Assessment of avian occurrence in the Brazilian chaco

Abstract
This study shows the magnitude of the avifauna occurring in the Brazilian Chaco biome, located in the central region of South America. The Chaco formation is present in Brazil, Paraguay, Bolivia and Argentina, comprising a large phyto physiognomy of nearly 800,000km², of which 9,000km² is located in Brazil, near the town of Porto Murtinho, a transition zone of the Pantanal wetland. It is formed by spiny trees which lose their small leaves during the dry season. During our field work we registered 326 species of wild birds, and, when added to other published surveys, this number totalizes 355 species living within the Brazilian Chaco. The most common species were Tyrannidae (13.2%), followed by Thraupidae (9.2%) and Icteridae (4.9%). Fourteen officially listed threatened bird species were detected during our field work. Our results contribute to the knowledge on bird diversity living in the Brazilian Chaco, and to the potential attraction for sustainable tourism, as an incentive to protect the avifauna and their habitats, achieving conservation for the biodiversity of the region.

Keywords: avifauna, birdwatching, chaco, conservation, threatened bird species

Introduction
The Chaco is one of the largest biomes in South America, rich in biodiversity, but facing increasing environmental disruptions due to demographic expansion and unsustainable use of natural resources. Wild species of birds can attract tourism as one element to conserve nature, providing economic incentives since biodiversity can represent important socioeconomic and environmental activities. The Chaco is an arid subtropical biome in the center of South America, dominated by savanna vegetation and rare low forest. It is the second largest biome in South America. This steppe Savanna vegetation formation, as it is known, comprises 520,000km² (46%) in Argentina, 230,000km² (32%) in Paraguay, 90,000km² (15%) in Bolivia and 9,000km² (7%) in Brazil. There is a predominance of xenomorphic vegetation, with deciduous trees, cacti and bromeliads. The vast Quaternary plain between the Paraguay Parauna rivers and the foothills of the western ranges, known as the ‘Gran Chaco’, is a natural region, 700km wide in the east west direction and roughly 1,500km from north to south, comprising an area estimated to range from 800,000 to 1,000,000km².

In its extreme eastern portion is the Paraguay River in Brazilian territory, south of the Pantanal wetland, in the sub regions Porto Murtinho and Nabileque, and this comprises the wet Chaco. It is a transition area among the surrounding biomes of the Pantanal wetland, namely the Cerrado (savanna), and the Dry Forests there is an interception among the vegetation formations, forming ecotones that cannot easily be identified by sight. There is high density of the palm tree “caranda” (Copernicia alba Morong), and other trees such as “paratudo” (Handroanthus aureus Mattos) and “piuva” (H. heptaphylla (Vell.) Mattos). The Chaco forest in north eastern Argentina and Paraguay, entering Brazilian territory, near the city of Porto Murtinho, is dominated by a hardwood tree red quebracho (Schinopsis balansae Engl) which is typical of this region. The Brazilian Chaco has lately received increasing research attention, especially in plant sciences, but there have been few studies on wild birds. Some studies have even stressed the lack of avian surveys for that region. The last survey carried out in the Brazilian Chaco region reached 282 bird species. This list of species includes previously collected secondary data. The aim of the present study is to contribute to the knowledge of the rich and diverse avifauna of the Brazilian Chaco region, to pursue conservation and to attract tourists to the region, and thus to implement sustainable use through tourism and birdwatching activities.

Materials and methods
Study area
This study was conducted throughout the Chaco region of Porto Murtinho, in the southwestern part of the state of Mato Grosso do Sul, in Brazil. The regional climate is hot and dry, with annual average rainfall of 970.3mm and temperature of 25°C, with a rainy season from November to February. The environmental seasonality within this region is more marked by rainfall than by change in temperature. Different kinds of habitats were surveyed, including riparian forest, open dry and flooded fields, savanna (Cerrado) and steppe savanna (Chaco), forest and areas under human use, such as pastures (Figure 1).

Field surveys
Short term and intensive bird surveys were carried out in the field from 2002 to 2015. Six expeditions were conducted with variable length of duration, covering terrestrial and fluvial routes, starting at 06h00 and going until 11h00, and then from 14h00 until 17h30. The search for nocturnal species ran from 19h00 until 22h00. Occasional and opportunistic bird registers were also recorded during our journeys, including directed visual observation and bird vocalization signals. The detected species were photographed whenever possible, to serve as evidence of occurrence. The surveyed areas are shown in Table 1.

Keywords: avifauna, birdwatching, chaco, conservation, threatened bird species
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Urban area of porto murtinho and paraguay river banks: The urban zone of the town of Porto Murtinho is located on the left bank of the Paraguay River, and despite the presence of 15,000 inhabitants, there are still some remnants of natural vegetation. Some key-trees are present: species of *Prosopis*, *Zizyphus*, *Schinopsis*, *Aspidosperma* and others.

Barranco branco station: This site is characterized by typical Chaco vegetation, including the predominance of the caranda palm *Copernicia alba* (common in steppe park savanna) on the left bank of the Paraguay River. Flooded fields are present along with the typical phyto physiognomies of Chaco: woody-grassy savanna, steppe scrub savanna and forested steppe savanna.

Ingazeira station: This area also presents typical Chaco vegetation such as riparian forest, deciduous forest, savanna forest; swamp sand flooded open fields with significant presence of woody-grassy savanna, steppe scrub savanna, steppe park savanna and forested steppe savanna.

Dam to control flooding and rural area: The vegetation cover of this study site is mainly formed by steppe woody-grassy savanna, steppe park savanna, forest steppe savanna and steppe scrub savanna. Besides the presence of the palm caranda *Copernicia alba*, other trees were noted such as *Prosopis* spp. and *Zizyphus oblongifolia*.

Road BR-267/MS: Along this road and its surroundings there is vegetation cover like savanna (Cerrado), remnants of seasonal deciduous forest, and transitions to the Pantanal wetland.

Cerro pora cattle ranch: This region shows a predominance of savanna (Cerrado), seasonal deciduous forest and gallery forest. The Chaco vegetation is restricted to some transition to Cerrado. Open fields are present. The area is used for cattle ranching.

Cangalha cattle ranch: This area is also used for cattle ranching, with some vegetation cover still present, including Cerrado and flooded fields. The species names and taxonomic arrangements adopted here follow. 14

Table 1 Surveyed area covered by field work from 2002 to 2015 throughout the Brazilian Chaco region near Porto Murtinho

| Surveyed sites                                      | Duration of the survey (days) | Survey period                  | Geographic coordinates |
|-----------------------------------------------------|-------------------------------|--------------------------------|-------------------------|
| Cachoeira do Apa Municipal Park                     | 4                             | August 2002, January 2003      | 22°10'21.08"S 57°30'58.5"W |
| Urban area of Porto Murtinho                        | 2-Jan                         | August 2002, January 2003, February 2008, June 2015, October 2015 | 21°41'42.01"S 57°52'42.2"W |
| Margin of the Paraguay River                        | 2-Jan                         | 15-Oct                         | 21°42'37.7"S 57°54'8.7"W |
| Barranco Branco Station                             | 4                             | February 2008, June 2015       | 21°5'58.6"S 57°50'37.8"W |
| Ingazeira Station                                  | 3                             | February 2008, June 2015       | 22°45'3.6"W 57°56'23.1"W |
| Dam to Control Flooding and Rural Area              | 2-Jan                         | February 2008, June 2015, October 2015 | 21°41'18.1"S 57°52'46.8"W |
| Road BR- 267/MS                                     | 1                             | 15-Oct                         | 21°41'59.32"S 57°51'47.38"W |
| Cerro Pora Cattle Ranch                            | 4                             | Dec-15                         | 22°01'44.0"S 57°31'22.0"W |
| Cangalha Cattle Ranch                              | 4                             | Dec-15                         | 22°08'21"S 57°34'50"W |

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Results and discussion

Chaco or “chaku”, in the Quechua language, means hunting territory, with high bird richness. The Brazilian part of the Chaco harbors different habitats for bird species, with influence of the savanna floral province (Cerrado) and the Pantanal wetland. However, the dry vegetation formation of the Chaco has its own characteristics: it is an environment that is more xeric than hydric, with some plant species like S. balansae, Aspidosperma quebrachoblanco, Caesalpinia paraguariensis, Acacia spp., Prosopis spp. and others. We registered 326 bird species during our survey. The most representative bird families were Tyrannidae (13.2%), Thraupidae (9.2%) and Icteridae (4.9%). Among the non Passeriformes the families with most representatives were Accipitridae (8.3%), Picidae (7.7%) and Psittacidae (7.7%). The Tyrannidae is the largest bird taxonomic family of the Neotropics, representing about 18% of the passeriforms of South America.13 This family includes frugivore and phytovore species.14 Among the Icteridae are the blackbirds, much sought after by birdwatchers. The list of the bird species encountered during our survey is summarized in Table 2. The number of bird species (326), registered in our present field survey, contributes to the ornithological knowledge of the region. Our results show that 253 species had already been registered in a previous survey.11 Comparing our study to another study carried out in the Argentine Chaco,16 which accounted for the occurrence of 96 species living in the understory of the forest, 69 species were coincident with our present study. Comparing our results to Bolivia, 80 species out of a total of 110 species found in a Bolivian Chaco survey17 were also recorded in our present study. In connection with the Paraguayan part of the Chaco, 233 bird species were registered there,18 and 194 species of those were also registered in this present study. Therefore, our survey shows the occurrence of 73 bird species which represent a new register for the Brazilian Chaco. Thus, the present survey plus the previous one for the Brazilian Chaco11 totalize 355 bird species for the region. The species Saltator multiclor, which is endemic to the Chaco,19 was found in open areas (n=130; 39.9%), and the other portion occurs in generalist habitats: forest, open areas and modified habitats (n=87; 26.7%), only in forest (n=44; 13.5%), and in aquatic areas (n=65; 19.9%). Some birds depend upon the presence of well preserved open habitats, including species of Furnariidae, Tyrannidae, Thraupidae, and Cardinalidae. Considering the location of the Chaco and its limits to the west with the Andes, the Amazon in the north, and the Pampas and Patagonia in the south, there has been a high biogeographical interest in the region.28,29}

The birds of the Chaco exhibit very low avian endemism and they present very close affinities with the surrounding avifauna.10,24–27 However, the region of Porto Murinho presents species of birds which are particular to the Chaco,22 with a close bio geographical connection with the nearby Cerrado and the Pantanal biomes. Considering the location of the Chaco and its limits to the west with the Andes, the Amazon in the north, and the Pampas and Patagonia in the south, there has been a high bio geographical interest in the region.28,29–31 Open habitats favor insectivore species, and the Tyrannidae are more abundant. We found 35.6% of insectivore species in our survey. They rely mostly on arthropod prey, complementing their diet with other items.13 Besides, many Tyrannidae species are austral migrants. Among the omnivores, the combination of terrestrial and hydric habitats favor the offer of invertebrate preys, amphibians and fish, depending on the annual seasonality.11 We found 32.6% of omnivore species. Our results show that the majority of the species occurrence was found in open areas (n=130; 39.9%), and the other portion occurs in generalist habitats: forest, open areas and modified habitats (n=87; 26.7%), only in forest (n=44; 13.5%), and in aquatic areas (n=65; 19.9%). Some birds depend upon the presence of well preserved open habitats, including species of Furnariidae, Tyrannidae, Thraupidae, and Cardinalidae. Therefore, deforestation and conversion of natural vegetation, particularly open natural areas, is one of the major threats to be considered in conservation measures.4,5,8,26–30

Table 2 Surveyed area covered by field work from 2002 to 2015 throughout the Brazilian Chaco region near Porto Murtinho

| Taxon | English Name | Habitat | Status | Trophic guild | Surveyed Sites |
|-------|--------------|---------|--------|---------------|---------------|
| Rhea Americana | Greater Rhea | | ONI | | 1,2,5,7,8 |
| Rheiformes | | | | | |
| Diplomystes rufus | | | | | |
| Rheiformes | | | | | |
| Rhynchotus rufescens | | | | | |
| Tinaminae | | | | | |
| Crypturellus Undulatus | Undulated Tinamou | FO | ONI | | 1,4,5,8,9 |
| Crypturellus Parvirostris | Small-Billed Tinamou | OP Ce | ONI | | 1,2,5,6,8 |
| Crypturellus Tataupa | Tataupa Tinamou | FO | ONI | | 1,4,5,8,9 |
| Anhimidae | | | | | |
| Procnias africana | | | | | |
| Chauna Torquata | Southern Screamer | A | ONI | | 1,2,6,7 |

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### Table Continued....

| Taxon                        | English Name                  | Habitat | Status | Trophic guild | Surveyed Sites |
|------------------------------|-------------------------------|---------|--------|---------------|----------------|
| **Anatidae**                 |                               |         |        |               |                |
| *Dendrocygna Autumnalis*     | Black-Bellied Whistling-Duck  | A       | R      | ONI           | 1,2,5,7,8      |
| *Cairina Moschata*           | Muscovy Duck                  | A       | R      | ONI           | 1,2,5,6,7,9,9  |
| *Callonetta Leucophrys*      | Ringed Teal                   | A       | AM     | ONI           | 7              |
| *Amazonetta Brasiliensis*    | Brazilian Teal                | A       | R      | ONI           | 2,5            |
| *Nanomys Dominicus*          | Masked Duck                   | A       | R      | ONI           | 7              |
| **Galliformes**              |                               |         |        |               |                |
| **Cracidae**                 |                               |         |        |               |                |
| *Penelope Superbilineata*    | Rusty-Margined Guan           | FO      |        | FRU           | 1,8,9          |
| *Aburria Cumanensis*         | Blue-Throated Piping-Guan     | FO      |        | FRU           | 1,2,3,4,5,6,9  |
| *Ortolia Canicollis*         | Chaco Chachalaca              | FO, OP Ce, OP Ch | FRU | 1,2,3,4,5,6,7,8,9 |
| *Crax Fasciolata*            | Bare-Faced Curassow           | FO      |        | FRU           | 1,4,5          |
| **Podicipediformes**         |                               |         |        |               |                |
| **Podicipedidae**            |                               |         |        |               |                |
| *Tachybaptus Dominicus*      | Least Grebe                   | A       | R      | ONI           | 5,7            |
| **Ciconiiformes**            |                               |         |        |               |                |
| **Ciconiidae**               |                               |         |        |               |                |
| *Giconia Maguari*            | Maguari Stork                 | A       | ICA    | PIS/CAR       | 5,7            |
| *Jabiru Mycteria*            | Jabiru                        | A       | ICA    | PIS/CAR       | 2,5,6,7        |
| *Mycteria Americana*         | Wood Stork                    | A       | ICA    | PIS           | 4,5,6,7        |
| **Suliformes**               |                               |         |        |               |                |
| **Phalacrocoracidae**        |                               |         |        |               |                |
| *Nannopterum Brasilianus*    | Neotropic Cormorant           | A       | R      | PIS           | 1,3,4,5,6      |
| **Anhingidae**               |                               |         |        |               |                |
| *Anhinga Anhinga*            | Anholinga                     | A       |        | PIS           | 1,3,4,5,6,7    |
| **Pelecaniformes**           |                               |         |        |               |                |
| **Ardeidae**                 |                               |         |        |               |                |
| *Tigrisoma Lineatum*         | Rufescent Tiger-Heron         | A       |        | PIS/CAR       | 1,3,5,6,7,8,9  |
| *Cochlearius cochlearius*    | Boat-Billed Heron             | A       |        | PIS/CAR       | 1              |
| *Nycticorax Nycticorax*      | Black-Crowned Night-Heron     | A       |        | ONI           | 1,2,3,5        |
| *Butorides Striata*          | Striated Heron                | A       | ICA    | ONI           | 1,2,3,4,5,6,7  |
| *Bubulcus Ibis*              | Cattle Egret                  | AA      | ICA    | INS           | 2,5,7,8,9      |
| *Ardea Cocoi*                | Cocoi Heron                   | A       |        | PIS/CAR       | 1,3,4,5,7      |
| *Ardea Alba*                 | Great Egret                   | A       | ICA    | PIS/CAR       | 1,2,3,4,5,6,7,8,9 |
| *Syrrhina Sibilatrix*        | Whistling Heron               | A, OP Ce, OP Ch | ONI | 1,2,4,5,7,8   |
| *Pilherodius Pileatus*       | Capped Heron                  | A       |        | PIS/CAR       | 1,5,7          |
| *Egretta Thula*              | Snowy Egret                   | A       | ICA    | PIS/CAR       | 1,2,3,4,5,6,7  |
| **Threskiornithidae**        |                               |         |        |               |                |
| *Plegadis Chihi*             | White-Faced Ibis              | A       | ICA    | ONI           | 7              |
| *Mesembrinibis Cayennensis*  | Green Ibis                    | A, FO   | R      | ONI           | 1,5            |

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### Table Continued....

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Phimosus Infuscatus        | Bare-Faced Ibis       | A         | R      | ONI           | 2,5,6,7,8      |
| Theristicus Caerulescens   | Plumbeous Ibis        | A, FO     |        | ONI           | 1,2,3,4,5,6,7,8,9 |
| Theristicus Caudatus       | Buff-Necked Ibis      | A, OP Ce, OP Ch |        | ONI           | 1,2,5,7,8      |
| Platalea Ajaja             | Roseate Spoonbill     | A         | ICA    | ONI           | 1,2,5,7       |

### Cathartiformes

#### Cathartidae

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Cathartes Aura             | Turkey Vulture        | FO, OP Ce, OP Ch | AM    | DET           | 1,2,4,5,7,8,9  |
| Cathartes Burrovianus      | Lesser Yellow-Headed Vulture | FO, OP Ce, OP Ch |        | DET           | 1,2,3,4,5,6,7,8,9 |
| Coragyps Atratus           | Black Vulture         | AA, OP Ce, OP Ch |        | DET           | 1,2,3,4,5,6,7,8,9 |
| Sarcoramphus Papa          | King Vulture          | OP Ce     |        | DET           | 1,8            |

### Accipitriformes

#### Pandionidae

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Pandion Haliaetus          | Osprey                | A         | S      | PIS           | 1,3,4          |

### Accipitrideae

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Leptodon Cayanensis        | Gray-Headed Kite      | FO        |        | CAR           | 1              |
| Chondrohierax Uncinatus    | Hook-Billed Kite      | FO        |        | CAR           | 5,7            |
| Gampsonyx Swainsonii       | Pearl Kite            | FO, OP Ce, OP Ch |        | CAR           | 1,2            |
| Elanus Leucurus            | White-Tailed Kite     | OP Ce, OP Ch |        | CAR           | 2,5,7,8        |
| Accipiter Striatus         | Sharp-Shinned Hawk    | FO        |        | CAR           | 5              |
| Ictinia Plumbea            | Plumbeous Kite        | OP Ce, OP Ch | R     | CAR/INS       | 1,4,7,8,9      |
| Busarellus Nigricolis      | Black-Collared Hawk   | A         |        | PIS/CAR       | 1,2,3,4,5,6,7  |
| Rostrhamus Sociabilis      | Snail Kite            | A         | R      | MAL           | 1,2,5,6,7      |
| Geranospiza Caerulescens   | Crane Hawk            | FO, OP Ce, OP Ch |        | CAR           | 1,2,4,5,7      |
| Heterospizias Meridionalis | Savanna Hawk          | OP Ce, OP Ch |        | CAR           | 1,2,3,4,5,6,7,8,9 |
| Urubitinga Urubitinga      | Great Black Hawk      | OP Ce, OP Ch |        | CAR           | 1,2,4,5,7      |
| Urubitinga Coronata        | Crowned Eagle         | OP Ce, OP Ch |        | CAR           | 5              |
| Rupornis Magnirostris      | Roadside Hawk         | OP Ce, OP Ch |        | CAR           | 1,2,4,5,6,7,8,9 |
| Geranoaetus Albicaudatus   | White-Tailed Hawk     | OP Ce     |        | CAR           | 1,2,7,8,9      |

### Gruiformes

#### Aramidae

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Aramus Guarauna            | Limpkin               | A         | R      | MAL           | 1,2,4,5,6,7,9  |

### Rallidae

| Taxon                      | English Name          | Habitat   | Status | Trophic guild | Surveyed Sites |
|----------------------------|-----------------------|-----------|--------|---------------|----------------|
| Aramides Ypecaha           | Giant Wood-Rail       | A         |        | ONI           | 1,2,4,5,7,8,9  |
| Aramides Cajaneus          | Gray-Necked Wood-Rail | A         |        | ONI           | 1,2,5          |
| Laterallus Melanophaius    | Rufous-Sided Crake    | A         |        | ONI           | 5              |
| Mustelirallus Albicollis   | Ash-Throated Crake    | A         |        | ONI           | 2,5,8          |
| Pardirallus Maculatus      | Spotted Rail          | A         | ICA    | ONI           | 5,7            |
| Pardirallus Nigricans      | Blackish Rail         | A         | ICA    | ONI           | 5,7            |
| Gallinula Galeata          | Common Gallinule      | A         | ICA    | ONI           | 2,5,7          |
| Porphyrio Martinicus       | Purple Gallinule      | A         | ICA    | ONI           | 1,2,5,6,7      |
| Taxon                          | English Name            | Habitat     | Status | Trophic guild | Surveyed Sites |
|-------------------------------|-------------------------|-------------|--------|---------------|----------------|
| Heliornithidae                |                         |             |        |               |                |
| Heliornis Fulica              | Sungrebe                | A           | ICA    | ONI           | 1,4            |
| Charadriiformes               |                         |             |        |               |                |
| Vanellus Cayanus              | Pied Lapwing            | A           | ICA    | ONI           | 1,4,5,7        |
| Vanellus Chilensis            | Southern Lapwing        | AA, OP Ce, OP Ch | ONI   | 1,2,3,4,5,6,7,8,9 |
| Charadrius Collaris           | Collared Plover         | A           | ICA    | ONI           | 4,5            |
| Recurvirostridae              |                         |             |        |               |                |
| Himantopus Melanurus          | White-Backed Stilt      | A           | R      | ONI           | 1,5,6,7        |
| Scolopacidae                  |                         |             |        |               |                |
| Gallinago Paraguaiae          | South American Snipe    | A           | ICA    | ONI           | 7              |
| Bartramia Longicauda          | Upland Sandpiper        | OP Ce, OP Ch | S     | ONI           | 7              |
| Tringa Solitaria              | Solitary Sandpiper      | A           | S      | ONI           | 1,5,7,8        |
| Tringa Melanoleuca            | Greater Yellowlegs      | A           | S      | ONI           | 7              |
| Tringa Flaviga                | Lesser Yellowlegs       | A           | S      | ONI           | 1,7            |
| Calidris Piscicollis          | White-Rumped Sandpiper  | A           | S      | ONI           | 7              |
| Calidris Melanotos            | Pectoral Sandpiper      | A           | S      | ONI           | 7              |
| Calidris Himantopus           | Stilt Sandpiper         | A           | S      | ONI           | 7              |
| Jacanidae                     |                         |             |        |               |                |
| Jacana Jacana                 | Wattled Jacana          | A           | ONI    | 1,2,4,5,6,7,8,9 |
| Sternaeida                    |                         |             |        |               |                |
| Sternum Superciliaris         | Yellow-Billed Tern      | A           | R      | PIS           | 1,2,3,5        |
| Phaetusa Simplex              | Large-Billed Tern       | A           | R      | PIS           | 1,2,3,5        |
| Rynchopidae                   |                         |             |        |               |                |
| Rynchops Niger                | Black Skimmer           | A           | R      | PIS           | 1,3,7          |
| Columbiformes                 |                         |             |        |               |                |
| Columbidae                    |                         |             |        |               |                |
| Columbina Minuta              | Plain-Breasted Ground-Dove | OP Ce, OP Ch | ONI   | 5,6,9         |
| Columbina Talpacoti           | Ruddy Ground-Dove       | OP Ce, OP Ch | R     | ONI           | 1,2,3,4,5,6,7,8,9 |
| Columbina Squamata            | Scaled Dove             | OP Ce, OP Ch | ONI   | 1,2,4,5,6,8,9 |
| Columbina Picui               | Picui Ground-Dove       | OP Ce, OP Ch | R     | ONI           | 1,2,3,4,5,6,7,8,9 |
| Claravis Pretiosa             | Blue Ground-Dove        | FO, OP Ce, OP Ch | R     | ONI           | 1,4,5,8        |
| Columbula Livia               | Rock Pigeon             | AA          |        | ONI           | 2              |
| Patagioenas Picazuro          | Picazuro Pigeon         | AA, FO, OP Ce, OP Ch | R     | ONI           | 1,2,4,5,6,7,8,9 |
| Patagioenas Cayennensis       | Pale-Vented Pigeon      | AA, FO, OP Ce, OP Ch | R     | ONI           | 1,2,4,5,7,8,9  |
| Zenaida Auriculata            | Eared Dove              | AA, OP Ce, OP Ch | R     | ONI           | 1,2,3,4,5,6,7,8,9 |
| Leptotila Verreauxi           | White-Tipped Dove       | FO, OP Ce, OP Ch | ONI   | 1,2,4,5,6,8,9 |
| Leptotila Rufaxilla           | Gray-Fronted Dove       | FO, OP Ce   | ONI    | 1,8,9         |
| Cuculiformes                  |                         |             |        |               |                |
| Cuculidae                     |                         |             |        |               |                |

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| Taxon                          | English Name          | Habitat       | Status | Trophic guild | Surveyed Sites |
|-------------------------------|-----------------------|---------------|--------|---------------|----------------|
| Piaya Cayana                  | Squirrel Cuckoo       | FO            |        | ONI           | 1,2,4,5,8,9    |
| Coccyzus Melacoryphus         | Dark-Billed Cuckoo    | OP Ce, OP Ch  | R      | ONI           | 6              |
| Crotophaga Major              | Greater Ani           | A, FO         | R      | ONI           | 1,3,5          |
| Crotophaga Ani                | Smooth-Billed Ani     | AA, OP Ce, OP Ch | ONI    | 1,2,3,4,5,6,7,8,9 |
| Guira Guira                   | Guira Cuckoo          | AA, OP Ce, OP Ch | ONI    | 1,2,4,5,6,7,8,9 |
| Tapera Naevia                 | Striped Cuckoo        | A, OP Ce, OP Ch | ONI    | 1,4,5,6       |

**Strigiformes**

**Tytonidae**

Tyto Furcata  American Barn Owl  AA, OP Ce, OP Ch  CAR  1,2,4

**Strigidae**

Megascope Choliba  Tropical Screech-Owl  FO, OP Ce, OP Ch  CAR/INS  1,2,4,5

Pulsatrix Perspicillata  Spectacled Owl  FO  CAR  1

Bubo Virginianus  Great Horned Owl  FO  CAR  1,4,5,6

Glaucidium Brasiliannum  Ferruginous Pygmy-Owl  FO, OP Ce, OP Ch  CAR  1,2,4,5,8

Athene Cunicularia  Burrowing Owl  AA, OP Ce, OP Ch  CAR/INS  1,2,6,7,8,9

**Nycibiiformes**

Nyciobius Griseus  Common Potoo  OP Ce, OP Ch  INS  1,2,4,5,8,9

**Nachtibidae**

**Caprimulgiformes**

**Caprimulgidae**

Antrostomus Rufus  Rufous Nightjar

Nyctidromus Albicollis  Common Pauraque  FO, OP Ce, OP Ch  INS  1,2,4,5,8,9

Hydropsalis Parvula  Little Nightjar  FO, OP Ce, OP Ch  S  INS  1,2,4,5,8,9

Hydropsalis Maculicadus  Spot-Tailed Nightjar  FO, OP Ce, OP Ch  INS  5

Hydropsalis Torquata  Scissor-Tailed Nightjar  FO, OP Ce, OP Ch  INS  1,2,4,5

Podager Nacunda  Nacunda Nighthawk  OP Ce, OP Ch  AM  INS  1,2,4,5,8,9

**Apodiformes**

**Apodidae**

Chaetura Meridionalis  Sick’s Swift  OP Ce  S  INS  7, 8

**Trochilidae**

Phaethornis Subochraceus  Buff-Bellied Hermit  FO  NEC  1

Eupetomena Macroura  Swallow-Tailed Hummingbird  AA, OP Ce, OP Ch  NEC  2, 6

Chlorostilbon Lucidus  Glittering-Bellied Emerald  AA, OP Ce, OP Ch  NEC  1,2,4,5,6,8,9

Thalurania Furcata  Fork-Tailed Woodnymph  FO  NEC  1,8,9

Hylocharis Chrysura  Gilded Hummingbird  AA, OP Ce, OP Ch  NEC  1,2,4,5,6,7,8,9

Heliocharis Furcifer  Blue-Tufted Starthroat  FO  NEC  1,5

**Trogoniformes**

**Trogonidae**

Trogon Curucui  Blue-Crowned Trogon  FO  ONI  1,2,3,4,5,8,9

Coraciiformes

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### Table Continued....

| Taxon                      | English Name              | Habitat | Status | Trophic guild | Surveyed Sites |
|----------------------------|---------------------------|---------|--------|---------------|----------------|
| Alcedinidae                |                           |         |        |               |                |
| Megaceryle Torquata        | Ringed Kingfisher         | A       |        | PIS           | 1,2,3,4,5,7,8  |
| Chloroceryle Amazona       | Amazon Kingfisher         | A       |        | PIS           | 1,3,5          |
| Chloroceryle Aenea         | American Pygmy Kingfisher | A       |        | PIS           | 1              |
| Chloroceryle Americana     | Green Kingfisher          | A       |        | PIS           | 1,3,5          |
| Chloroceryle Inda          | Green-And-Rufous Kingfisher| A     |        | PIS           |                |
| Momotidae                  |                           |         |        |               |                |
| Momotus Momota             | Amazonian Motmot         | FO      |        | ONI           | 1,2,3,4,5,7,8  |
| Galbuliformes              |                           |         |        |               |                |
| Galbulidae                 |                           |         |        |               |                |
| Galbula Ruficauda          | Rufous-Tailed Jacamar     | FO      |        | INS           |                |
| Momocinae                  |                           |         |        |               |                |
| Nyctalus Chacuru           | White-Eared Puffbird      | OP Ce   |        | ONI           | 8              |
| Nyctalus Striatapectus     | Chaco Puffbird            | OP Ce, OP Ch | ONI | 1,2,4,5,8,9  |
| Piciformes                 |                           |         |        |               |                |
| Ramphastos Toco            | Toco Toucan               | AA, FO, OP Ce, OP Ch | ONI/FRU | 1,2,3,4,5,6,7,8,9 |
| Pteroglossus Castanotis    | Chestnut-Eared Aracari    | FO      |        | ONI/FRU      | 1,2,4,5,8,9   |
| Picidae                    |                           |         |        |               |                |
| Picumnus Cirratus          | White-Barred Piculet      | OP Ce, OP Ch | INS | 1,4,5        |
| Picumnus Albovittatus      | White-Wedged Piculet      | OP Ce, OP Ch | INS | 1,3,5        |
| Melanerpes Candidus        | White-Woodpecker          | AA, OP Ce, OP Ch | INS | 1,2,4,5,7,8,9 |
| Melanerpes Cactorum        | White-Fronted Woodpecker  | OP Ch   |        | INS           | 5              |
| Veniliornis Passerinus     | Little Woodpecker         | FO, OP Ce, OP Ch | INS | 1,2,4,5,8,9  |
| Veniliornis Mixtus         | Checkered Woodpecker      | OP Ce, OP Ch | INS | 2,4,5,6      |
| Piculus Chrysochloros      | Golden-Green Woodpecker   | FO      |        | INS           | 1,4,5,6,8,9   |
| Colaptes Melanochloros     | Green-Barred Woodpecker   | AA, FO, OP Ce, OP Ch | INS | 1,2,4,5,6,7,8,9 |
| Colaptes Campesiris        | Campo Flicker             | AA, OP Ce, OP Ch | INS | 1,2,4,5,6,7,8,9 |
| Celeus Lugubris            | Pale-Crested Woodpecker   | FO      |        | INS           | 1,3,4,5,8,9   |
| Dryocopus Lineatus         | Lineated Woodpecker       | FO      |        | INS           | 1,8,9          |
| Campephilus Melanoleucus   | Crimson-Crested Woodpecker| FO, OP Ce, OP Ch | INS | 1,2,4,5,8,9  |
| Campephilus Leucopogon     | Cream-Backed Woodpecker   | FO, OP Ch | INS | 5            |
| Cariamiformes              |                           |         |        |               |                |
| Cariamidae                 |                           |         |        |               |                |
| Cariama Cristata           | Red-Legged Seriema        | OP Ce, OP Ch | ONI | 1,2,4,5,6,7,8,9 |
| Falconiformes              |                           |         |        |               |                |
| Falconidae                 |                           |         |        |               |                |
| Caracara Plancus           | Southern Caracara         | OP Ce, OP Ch | ONI | 1,2,3,4,5,6,7,8,9 |
| Milvago Chimachima         | Yellow-Headed Caracara    | OP Ce, OP Ch | ONI | 1,2,4,5,6,7  |
| Herpetotheres Cachinnans   | Laughing Falcon           | OP Ce, OP Ch | CAR | 1,2,4,5,6,7,8,9 |

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| Taxon                          | English Name           | Habitat    | Status | Trophic guild | Surveyed Sites |
|-------------------------------|------------------------|------------|--------|---------------|----------------|
| Micrastur Semitorquatus       | Collared Forest-Falcon | FO         |        | CAR           | 1,4            |
| Falco Sparverius              | American Kestrel       | OP Ce, OP Ch | R      | CAR           | 1,2,4,5,6,7,8,9 |
| Falco Rufigularis             | Bat Falcon             | OP Ce, OP Ch |       | CAR           | 1              |
| Falco Femoralis               | Aplomado Falcon        | ICA        |        | CAR           | 1,2,4,5,7,8,9 |
| Psittaciformes                |                        |            |        |               |                |
| Psittacidae                   |                        |            |        |               |                |
| Anodorhynchus Hyacinthinus    | Hyacinth Macaw         | FO, OP Ce, OP Ch |       | FRU           | 1,7            |
| Ara Chloropterus              | Red-And-Green Macaw    | OP Ce, OP Ch |       | FRU           | 1,2,4,5,6,7,8,9 |
| Primolius Auricollis          | Yellow-Collared Macaw  | FO, OP Ce, OP Ch |       | FRU           | 1,4,5,7       |
| Thecotocerus Acuticaudatus    | Blue-Crowned Parakeet  | FO, OP Ce, OP Ch |       | FRU           | 1,2,4,5       |
| Psitzacara Leucophthalmus     | White-Eyed Parakeet    | FO, OP Ce, OP Ch |       | FRU           | 1,2,4,5,6,8,9 |
| Aratinga Nenday               | Nanday Parakeet        | OP Ce, OP Ch |       | FRU           | 1,2,3,4,5,7,8,9 |
| Eupisitula Aurea              | Peach-Fronted Parakeet | OP Ce, OP Ch |       | FRU           | 8,9            |
| Pyrrhura Devillei             | Blaze-Winged Parakeet  | FO, OP Ce, OP Ch |       | FRU           | 1,4,5,8,9     |
| Myiopsitta Monachus           | Monk Parakeet          | AA, FO, OP Ce, OP Ch |       | FRU           | 1,2,3,4,5,6,7,8,9 |
| Forpus Xanthopterygius        | Blue-Winged Parrotlet  | OP Ce      |       | FRU           | 8,9            |
| Brotogeris Chiriri            | Yellow-Chevroned Parakeet | AA, OP Ce, OP Ch |       | FRU           | 1,2,3,4,5,6,7,8,9 |
| Pionus Maximilianus           | Scaly-Headed Parrot    | FO, OP Ce, OP Ch |       | FRU           | 1,2,3,4,5,6,7,8,9 |
| Amazona Aestiva               | Turquoise-Fronted Parrot | FO, OP Ce, OP Ch |       | FRU           | 1,2,4,5,6,8,9 |
| Passeriformes                 |                        |            |        |               |                |
| Thamnophilidae                |                        |            |        |               |                |
| Formicivora Rufa              | Rusty-Backed Antwren   | OP Ce, OP Ch |       | INS           | 1,2,8,9       |
| Thamnophilus Dolatus          | Barred Antshrike       | FO, OP Ce, OP Ch |       | INS           | 1,2,3,4,5,6,8,9 |
| Thamnophilus Caerulescens     | Variable Antshrike     | FO, OP Ce, OP Ch |       | INS           | 1,4,5,8,9     |
| Taraba Major                  | Great Antshrike        | FO, OP Ce, OP Ch |       | INS           | 1,2,3,4,5,6,8,9 |
| Cercomacra Melanaria          | Mato Grosso Antbird    | FO         |       | INS           | 1,5            |
| Dendrocolaptidae              |                        |            |        |               |                |
| Sittassomus Griseicapillus    | Olivaceous Woodcreeper | FO, OP Ce, OP Ch |       | INS           | 1,2,3,4,5,6,8,9 |
| Campyloschistes Griseicapillus| Rod-Pine Creeper       | FO         |       | INS           | 1,4,5          |
| Trochilirostris               | Narrow-Billed Woodcreeper | OP Ce, OP Ch |       | INS           | 1,2,4,5,6,7,8,9 |
| Dendrocolaptidae              | Platanus Woodcreeper   | FO         |       | INS           | 8,9            |
| Xiphocolaptidae               | Great Rufous Woodcreeper | FO, OP Ce, OP Ch |       | INS           | 1,2,4,5,8,9 |
| Furnariidae                   |                        |            |        |               |                |
| Furnarius Leucopus            | Pale-Legged Horneno    | FO         |       | ONI           | 1              |
| Furnarius Rufus               | Rufous Horneno         | AA, FO, OP Ce, OP Ch |       | ONI           | 1,2,3,4,5,6,7,8,9 |
| Pseudoseisura Unirufa         | Rufous Cacholote       | FO, OP Ce, OP Ch |       | INS           | 1,2,4,5       |
| Phacelodomus Rufifrons        | Rufous-Fronted Thornbird | OP Ce, OP Ch |       | INS           | 1,2,4,5,6,8,9 |
| Phacelodomus Ruber            | Greater Thornbird      | OP Ce, OP Ch |       | INS           | 1,2,4,5,8,9   |
| Anumbius Anumbi               | Firewood-Gatherer      | OP Ce, OP Ch |       | INS           | 5,7            |

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| Taxon                        | English Name             | Habitat          | Status | Trophic guild | Surveyed Sites |
|-----------------------------|--------------------------|------------------|--------|---------------|----------------|
| Schoeniophylax              | Phryganophilus           |                  |        |               |                |
| Certhiaxis Cinnamomeus      | Yellow-Chinned Spinetail | A                |        | INS           | 1,2,3,4,5,7,8,9|
| Synallaxis Frontalis        | Sooty-Fronted Spinetail  | FO, OP Ce, OP Ch | INS    |               | 1,2,6,8,9      |
| Synallaxis Hypospodia       | Cinereous-Breasted Spinetail | A               |        | INS           | 5,8,9          |
| Synallaxis Albilora         | White-Lored Spinetail    | FO               | INS    |               | 1,3,4,5,8,9    |
| Cranioloeuca Vulpina        | Rusty-Backed Spinetail   | A, FO            | INS    |               | 1,4,5          |
| Pipridae                    | Pipra Fasciicuda         | Band-Tailed Manakin | FO    | FRU           |                |
| Tityridae                   | Tityra Inquisitor        | Black-Crowned Tityra | FO, OP Ce, OP Ch | ONI  | 1,4,5,8,9 |
|                             | Tityra Cayana            | Black-Tailed Tityra | FO, OP Ce, OP Ch | ONI  | 1,4,5,8,9 |
| Pachyramphus Viridis        | Green-Backed Becard      | FO, OP Ce, OP Ch | INS    |               | 1,4,5,8,9      |
| Pachyramphus Polychotopus   | White-Winged Becard      | FO, OP Ce, OP Ch | AM     | INS           | 1,2,4,5,8,9    |
|                             | Pachyramphus Validus     | Crested Becard   | FO, OP Ce   | AM     | INS           | 8,9            |
| Xenopsaris Albinucha        | White-Naped Xenopsaris   | OP Ce, OP Ch     | INS    |               | 7              |
| Platyrinchidae              | Platyrinchus Mystaceus   | White-Throated Spadebill | FO    | INS           | 1,8,9           |
| Rhynchoicyclidae            |                         |                  |        |               |                |
| Leptopogon Amaurocephalus   | Sepia-Capped Flycatcher  | FO               | AM     | INS           | 1,4,5,8,9      |
| Tolmomyias Sulphurescens    | Yellow-Olive Flycatcher  | FO               |        | INS           | 1,5,8,9        |
| Todirostrum Cinereum       | Common Tody-Flycatcher   | AA, FO, OP Ce    | INS    |               | 1,2,8,9        |
| Hemircticus Margaritaceiventer | Pearly-Vented Tody-Tyrant | OP Ce, OP Ch    | INS    |               | 1,2,4,5,6,8,9 |
| Tyrannidae                  |                          |                  |        |               |                |
| Inezia Inornata             | Plain Tyrannulet         | OP Ce, OP Ch     | AM     | INS           | 1,4,5,8,9      |
| Euscarthmus Meloryphus      | Tawny-Crowned Pygmy-Tyrant | OP Ce, OP Ch | AM     | INS           | 1,4,5,8,9      |
| Campstotoma Obsoletum       | Southern Beardless-Tyrannulet | FO, OP Ce, OP Ch | INS    | 1,2,3,4,5,6,8,9 |
| Elaenia Flavigaster        | Yellow-Bellied Elaenia   | OP Ce            | ICA    | INS/FRU      | 8,9            |
| Elaenia Chilensis          | Chilean Elaenia          | OP Ce, OP Ch     | ICA    | INS           | 1              |
| Elaenia Parvirostris       | Small-Billed Elaenia     | OP Ce, OP Ch     | ICA    | INS           | 5,7            |
| Elaenia Chiriquensis       | Lesser Elaenia           | OP Ce            | ICA    | INS           | 8,9            |
| Suiriri Suiriri            | Suiriri Flycatcher       | OP Ce, OP Ch     | ICA    | INS           | 4,5,8,9        |
| Myiopagis Gaimardii        | Forest Elaenia           | FO               | INS    |               | 1,8,9          |
| Myiopagis Viridicata       | Greenish Elaenia         | FO               | AM     | INS           | 1,4,5,8,9      |
| Phaeomyias Murina          | Mouse-Colored Tyrannulet | OP Ce, OP Ch     | AM     | INS           | 1,4,5,8,9      |
| Polystictus Pectoralis     | Bearded Tachuri          | OP Ce, OP Ch     | AM     | INS           | 5              |
| Serpophaga Subcristata     | White-Crested Tyrannulet | OP Ce, OP Ch     | AM     | INS           | 1,4,5,8,9      |
| Legatus Leucophaius        | Piratic Flycatcher       | FO, OP Ce, OP Ch | AM     | INS           | 1,8,9          |
| Myiarchus Swainsoni        | Swainson’s Flycatcher    | FO, OP Ce, OP Ch | AM     | INS           | 1,4,8,9        |

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| Taxon                          | English Name          | Habitat       | Status | Trophic guild | Surveyed Sites |
|-------------------------------|-----------------------|---------------|--------|---------------|----------------|
| Myiarchus Ferox               | Short-Crested Flycatcher | FO, OP Ce, OP Ch | INS    | 1,8,9         |                |
| Myiarchus Tyrannulus          | Brown-Crested Flycatcher | OP Ce, OP Ch  | INS    | 1,2,4,5,6,8,9 |                |
| Sirystes Sibilator            | Sibilant Sirystes     | FO            | ICA    | INS           | 8,9            |
| Casinornis Rufus              | Rufous Casinornis     | FO, OP Ce, OP Ch | AM     | INS           | 1,2,3,4,5,6,7,8,9 |
| Pitangus Sulphuratus          | Great Kiskadee        | AA, FO, OP Ce, OP Ch | ONI  | 1,2,3,4,5,6,7,8,9 |    |
| Machetonitis Rixosa           | Castle Tyrant         | AA, OP Ce, OP Ch | ICA    | INS           | 1,2,3,4,5,6,7,8,9 |
| Myiodyndastes Maculatus       | Streaked Flycatcher   | FO, OP Ce, OP Ch | AM     | INS           | 1,2,4,5,6,7,8,9 |
| Megarynchus Pitangua          | Boat-Billed Flycatcher | FO, OP Ce, OP Ch | ICA    | ONI           | 1,2,3,4,5,6,7,8,9 |
| Myiozetetes Cayanensis        | Rusty-Margined Flycatcher | A, FO       | R      | INS           | 1,4,5,8,9      |
| Myiozetetes Similis           | Social Flycatcher     | A, FO         | R      | INS           | 1              |
| Tyranthus Melancholicus       | Tropical Kingbird     | AA, OP Ce, OP Ch | AM     | INS           | 1,2,3,4,5,6,7,8,9 |
| Tyranthus Savana              | Fork-Tailed Flycatcher | AA, OP Ce, OP Ch | AM     | INS           | 1,2,4,5,7,8,9  |
| Griseotyrannus Aurantioaestroristatus | Crowned Slaty Flycatcher | AA, OP Ce, OP Ch | AM   | INS           | 1,2,4,5,6,7,8,9 |
| Empidonumovis Varius          | Variegated Flycatcher | OP Ce, OP Ch  | AM     | INS           | 1,4,5,6,7,8,9  |
| Myiophobus Fasciatus          | Bran-Colored Flycatcher | OP Ce, OP Ch  | AM     | INS           | 1,5            |
| Sublegatus Modestus           | Southern Scrub-Flycatcher | OP Ce, OP Ch  | AM     | INS           | 1,4,5,8,9      |
| Pyrocephalus Rubinus          | Vermilion Flycatcher  | OP Ce, OP Ch  | AM     | INS           | 1,2,4,5,7,8,9  |
| Fluvicola Albiventer          | Black-Backed Water-Tyrant | A           | AM     | INS           | 1,2,4,5,6,7,9  |
| Arundiniceps Leucocephala     | White-Headed Marsh Tyrant | A           | AM     | INS           | 1,4,5,6,7,8,9  |
| Gubernetes Yetapa             | Streamer-Tailed Tyrant | A, OP Ce, OP Ch | ICA   | INS           | 1,8,9          |
| Alectrurus Risora             | Strange-Tailed Tyrant  | OP Ce, OP Ch  | AM     | INS           | 1              |
| Cinemotricus Fuscatus         | Fuscous Flycatcher    | FO, OP Ce, OP Ch | AM   | INS           | 1,4,5,8,9      |
| Hymenops Perspicillatus       | Spectacled Tyrant     | OP Ce, OP Ch  | AM     | INS           | 7              |
| Satrapa Icterophrys           | Yellow-Browed Tyrant  | OP Ce, OP Ch  | AM     | INS           | 4,5,7          |
| Xolmis Cinereus               | Gray Monjita          | OP Ce, OP Ch  | ICA    | INS           | 1,2,4,5,6,7,8,9 |
| Xolmis Velatus                | White-Rumped Monjita  | OP Ce, OP Ch  | R      | INS           | 1,2,5,6,7,8,9  |
| Xolmis Irupero                | White Monjita         | OP Ce, OP Ch  | R      | INS           | 1,2,4,5,6,7,8,9 |
| Vireonida                      |                        |               |        |               |                |
| Cyclarhis Gujanensis          | Rufous-Browed Peppershrike | FO, OP Ce, OP Ch | ONI  | 1,2,3,4,5,6,7,8,9 |    |
| Vireo Chivi                   | Chivi Vireo           | OP Ce, OP Ch  | AM     | INS           | 1,6,7,8        |
| Corvidae                      |                        |               |        |               |                |
| Cyanocorax Cyanomelas         | Purplish Jay          | FO, OP Ce, OP Ch | ONI  | 1,2,4,5,7,8,9 |    |
| Cyanocorax Cristatellus       | Curl-Crested Jay      | OP Ce         | ONI    | 8,9           |                |
| Cyanocorax Chrysops           | Plush-Crested Jay     | FO             | ONI    | 1,4,5,7,8,9  |                |
| Hirundinidae                  |                        |               |        |               |                |
| Stelgidopteryx Ruficollis     | Southern Rough-Winged Swallow | A, FO | ICA | INS | 1,5,8     |
| Progne Tapera                 | Brown-Crested Martin  | AA, OP Ce, OP Ch | ICA  | INS           | 1,2,3,4,5,6,7,8,9 |
| Progne Chalybea               | Gray-Breasted Martin  | AA, OP Ce, OP Ch | ICA  | INS           | 1,2,8,9        |
| Tachycineta Albiventer        | White-Winged Swallow  | A              | INS    | 2,3,4,5      |                |

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| Taxon                        | English Name                | Habitat    | Status | Trophic guild | Surveyed Sites |
|-----------------------------|-----------------------------|------------|--------|---------------|---------------|
| Tachycineta Leucorrhoa     | White-Rumped Swallow        | OP Ce, OP Ch | ICA    | INS           | 1,7           |
| Riparia Riparia             | Bank Swallow                | OP Ce, OP Ch | S      |               |               |
| Hirundo Rustica             | Barn Swallow                | OP Ce, OP Ch | S      | INS           | 1,7           |
| Troglytidae                 |                             |            |        |               |               |
| Troglytes Musculus          | Southern House Wren         | AA, OP Ce, OP Ch | INS    |               | 1,2,4,5,6,7,8,9 |
| Campylophrynchus Turdinus   | Thrush-Like Wren            | AA, FO, OP Ce, OP Ch | INS    |               | 1,2,3,4,5,6,7,8,9 |
| Cantorchilus Guarananus     | Fawn-Breasted Wren          | FO         | INS    |               | 1,4,5,7,8,9   |
| Donacobiidae                |                             |            |        |               |               |
| Donacobius Atricapilla      | Black-Capped Donacobius     | A          | INS    |               | 1,2,3         |
| Poliopiidae                 |                             |            |        |               |               |
| Polioptila Domicola         | Masked Gnatcatcher          | OP Ce, OP Ch | INS    |               | 1,2,4,5,6,7,8,9 |
| Turdidae                    |                             |            |        |               |               |
| Turdus Leucomelas           | Pale-Breasted Thrush        | FO         | S      | ONI           | 1,4           |
| Turdus Rufiventris          | Rufous-Bellied Thrush       | AA, FO, OP Ce, OP Ch | ONI    |               | 1,2,4,5,6,8,9 |
| Turdus Amaurochalinus       | Creamy-Bellied Thrush       | AA, FO, OP Ce, OP Ch | R      | ONI           | 1,2,4,5,6,8,9 |
| Mimidae                     |                             |            |        |               |               |
| Mimus Saturninus            | Chalk-Browed Mockingbird    | AA, OP Ce, OP Ch | ONI    |               | 1,2,3,4,5,6,7,8,9 |
| Mimus Triurus               | White-Banded Mockingbird    | AA, OP Ce, OP Ch | AM     | ONI           | 1,2,7         |
| Motacillidae                |                             |            |        |               |               |
| Anthus Lutescens            | Yellowish Pipit             | AA, OP Ce, OP Ch | R      | INS           | 1,7           |
| Passerellidae               |                             |            |        |               |               |
| Zonotrichia Capensis        | Rufous-Collared Sparrow     | AA, OP Ce, OP Ch | ONI    |               | 1,2,8,9       |
| Ammodramus Humeralis        | Grassland Sparrow           | AA, OP Ce, OP Ch | GRA    |               | 7,8,9         |
| Arremon Flaviostris         | Saffron-Billed Sparrow      | FO         | GRA/INS|               | 1,5           |
| Parulidae                   |                             |            |        |               |               |
| Setophaga Pitsayumi         | Tropical Parula             | FO, OP Ce, OP Ch | INS    |               | 1,4,5,8,9     |
| Geothlypis Aequinoctialis   | Masked Yellowthroat         | OP Ce, OP Ch | INS    |               | 7             |
| Basileuterus Culicivorus    | Golden-Crowned Warbler      | FO         | INS    |               | 1,4,5,8,9     |
| Myiophylus Flaveola         | Flavescent Warbler          | FO         | INS    |               | 1,4,5,8,9     |
| Icteridae                   |                             |            |        |               |               |
| Psarocolius Decumanus       | Crested Oropendola          | FO         | ONI    |               | 1,4,5         |
| Procnias Solitarius         | Solitary Black Cacique      | FO, OP Ce, OP Ch | ONI    |               | 1,2,6,7       |
| Cacicus Chrysopertus        | Golden-Winged Cacique       | FO, OP Ce, OP Ch | ONI    |               | 1,2,4,5,6,7,8,9 |
| Cacicus Haemorrhous         | Red-Rumped Cacique          | FO, OP Ce, OP Ch | ONI    |               | 1,8,9         |
| Icterus Pyrrhopeters        | Variable Oriole             | FO, OP Ce, OP Ch | ONI    |               | 1,2,4,5,6,7,8,9 |
| Icterus Croconotus          | Orange-Backed Troupial      | FO, OP Ce, OP Ch | ONI    |               | 1,2,3,4,5,7   |
| Gnorimopsar Chophi          | Chophi Blackbird            | AA, OP Ce, OP Ch | ONI    |               | 1,2,3,4,5,6,7,8 |
| Amblyramphus Holosericeus   | Scarlet-Headed Blackbird    | A           | ONI    |               | 4,7           |
| Agelasticus Cyanopus        | Unicolored Blackbird        | A           | R      | ONI           | 1,5,7,8,9     |
| Chrysomus Ruficapillus      | Chestnut-Capped Blackbird   | A           | R      | ONI           | 1,2,5,7       |

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### Table Continued...

| Taxon                                | English Name                  | Habitat            | Status  | Trophic guild | Surveyed Sites |
|--------------------------------------|-------------------------------|--------------------|---------|---------------|----------------|
| *Pseudoleistes Guirahuro*            | Yellow-Rumped Marshbird       | OP Ce              | ONI     | 8,9           |                |
| *Agelaioides Badius*                 | Grayish Baywing               | OP Ce, OP Ch       | ONI     | 1,2,4,5,6,7,8,9 |                |
| *Molothrus Rufouaxillaris*           | Screaming Cowbird             | AA, OP Ce, OP Ch   | ONI     | 1,2,4,5,7,8,9 |                |
| *Molothrus Orzyvorus*                | Giant Cowbird                 | AA, FO, OP Ce, OP Ch | ONI   | 1,2,7,8      |                |
| *Molothrus Bonariensis*              | Shiny Cowbird                 | AA, OP Ce, OP Ch   | ONI     | 1,2,3,4,5,6,7,8,9 |                |
| *Sturnella Superliciaris*            | White-Browed Meadowlark       | AA, OP Ce, OP Ch   | R ONI   | 7             |                |

**Thraupidae**

| *Paroaria Coronata*                  | Red-Crested Cardinal          | AA, FO, OP Ce, OP Ch | GRA    | 1,2,3,4,5,6,7,8,9 |                |
| *Paroaria Capitata*                  | Yellow-Billed Cardinal        | AA, OP Ce, OP Ch    | GRA    | 1,2,3,4,5,6,7,8,9 |                |
| *Tangara Sayaca*                     | Sayaca Tanager                | AA, FO, OP Ce, OP Ch | FRU   | 1,2,3,4,5,6,7,8,9 |                |
| *Tangara Palmarum*                   | Palm Tanager                  | AA, FO, OP Ce, OP Ch | FRU   | 1,2,4,5,7,8,9 |                |
| *Tangara Cayana*                     | Burnished-Buff Tanager        | FO, OP Ce, OP Ch    | FRU    | 1,2           |                |
| *Nemosia Pileata*                    | Hooded Tanager                | FO, OP Ce, OP Ch    | INS    | 1,4,5         |                |
| *Conirostrum Speciosum*              | Chestnut-Vented Conebill      | FO, OP Ce, OP Ch    | ICA    | 1,4,5,6,8,9   |                |
| *Sicalis Flaveola*                   | Saffron Finch                 | OP Ce, OP Ch        | GRA    | 1,2,3,4,5,6,7,8,9 |                |
| *Hemithraupis Guira*                 | Guira Tanager                 | FO, OP Ce, OP Ch    | INS    | 8,9           |                |
| *Volatinia Jacarina*                 | Blue-Black Grassquit          | AA, OP Ce, OP Ch    | R GRA   | 1,4,5,6,7,8,9 |                |
| *Eucometis Penicillata*              | Gray-Headed Tanager           | FO                  | INS/FRU | 1,4,5,8,9     |                |
| *Coryphosphingus Cucullatus*         | Red-Crested Finch             | AA, FO, OP Ce, OP Ch | GRA   | 1,2,4,5,7,8,9 |                |
| *Tachyphonus Rufus*                  | White-Lined Tanager           | FO, OP Ce, OP Ch    | FRU    | 1,2,3,5,6,8,9 |                |
| *Rampheclus Carbo*                   | Silver-Beaked Tanager         | FO, OP Ce, OP Ch    | INS/FRU | 1,2,3,4,5,6,8,9 |                |
| *Tersina Viridis*                    | Swallow-Tanager               | FO                  | ICA    | INS/FRU       | 8              |
| *Coereba Flaveola*                   | Banaquit                       | AA, FO, OP Ce, OP Ch | NEC/INS | 1,2,6         |                |
| *Sporophila Lineola*                 | Lined Seedeater               | OP Ce, OP Ch        | ICA    | 1,2,6,7       |                |
| *Sporophila Collaris*                | Rusty-Collared Seedeater      | OP Ce, OP Ch        | ICA    | GRA           | 1,2,4,5,6,7,8 |                |
| *Sporophila Caerulescens*            | Double-Collared Seedeater     | OP Ce, OP Ch        | R GRA   | 1,2,6,7       |                |
| *Sporophila Leucoptera*              | White-Bellied Seedeater       | OP Ce, OP Ch        | GRA    | 1,2,4,5,6,7   |                |
| *Sporophila Hypoxantha*              | Tawny-Bellied Seedeater       | OP Ce, OP Ch        | R GRA   | 7             |                |
| *Sporophila Ruficollis*              | Dark-Throated Seedeater       | OP Ce, OP Ch        | AM GRA  | 7             |                |
| *Sporophila Palustris*               | Marsh Seedeater               | OP Ce, OP Ch        | AM GRA  | 7             |                |
| *Sporophila Angolensis*              | Chestnut-Bellied Seed-Finch   | FO, OP Ce, OP Ch    | GRA    | 1,4,5,8,9     |                |
| *Emberizoides Herbicola*             | Wedge-Tailed Grass-Finch      | OP Ce, OP Ch        | INS    | 8,9           |                |
| *Saltatricula Atrococilis*           | Black-Throated Saltator       | OP Ce              | INS    | 8,9           |                |
| *Saltatricula Multicolor*            | Many-Colored Chaco Finch      | OP Ch              | INS    | 2             |                |
| *Saltator Coerulescens*              | Grayish Saltator              | OP Ce, OP Ch        | ONI    | 1,2,3,4,5,6,7,8,9 |                |
| *Saltator Similis*                   | Green-Winged Saltator         | FO, OP Ch           | R ONI   | 1             |                |
| *Microspingus Melanoleucus*          | Black-Capped Warbling-Finch   | OP Ce, OP Ch        | INS    | 1,2,4,5,6,7,8,9 |                |

**Cardinalidae**

| *Piranga Flava*                      | Hepatic Tanager               | OP Ce, OP Ch        | AM     | INS/FRU       | 4              |
| *Cyanoloxia Brissonii*               | Ultramarine Grosbeak          | OP Ce, OP Ch        | ONI    | 5             |                |
Some of our recorded species were only recently recorded for the Pantanal wetland, including: Notthura boraquira, Aramides ypecaha, Pardirallus maculatus, Calidris himantopus, Dendrocopetes platyrostris, Elaenia chilensis, E. parvirostris, Platyrinchus mystaceus, Hymenops perspicillatus, Pachyramphus validus, Xenopsaris albinucha, Pseudoilex guirahuro, Sporophila ruficollis, S. palustris. A considerable number of species migrate to the Pantanal wetland, and others are present in the Pantanal in Cerrado vegetation. Species such as Cyanocorax cristatellus and Saltator linearis, common in open areas associated with Cerrado vegetation, were found in this study in similar habitats, showing the transitional feature of the Porto Murtinho region. There are migrant species that occur in the region. The Tyranidae Austral migrants, for example, arrive in general by the end of the dry season, fixing home ranges in the region throughout the wet season, coinciding with greater abundance of food. Some of the species registered deserve special attention since they are officially listed as threatened under national and international guidelines, considering the alteration and loss of their natural habitats. When dealing with threatened species, the value of rarity is one trophy for the birders, which requires a fair conservation strategy in order to balance protection and visiting strategies. On the other hand, the number of threatened species found in this study reinforces the need for a reliable conservation strategy. Natural habitats have been modified and the increasing deforestation has reached the study area. There are no protected areas designated for the Porto Murtinho region to preserve the native Chaco natural habitats and their associated biodiversity. All activities in the region related to the exploitation of biodiversity resources have been unsustainable in recent years, for example the use of the red quebracho (S. balansae) to extract tannin, the leaves of erva mate (Ilex paraguariensis) for tea, as well as predatory fisheries. In addition to the intrinsic value of biodiversity, its conservation needs to consider a combination of multiple strategies. For example, biodiversity plays an important role to human well-being and health, providing basic products and ecosystem services. Thus, conservation is also related to the social and economic dimensions of development. But although this relationship, human land occupation has become the dominant force that negatively impacts the biological system. The avifauna of the Chaco expresses the fascination of the local people, who have generated stories and folklore associated with mystical birds, a crucial theme used in the region, in its broadest sense, nature-based tourism has to be sustainable in terms of its potential negative effects on the environment, for its successful conduct.

**Conclusion**

The present results contribute to knowledge of the great diversity of bird species in the region, which may be an attraction for sustainable tourism through birdwatching activities. This should be an incentive to protect the avifauna and their habitats, achieving conservation for the biodiversity of the region.

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**Conflict of interest**

No conflict of interest was detected during the work carried out in the field or for its publication.

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**Table Continued...**

| Taxon | English Name | Habitat | Status | Trophic guild | Surveyed Sites |
|-------|-------------|---------|--------|---------------|----------------|
| Fringillidae | | | | | |
| Spinus Magellanicus | Hooded Siskin | FO, OP Ce, OP Ch | GRA | 4,8 | |
| Euphonia Chlorotica | Purple-Throated Euphonia | FO, OP Ce, OP Ch | FRU | 1,2,4,5,7,8,9 | |
| Passeridae | | | | | |
| Passer Domesticus | | AA | ONI | | 1,2,8,9|

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