatcher| FR      | O, S (MPEG 65146) | 1, 2, 3, 4 |
| Mionectes macconnelli| McConnell’s Flycatcher  | S       | S (MPEG 65638, 65639) | 4              |
| Hemitriccus minor  | Snethlage’s Tody-Tyrant | FR      | S (MPEG 65145) | 1              |
| Myiopagis gaimardii| Forest Elaenia          | ESR     | S (MPEG 65635) | 3, 5           |
| Elaenia parvirostris| Small-billed Elaenia    | EFR     | S (MPEG 65139) | 4              |
| Elaenia spectabilis| Large Elaenia           | ESR     | S (MPEG 65142) | 3              |
| Tolmomyias flaviventris| Yellow-breasted Flycatcher | ESR   | S (MPEG 65636, 65637, 65140, 65141) | 3, 4  |
| Tolmomyias poliocephalus| Gray-crowned Flycatcher | ESR     | S (MPEG 65633) | 3              |
| Lathrotriccus euleri| Euler’s Flycatcher      | ESR     | O            | 6              |
| Legatus leucophaius | Piratic Flycatcher       | ESR     | O, S (MPEG 65144) | 1, 2, 3, 4, 6 |
| Myiozetetes cayanensis| Rusty-margined Flycatcher | ETF  | O            | 1, 2, 3, 4, 6, 5, 7 |
| Pithangus sulphuratus| Great Kiskadee          | ETF     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Myiodynastes maculatus | Streaked Flycatcher     | ETF     | O            | 2, 3           |
| Megarynchus pitangia| Boat-billed Flycatcher   | EFR     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Empidonumus varius  | Variegated Flycatcher    | EFR     | O, P(WA454249) | 3, 6           |
| Tyrannus melancholicus| Tropical Kingbird       | EFR     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Myiarchus ferox     | Short-crested Flycatcher | EFR     | O, S (MPEG 65640) | 1, 2, 3, 4, 6, 5, 7 |
| Attila spadiceus    | Bright-rumped Attila     | FR      | O, S (MPEG 65137) | 2, 3           |
| **Vireonidae**     |                         |         |              |                |
| Cyclarhis gujanensis| Rufous-browed Peppershrike | EFR  | O, V         | 1, 2, 3, 4, 6  |
| Vireo olivaceus     | Red-eyed Vireo          | ESR     | S (MPEG 65647) | 6              |
| Hylophilus semicinereus| Gray-chested Greenlet  | ESR     | S (MPEG 65648) | 6              |
| Hylophilus ochraceiceps| Tawny-crowned Greenlet | FR      | S (MPEG 65160) | 1              |
| **Hirundinidae**   |                         |         |              |                |
| Tachycineta albiventer| White-winged Swallow    | R       | O            | 1, 2, 4        |
| Progne tapera       | Brown-chested Martin     | O       | O            | 4, 6           |
| Progne chalybea     | Gray-breasted Martin     | O, A    | O            | 4, 6, 5, 7     |
| Atticora fasciata   | White-banded Swallow     | R       | O, S (MPEG 65162) | 1, 2, 4, 5    |
| **Troglodytidae**   |                         |         |              |                |
| Microcerculus marginatus| Scaly-breasted Wren      | TF      | S (MPEG 65155) | 1              |
| Troglohytes musculus| Southern House Wren      | A, O    | O            | 2, 6           |
| Campylorhynchus turdinus| Thrush-like Wren        | EFR     | O            | 1, 2, 3, 4, 5  |
| Pheugopedius genibarbis| Moustached Wren         | ESR     | O, S (MPEG 65156) | 2, 5           |
| Family and Species | English Name               | Habitat | Records Type | Sites       |
|--------------------|---------------------------|---------|--------------|-------------|
| Cantorchilus leucotis | Buff-breasted Wren         | S       | S (MPEG 65157) | 4           |
| **TURDIDAE**        |                           |         |              |             |
| Turdus fumigatus    | Cocoa Thrush              | EFR     | S (MPEG 65654) | 1, 4        |
| Turdus lawrencii    | Lawrence’s Thrush         | FR      | O, V         | 1           |
| Turdus albicollis   | White-necked Thrush       | TF      | S (MPEG 65655) | 3, 5        |
| **PASERELLIDAE**    |                           |         |              |             |
| Ammodramus aurifrons | Yellow-browed Sparrow     | O       | O            | 2, 3, 4, 6, 5, 7 |
| **PARULIDAE**       |                           |         |              |             |
| Myiothlypis rivularis | Neotropical River Warbler | FR      | S (MPEG 65161) | 1           |
| **ICTERIDAE**       |                           |         |              |             |
| Psarocolius viridis | Green Oropendola          | EFR, FR | O            | 3, 4        |
| Icterus cayanensis  | Epaulet Oriole            | EFR, FR | O            | 5           |
| Cacicus cela        | Yellow-rumped Cacique     | EFR     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Molothrus oryzivorus | Bobolink                | R       | O            | 4           |
| Molothrus bonariensis | Shiny Cowbird         | EFR     | S (MPEG 65662) | 2, 4        |
| Sturnella militaris | Red-breasted Blackbird   | O       | S (MPEG 65169) | 4, 5, 7     |
| **THRAUPIDAE**      |                           |         |              |             |
| Saltator grossis    | Slate-colored Grosbeak    | ESR     | O            | 2           |
| Saltator maximus    | Buff-throated Saltator    | EFR     | O            | 2, 3, 4     |
| Habia rubica        | Red-crowned Ant-Tanager   | TF      | S (MPEG 65657) | 1           |
| Lamio cristatus     | Flame-crested Tanager     | TF      | S (MPEG 65653) | 1           |
| Lamio surinamus     | Fulvous-crested Tanager   | EFR     | O            | 3           |
| Tachyphonus rufus   | White-lined Tanager       | EFR     | O, S (MPEG 65164, 65165, 65166) | 2, 4, 6, 5, 7 |
| Tachyphonus phoenicius | Red-shouldered Tanager   | S       | S (MPEG 65159) | 4           |
| Ramphocelus carbo   | Silver-beaked Tanager     | EFR     | O, S (MPEG 65658) | 1, 2, 3, 4, 6, 5, 7 |
| Tangara episcopus   | Blue-gray Tanager         | EFR     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Tangara palmarum    | Palm Tanager              | EFR     | O            | 1, 2, 3, 4, 6, 5, 7 |
| Tangara chilensis   | Paradise Tanager          | TF      | O            | 3           |
| Tangara schrankii   | Green-and-gold Tanager    | FR      | O, P(WA784182) | 2           |
| Dacnis lineata      | Black-faced Dacnis        | TF, ESR | S (MPEG 65178, 65179) | 3           |
| Dacnis cayana       | Blue Dacnis               | TF, ESR | S (MPEG 65177) | 3           |
| Cyaneerpes nitidus  | Short-billed Honeycreeper | TF, ESR | S (MPEG 65170, 65171, 65172, 65173, 65174) | 3           |
| Cyaneerpes caeruleus | Purple Honeycreeper      | TF, ESR | S (MPEG 65175, 65176) | 3           |
| Volatinia jacarina  | Blue-black Grassquit      | ESR     | O            | 4, 6, 5, 7  |
| Sporophila americana | Wing-barred Seedeater     | O       | S (MPEG 65167, 65663), P(WA453727) | 4           |
A preliminary survey and rapid ecological assessment of the avifauna of Amana National Forest (Itaituba and Jacareacanga, Pará, Brazil)

Edson Guilherme

| Family and Species | English Name             | Habitat | Records Type                  | Sites |
|--------------------|--------------------------|---------|-------------------------------|-------|
| Sporophila nigricollis | Yellow-bellied Seedeater | ESR     | O, S (MPEG 65664, 65666)      | 3, 6  |
| Sporophila castaneiventris | Chestnut-bellied Seedeater | O       | O                             | 4, 6, 5, 7 |
| Sporophila angolensis | Chestnut-bellied Seed-Finch | O       | O, S (MPEG 65665)             | 2, 3, 4 |
| Paroaria gularis    | Red-capped Cardinal      | R       | O                             | 1, 2, 4, 5 |
| **CARDINALIDAE**    |                          |         |                               |       |
| Caryothraustes canadensis | Yellow-green Grosbeak     | S       | S (MPEG 65660)                | 4     |
| Cyanoloxia rothschildii | Rothchild’s Blue Grosbeak | TF      | O                             | 1, 3, 4 |
| **FRINGILIDAE**     |                          |         |                               |       |
| Euphonia xanthogaster | Orange-bellied Euphonia  | TF      | S (MPEG 65667)                | 3     |

1 - Refers to interviews with local residents (at each sampling point) on the occurrence of some bird species in the Amana National Forest.