

GUYANA GOLDFIELDS INC
REVISED AND UPDATED BIODIVERSITY BASELINE

1 Biological Environment

1.1 GENERAL CHARACTERIZATION OF THE REGION

The Smithsonian Institution's Biological Diversity of the Guiana Shield Program, has focused its efforts on building a data base for biodiversity in the Guiana Shield Region. This data base includes, checklists for vascular plants (Funk et al., 2007), fishes (Vari & Ferraris, 2009), and terrestrial vertebrates (Hollowell & Reynolds, 2005). The data collection serves as a great asset to regional baseline on species richness. Minimal emphasis has been given to biodiversity data collection in the Cuyuni Region however several historical studies was done by Naturalist William Beebe in Bartica in the 1930's. Lynne Gillespie collected various species of plants along the Cuyuni River around the Aurora camp in 1997. The fish of the Venezuelan portion of the Cuyuni basin have been better studied by Machado-Allison and colleagues (Machado-Allison et al., 2000) and Sidlauskas and others surveyed the fish of the Guyana portion of the Cuyuni in 2011 (University of Toronto Scarborough, 2011; Sislaukas, 2011).

The ecological community of the Cuyuni River basin is dominated by a mixed brown sand and swamp forest. The forest is mixed with aquatic environments in the form of various streams and comprises of non-flooded rainforest and seasonally flooded riparian forest. The wet season supports the aquatic biota while the valley slopes, hillslopes, and ridgetops support the section of the forests with species intolerant of flooding. A small footprint of this forest has been disturbed by human activity, but it is still heavily populated by a large diversity of faunal species namely jaguar and peccaries, lowland tapirs, black caiman and many others native to the area.

Hydrology and water quality are maintained by the forest in the Cuyuni basin. The Cuyuni basin river systems is a combination of surface and groundwater processes. Surface waters commonly known as "blackwaters" of the region has a low pH, high contents of tannins and humic organic acids, however, presently the natural condition has been altered by human impacts. The Guyana Forestry commission declares that 94% deforestation in Guyana due to Artisanal and Small-scale Mining (ASM). During the period 2010 to 2011, deforestation totaled 9,796 ha/yr, and the majority of this (96%) took place in state forests, primarily along the rivers – the primary means of egress – and along existing roads.

Mining and logging have significantly and adversely affected the quality of biodiversity and the environment in the greater project area. Environmental degradation and the depletion of fauna in the project area has been documented in the following studies (Duplaix, 2009) and (Sidlauskas, 2011). Dated back from the 1800's to present, the Cuyuni river basin and majority of Region 7 as well as adjacent areas has been affected. Artisanal Mining has led to a vast increase in turbidity and sedimentation in the river. The release of mercury through the amalgamation process in the environment is a major concern in Region 7. Studies of sediments in the Mazuruni and Essequibo suggest that the alluvial deposits is linked to anthropogenic sources which have increase over the years.

Research has shown that the abundance and diversity of fish in the Cuyuni River basin has been adversely affected by historical artisanal mining due largely to impacts from accelerated sedimentation and increased turbidity. Indigenous people have used the Cuyuni river as a transportation corridor to the basin. Construction of the barama road has led to increased human activity to north of the Cuyuni River and to the west of the Essequibo River.

1.1.1 Regional Biological Context and Critical Habitat Assessment

The project is located in the coastal lowlands/ Atlantic Coastal Shelf Region of northwestern Guyana, some 150km inland from the Atlantic coast of Northern South America. Aurora Concession was established in 1998 for the purpose of gold exploration and mining and has altered the landscape. However, before the establishment of Aurora Concession, this area has suffered exploitation by loggers and Miners dated back from the 19th century.

IFC PS 6 identifies five criteria for the assessment of whether a given modified or natural habitat may be considered a critical habitat:

1. Criterion 1: Critically Endangered and Endangered Species;
2. Criterion 2: Endemic and Restricted-Range Species;
3. Criterion 3: Migratory and Congregatory Species;
4. Criterion 4: Unique Assemblages of Species and Key Evolutionary Processes; and
5. Criterion 5: Key Ecosystem Services.

IUCN-listed Endangered or Critically Endangered plant species and Endemic and Restricted-range species were identified in the surveys however these identification/sightings does not qualify the area as a critical habitat. With respect to Migratory and Congregatory species the AGM project should have no impacts on the ability of the river to support migratory processes. In addition to this there is no significant presence of any terrestrial migratory or congregatory species in the region. As it relates to Unique Assemblages of Species and Key Evolutionary Processes, there are no recognized unique assemblages or species of unique phylogeny associated with the landscape of the Aurora Concession. Species present in this area are not of current social, economic, or cultural importance. While there are species of potential commercial and subsistence value in the Project Area of Influence, these are not present within the zones of traditional use of any known communities other than ASM camps or individuals involved in the supplying of fish and bush meat to the small-scale Miners.

1.2 HISTORY OF BIODIVERSITY BASELINE STUDIES

Biological Sampling of the Study Area of the Project has a long history of field data collection for the purpose of characterizing the existing environmental conditions at the Aurora site and vicinity. Formal studies began in 2006 and continued through 2011. Species recorded during baseline surveys were compared with the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species for Guyana to determine and classify species that are threatened, that is, species listed as Critically Endangered, Endangered or Vulnerable. The IUCN defines species according to their likelihood of extinction and produces a Red List, which includes internationally recognized flora and fauna. The criteria for the IUCN classification are provided in Table 1.

Table 1: IUCN Red List Classification

IUCN CLASSIFICATION	DESCRIPTION
EXTINCT (E)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual.
EXTINCT IN THE WILD (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

CRITICALLY ENDANGERED (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see 2001 IUCN Redlist Categories and Criteria Version 3.1), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
ENDANGERED (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see 2001 IUCN Redlist Categories and Criteria Version 3.1), and it is therefore considered to be facing a very high risk of extinction in the wild.
VULNERABLE (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see 2001 IUCN Redlist Categories and Criteria Version 3.1), and it is therefore considered to be facing a high risk of extinction in the wild.
NEAR THREATENED (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
LEAST CONCERN (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
DATA DEFICIENT (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.
NOT EVALUATED (NE)	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Biological sampling or biodiversity surveys associated with the potential development of mining operations in the Aurora concession began in 2006 and are summarized in Table 2 below. The initial biological surveys of the Aurora concession were performed in 2006 by Guyanese biologists and the WWF. Three separate surveys were conducted in 2006, the first being a wet season survey in January-February followed by another wet season survey in July and the final survey in the dry season in December. Survey efforts were focused on two (2) sites; the general concession area and Golden Mile (the area where exploration activities were focused). Six (6) transects were sampled at each site and five (5) taxa were surveyed; avifauna (birds), mammals (volant and non-volant), herpetofauna (amphibians and reptiles) ichthyofauna (fishes) and macro invertebrates. Methodology included, audio encounter surveys (AES), visual encounter surveys (VES), pitfall traps, Leaf litter and surface soil searches, Butterfly nets/pooters/canopy beating, mist-netting, dredging, kick-netting, trapping and /hoop-netting.

To upgrade the existing baseline information, a biodiversity assessment was conducted for the Project AOI in April 28th through May 5th, 2009, by the consulting firm ERM. The focus of this assessment was to determine the presence or absence of critical habitat as defined by IFC PS 6 (IFC, 2012b). The assessment used various data sources and methodologies including satellite imagery, literature surveys, field sampling, direct observation, and where appropriate, interviews. The flora and fauna data collection were done at six (6) terrestrial sites and four (4) aquatic sites and focused on endemic and threatened species, identification of potentially sensitive habitats including wetlands, species of socioeconomic or cultural importance, migratory and congregational species, and protected areas in the region. Both diurnal and nocturnal surveys were conducted. The vegetation of the Golden Square Mile, the Tailings Management Area (TMA) and Mine Water Pond (MWP) (as identified at the time of the survey), and the Julian Ross Itabu areas were characterized by cataloging the dominant tree and shrub species. This included sample collection of certain plants, identification and recording. Fish were sampled by nets and hook and line. Amphibians and reptiles were sampled by visual encounters and auditory surveys. Birds were sampled by

point counts and mist netting. Mammals were documented by direct and indirect observation (e.g., tracks, scat, fur) supplemented by interviews with Guyanese experts on the biodiversity of the area.

A specialized survey for giant otters was completed along the Cuyuni River, including the Julian Ross Itabu Branch, and various tributaries from October 13 through 22, 2009, by international giant otter specialist Dr. Nicole Duplaix (Duplaix, 2009). The focus of this survey was to establish whether there were any resident Giant otters (*Pteronura brasiliensis*) on the Cuyuni River, in the vicinity of Aurora. No otters or recent evidence of their presence was observed. Dr. Duplaix concluded that the habitat was not suitable given the high level of turbidity in the rivers (largely from ASM activity upstream of the study area), and that the two lone individual specimens sighted in multiple years of baseline field work were likely migrants passing through the area and not resident.

A rapid biodiversity assessment was undertaken in 2010 to assess floral and faunal composition of the, then proposed, access road site. This survey was done on February 8th to 12th and emphasis was placed on species of conservation interest or sites of conservation value. The faunal survey focused on the major vertebrate group mammals, birds, fishes, amphibians and reptiles and macro-invertebrates. The methodologies used for species identification were visual encounter surveys (VES), audio encounter survey (AES), track and scat identification, and opportunistic sightings, baited traps and leaf litter searches. Fishes were collected using tangle seines, dip nets and hook and line methods

In 2011, two additional biological assessments at the Aurora concession were conducted by local ecological specialists under the supervision of ENVIRON. A wet season assessment was conducted between July and September 2011, and the dry season assessment was conducted from October to November 2011. The wet and dry season assessments were designed to

1. Validate the previous findings of biological surveys conducted in 2009 at Aurora; and
2. Evaluate the presence of critical habitat as defined by IFC PS 6 (IFC, 2012b). As mentioned in section 1.1.1.1, the IFC PS 6 defines critical habitats as areas having high biodiversity value, and may include the following:
 - habitats of significant importance to critically endangered and/or endangered species;
 - habitats of significant importance to endemic and/or restricted-range species;
 - habitats of significant importance to globally significant concentrations of migratory species and/or congregatory species;
 - regionally significant and/or highly threatened or unique ecosystems; and/or
 - areas which are associated with key evolutionary processes.

Four (4) transects were set up for biodiversity sampling. Fishes were sampled by nets and hook and line. Amphibians and reptiles were sampled by visual encounters and auditory surveys. Birds were sampled by point counts and mist netting and mammals were documented by direct and indirect observation (e.g., tracks, scat, and fur).

In addition, an independent ichthyological survey of the Cuyuni River upstream and downstream of the Aurora concession was also conducted by a scientific team from the University of Oregon in early 2011 (Sidlauskas, 2011). Preliminary conclusions from the study suggest that high sediment loads primarily associated with current and historical ASM activities have contributed to very significant loss of species diversity and depleted fish abundance that is "...highly unusual for a South America river..." and represents "...a substantial alteration of the river's natural state."

Table 2: History of biodiversity field surveys in the vicinity of the Aurora Project site, 2006 to 2011

Description	Date	Calendar days	Season
WWF Initial Survey	January 17 to February 4, 2006	19	Wet
GSE Initial Survey	July 1 to July 7, 2006	7	Wet
GSE Initial Survey	October 6 to October 13, 2006	8	Dry
GSE Initial Survey	February 22 to March 5, 2007	12	Dry
ERM ESIA Survey	April 28 to May 5, 2009	8	Dry
Nicole Duplaix Giant Otter Survey	October 14 to October 21, 2009	9	Dry
Access road biodiversity survey	February 8-12, 2010	5	Wet
Julian Ross Itabu Surveys	May 2011	4	Dry
General Baseline Surveys	July 28 to August 26, 2011	16	Wet
General Baseline Surveys	October 22 to November 14, 2011	23	Dry
Total		111	

1.2.1 Results

The first baseline survey was conducted in January- February 2006 in the concession site. This survey documented twenty (20) species of fish, thirteen (13) species of amphibians, twenty-two (22) species of reptiles, thirty-nine (39) species of birds, fourteen (14) mammal species and nineteen (19) different orders/families of macro-invertebrates. The Black Caiman (*Melanosuchus niger*), classified as lower risk/conservation dependent (IUCN 2000), was reported to be present at the site based on anecdotal evidence from workers at the site. The survey conducted at Golden Mile documented nine (9) species of fish, four (4) species of amphibians, ten (10) species of reptiles, twenty-three (23) bird species, five (5) mammal species and seven (7) groups of Invertebrates consisting of six (6) orders. A list of all the species documented in this survey is seen in the appendix A.

The second survey conducted in the concession site in July 2006 documented thirteen (13) species of amphibians, twenty-two (22) species of reptiles, thirty-nine (39) species of birds, fourteen (14) mammal and a total of nineteen (19) different orders/families of macro-invertebrates. The Golden Mile survey documented five (5) species of amphibians, eight (8) species of reptiles, twenty-one (21) species of birds and five (5) mammal species. Macro invertebrate species from the order Diptera and Lepidoptera were abundant. No fish survey was done in Golden Mile. A list of all the species documented in this survey is seen in the appendix A.

The last survey in 2006 was conducted in October. The concession site documented nine (9) species of fish, four (4) species of amphibians, four (4) species of reptiles, thirty-seven (37) species of birds, eight (8) species of mammals and fifteen (15) orders of macro invertebrates. The Golden Mile survey documented three (3) fish species, one (1) species of amphibian, two (2) species of reptiles, nine (9) species of birds and three (3) species of mammals an eight (8) orders and two (2) classes of macro invertebrates. Overall, fewer animal species were identified in this dry season survey than for those conducted during the wet seasons. This decrease was attributed to altered weather patterns. In the dry season animals must roam in search of food

and water and as such became less concentrated in the sample areas. A list of all the species documented in this survey is seen in the appendix A.

The 2009 baseline study documented a total of one hundred and forty (140) avifaunal species, forty-five (45) species of herpetofauna, eighteen (18) mammalian species, forty-five (45) species of ichthyofauna and a total of 22 families/orders of macro-invertebrates. Six (6) endemic birds along with two (2) migrant birds were recorded. Two species were identified within this survey as being globally threatened or endangered by the World Conservation Union (IUCN)'s Red List. These species are the Harpy Eagle, *Harpia harpyja*, and the Giant Otter, *Pteronura brasiliensis*. Further detailed studies were recommended to establish population size and breeding sites for these species within the area. The survey also documented species identified under CITES Appendix I and II. The majority of the species identified under CITES were avifauna. The presence or absence of critical habitats was not reported on. A list of species documented in this survey is shown in the appendix A.

In 2010, a total of fourteen (14) species of mammals, one hundred and fourteen (114) bird species, seventeen (17) species of herpetofauna, twenty-one (21) species of fishes and of twenty-two (22) families/orders of macro-invertebrates were identified. Two migrant birds, *Elanoides forficatus* and *Ictinia plumbea*, were identified. None of the species documented are endangered, threatened or given special protection status. A list of all the species documented in this survey is seen in appendix A

During the 2011 wet and dry season survey at Aurora, one hundred and thirty-six (136) species of birds were observed, fourteen (14) bat species, nineteen (19) species of mammals. Forty-seven (47) species macro invertebrates were not a part of the 2011 surveys. All of the species encountered are common to the wider geographic area of Guyana and many are found across the entire Guianan-Amazonian lowlands region. None of the species reported are categorized as endangered or threatened, however, Yellow-footed tortoise is listed as Vulnerable although it is widely distributed and abundant in Guyana and northern South America. One species, *Stefania evansi*, is considered to be endemic to Guyana. A list of all the species documented in this survey is seen in appendix A.

Table 3: Total number of faunal species documented in the AGM baseline studies from 2006-2011

Taxa	Total number of species
Mammals	73
Birds	338
Fishes	79
Herpetofauna	100
Macro invertebrates	76

1.2.2 Cumulative frequency

As noted above, multiple biodiversity surveys have been conducted at the Aurora site and vicinity since 2006. To examine the adequacy of the surveys in terms of relative numbers of new species per survey, cumulative species numbers versus survey years were plotted (figure 1). These curves indicate that the number of new species encountered in the survey is tailing off over the last several surveys, suggesting that the survey work has been adequate in terms of documenting the biodiversity of the study area.

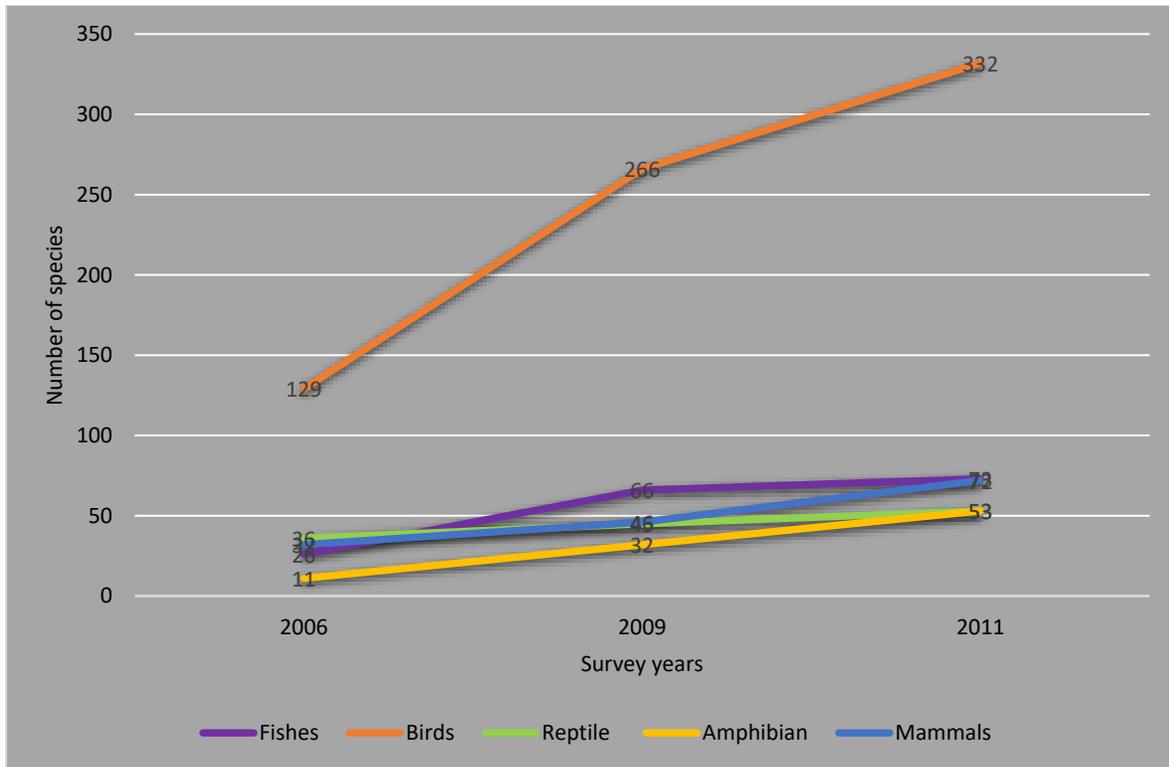


FIG 1. Number of New Species of Mammal, Amphibian, Reptile, and Fish versus Years of Survey

1.2.3 Invasive Alien Species

It is mandated by the PS 6 (IFC, 2012b) that “Projects should not introduce or promote invasive alien species (plants or animals) except as may be allowed by governing regulations,” and “existing alien species should not be spread; where practicable, they should be eradicated from natural habitats under the project proponent’s control.”

The baseline data did not document any alien species in the Project AOI. Despite the opportunity that ongoing logging and small-scale mining operations have provided potentially invasive species, none appear to have dominated the local flora and fauna.

1.2.4 Threatened Species

The local conservation status of species within Guyana is set out in the First Schedule of the Wildlife Management and Conservation Regulations, 2013. The First Schedule of the Regulations classifies threatened wildlife as Vulnerable (V), Endangered (EN) and Critically Endangered (CR), as guided by the criteria of the IUCN Red List of Threatened Species, occurring in Guyana. Taxa in any of these three categories are collectively referred to as ‘threatened’. Near threatened species are classed by IUCN as species threatened with extinction in the near future. The IUCN Red List species was therefore used in this analysis. Threatened and Near Threatened (NT) species of international concern recorded by baseline studies are shown in table 4.

Table 4: Threatened species found during baseline studies

MAMMALS	COMMON NAMES	IUCN
<i>Mymecophaga tridactyla</i>	Giant Anteater	VU
<i>Priodontes maximus</i>	Giant Armadillo	VU
<i>Tapirus terrestris</i>	Lowland Tapir	VU
<i>Tayassu pecari</i>	White-Lipped Peccary	VU
<i>Leopardus tigrinus</i>	Tiger	VU
<i>Ateles paniscus</i>	Guiana Spider Monkey	NT
<i>Panthera onca</i>	Jaguar	NT
<i>Leopardus weidii</i>	Leopard	NT
<i>Lontra longicaudis</i>	Neotropical Otter	NT
BIRDS		
<i>Patagioenas subvinoacea</i>	Ruddy Pigeon	VU
<i>Crax alector</i>	Black Curassow	VU
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	VU
<i>Ramphastos tucanus</i>	Red billed Toucan	VU
<i>Myrmotherula longipennis</i>	Longed-winged Antwren	VU
<i>Tinamus tao</i>	Gray Tinamous	VU
<i>Harpia harpyja</i>	Harpy Eagle	NT
<i>Spizaetus ornatus</i>	Ornate Hawk	NT
<i>Egretta rufescens</i>	Redish Egret	NT
<i>Periporphyrus erythromelas</i>	Red-and-black Grosbeak	NT
<i>Odontophorus gujanensis</i>	Marbled Wood-Quail	NT
<i>Celeus torquatus</i>	Ringed Woodpecker	NT
<i>Psophia crepitans</i>	Grey winged Trumpeter	NT
<i>Amazona dufresniana</i>	Blue-cheeked Parrot	NT
<i>Pionopsitta caica</i>	Caica Parrot	NT
<i>Amazona farinosa</i>	Mealey Parrot (White eyed)	NT
<i>Epinecrophylla gutturalis</i>	Brown belly Antwren	NT
<i>Hypocnemis cantator</i>	Guianan Warbling Antbird	NT
<i>Tinamus major</i>	Great Tinamou	NT
REPTILE		
<i>Lachesis muta</i>	Bush master	VU
<i>Geochelone carbonaria</i>		VU
<i>Geochelone denticulata</i>	Yellow-footed Turtle	VU
AMPHIBIANS		
<i>Leptodactylus lutzi</i>	Lutz's thin-toed frog	EN

1.3 MONITORING

Monitoring studies began in 2015 after the commencement of construction activities. Surveys conducted during the monitoring period 2015-2019, are documented in table 3. The Aurora Gold Mine's Project designed monitoring efforts to meet requirements of the Performance Standard 6, Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012) in the context of the ecological and biodiversity realities of the Aurora site and surrounding region. The context is that the cumulative historical impacts of small-scale mining are the greatest threat to regional biodiversity. Monitoring at the Aurora site was a continuous process and took into consideration both spatial and temporal scales. These considerations allowed managers to identify changes and trends over time to assess whether interventions were achieving biodiversity goals and to adapt management accordingly. A

Biodiversity Monitoring and Evaluation Plan (BMEP) was developed in 2015. This was done after a rapid biodiversity assessment was conducted to identify construction impacts on wildlife. In addition to surveys, opportunistic sightings were documented for 2015, 2016, 2018 and 2019 as part of the monitoring agenda.

Table 5: History of Biodiversity Monitoring surveys

Description	Dates	Calendar Days	Season
Rapid Biodiversity Assessment	2 nd -7 th February 2015	6	Dry
BMEP survey I	August-October 2016	90	Wet
BMEP survey II	February-April 2017	92	Dry
BMEP survey III	6 th February-7 th March; 27 th March-6 th May 2018	79	Dry
Total		267	

1.3.1 2015 Rapid Biodiversity Assessment

A Rapid Biodiversity Assessment was the first monitoring exercise to be carried out. The assessment lasted six (6) days and aimed to monitor the effects of the construction phase on wildlife. This was done by documenting faunal species present during the construction phase and comparing results with the several pre construction baseline surveys carried out in prior years. Four (4) transects were surveyed by five (5) biodiversity specialist for the presence of herpetofauna, avifauna, mammals (volant and non-volant), macro invertebrates and fishes. Sampling methodologies included Audio Encounter Survey (AES), Visual Encounter Survey (VES), mist netting, drag nets, hooks and lines, cast nets, dip nets, seines and baited traps.

A total of fifteen (15) non volant mammal species, seven (7) bat species, one hundred and twenty-four (124) bird species, eleven (11) fish species, thirteen (13) herpetofauna species and eighteen (18) orders of macro invertebrates were document in the 2015 survey. The survey recorded low species abundance of fauna when compared to baseline studies. This was said to be the result of low survey effort. Primate species were especially low in comparison to past surveys and to undisturbed regions of the Guianas with similar habitats thus, the low species abundance was attributed in part to Mine activities. Despite this, conclusions noted that overall, construction activities did not significantly affect species diversity.

1.3.2 The Biodiversity Monitoring and Evaluation Plan (BMEP)

The Biodiversity Monitoring and Evaluation Plan (BMEP) was developed in 2015 to assess and monitor how project operations affected wildlife. The monitoring program was designed to address three questions:

1. To what extent does the presence and operational disturbance of the Project affect biodiversity, in terms of species composition, species densities and distance from the Project envelope? (Q1)
2. To what extent does biodiversity recover over time? (Q2)
3. Has/will the protection of the concession from hunting create a refugium for the species likely subjected to the heaviest harvesting pressure by ASM? (Q3)

To answer these questions, the BMEP set out to conduct one wet season and one dry season survey every year after Mine construction began. Baseline assessments employed trained biologist to survey six

dominant taxa, however, the BMEP surveys focused on two subsets of biodiversity- birds and terrestrial mammals and employed camera traps and point counts as the main survey method.

To assess impact of the Mine, the current animal diversity and abundance in forests surrounding the Mine footprint were compared with the animal diversity and abundance in a forested area that was not exposed to any mining impacts. Therefore, two sampling sites were outlined; one in the Concession around the Project footprint and the other at a control area approximately 10 km east of the Project footprint in relatively pristine forest.

The methodology outlined in the BMEP included thirty (30) camera traps being placed in a thirty (30) km² grid for a thirty (30) day period at both sampling areas. Each site was divided into ten (10) transects and point counts were to record birds for five (5) minute every one hundred (100) meters, for a total of one hundred (100) point counts per sampling area per season. Figure 1 shows transect layout and camera trap locations for 2016, 2017 and 2018 surveys. Due to later setbacks and analysis, only one (1) survey was conducted each year and the number of cameras used and point counts per site, varied.

Q1 was answered by comparing Mine with Control data to determine the level of impact per species. To determine if some species avoided, were attracted to, or were indifferent to proximity of the Mine footprint, data from cameras within and beyond 500m of the Mine edge were compared. Q2 was answered by monitoring over time to show whether and how soon disturbed biodiversity returned to pre-Mine (i.e., Control) levels. To answer question three (Q3) analysis of densities of hunted species at the Mine site compared to control site was used to indicate if the Mine site acted as a refugium. AGM also has a no hunting policy in place, and this was used to assess whether hunted/game species found a 'safe heaven' in the mining site.

A 25-40m wide forest clearance was done for the creation of a Mine access road creating a forest fragment. As such, monitoring also took into consideration the impacts of forest fragments on fauna. Forest fragments may, with time, lead to forest and biodiversity degradation (Laurance et al. 2009). The survey monitored if such signs were developing by comparing diversity and abundance on the north and south side of the road in the Control area and used analysis of aggregated data to determine effects of the forest fragments on biodiversity.

When selecting survey personnel, AGM opted for the following general research approach for the BMEP: An external environmental consultant (Monitoring Director, MD) was employed to train and instruct the AGM management team and field personnel onsite to perform fieldwork. Field data was sent to the offsite MD, who verified the data to the extent possible, then analyses and reports were made of the survey's results. AGM's management team implemented and coordinated the fieldwork onsite, which was performed by contracted non-specialist personnel with the exception of the bird expert.

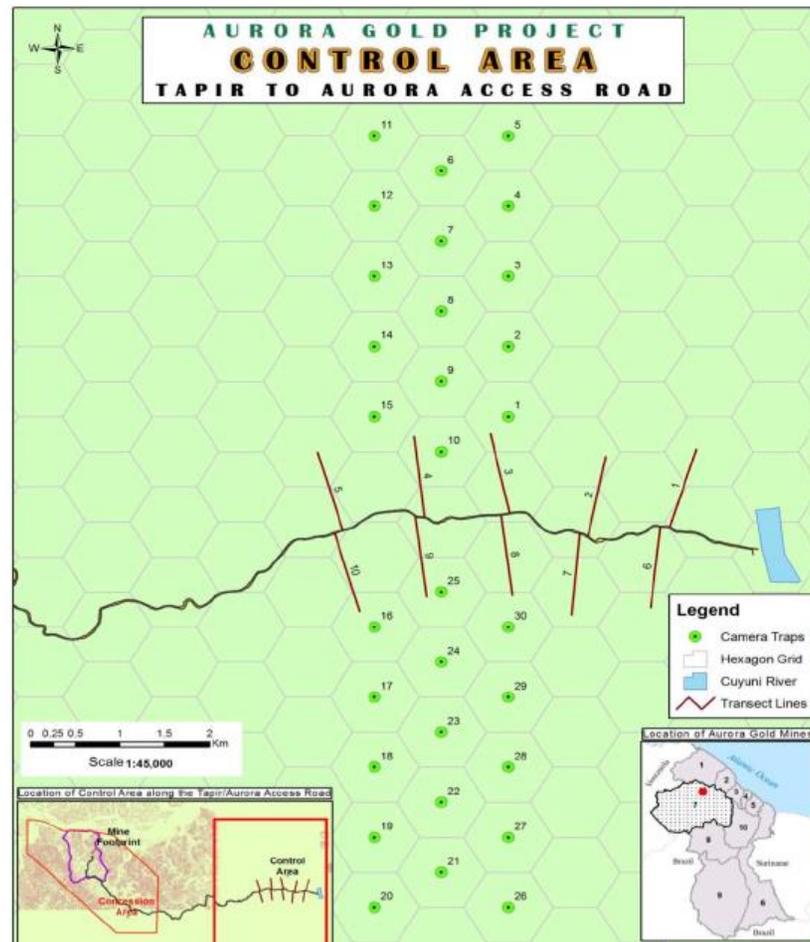
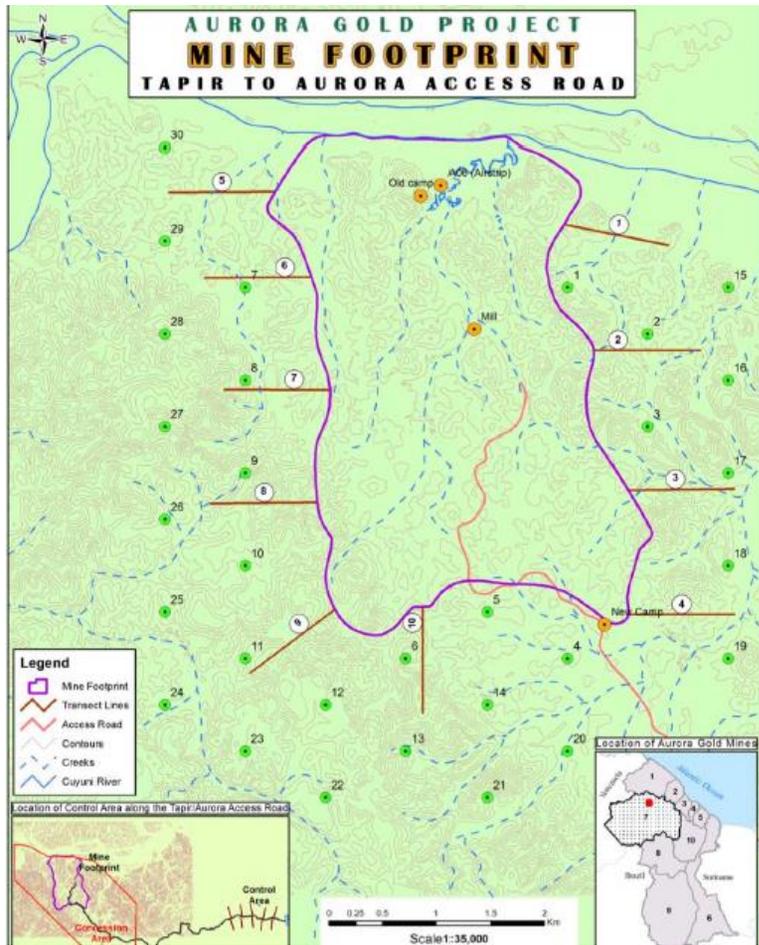


FIG 2. Schematic maps of study sites, Mine footprint, concession area (inset) and BMEP methodology

1.3.2.1 BMEP Monitoring Results

1.3.2.1.1 2016 survey

The first BMEP monitoring survey was carried out in August to October 2016 and focused on the two (2) sampling areas outlined in the BMEP. Sampling effort included point counts and one thousand (1000) hours of video from camera traps. Twenty-seven (27) cameras were set up at the Mine site and twenty-two (22) were set up at the control site. Overall, seventeen (17) protected or globally threatened animal species were detected.

This assessment was hampered by several start-up problems mainly from camera trap data. Twenty three percent (23%) of the Mine site cameras and forty-seven (47%) of the Control site cameras produced no results due to faultiness or improper setup technique. This crippled adequate data collection and therefore, potentially played a part in the results 'favoring' one site over the other. Therefore, this survey was considered a pilot (indicative) dataset. It was concluded that all findings needed to be validated by replicate surveys.

A total of one hundred and fourteen (114) bird species were documented in this survey. Findings showed the total number of species did not differ much in both forests (74 in control area vs. 70 species in concession area). Twenty-three (23) mammals were documented of which, nineteen (19) were detected at both sites. Four (4) species were only detected around the Mine and four (4) other species only in the Control. These findings generally suggest that mining activities have minimal effects on species diversity. A list of all species documented during this survey is shown in appendix B.

Distance from the Mine played no big role in affecting species diversity as species diversity in the 500m zone was equal to that in forest beyond. In terms of abundance and composition, however, there are species that seem to prefer avoiding proximity to the Mine, such as Curassow, Trumpeter, Agouti, Deer and White-lipped peccary.

The impacts of the no hunting policy, when assessed, were inconclusive due to the minimal sampling effort. When the game/hunted species population was assessed at both sites, the results showed no indication that AGM's patrolled concession forms a refugium for any game/hunted species.

Species diversity and abundance were assessed from the Control area cameras placed on the north and south side of the forest fragment (access road). Findings showed similar species were present on both sides. This was an indication that the fragmentation was unlikely a confounding factor in animal abundance. It was concluded, however, that further studies must be done to validate this finding.

1.3.2.1.2 2017 survey

This assessment was carried out in February – April 2017. Thirty (30) camera traps were placed around the Mine footprint for thirty (30) days, followed by thirty (30) days in the Control area. Overall, twenty-five (25) protected or globally threatened animal species were detected (8 more than in 2016).

A total of one hundred and eighteen (118) bird species were observed, with eighty-eight (88) species documented in the Mine and ninety-three (93) in the control area. Species composition varied notably between the two sites with just over half of the species observed at both sites. Twenty-five (25) species were only observed in the Mine forest, and thirty (30) species were only in the Control forest. Overall, mammalian species diversity was about the same at both sites; fifteen (15) at the Mine and sixteen (16) at the control. Fourteen (14) species were detected at both sites. One (1) species was only detected around the Mine and two (2) species only in the Control forest. A list of all species documented during this survey is shown in appendix B.

The Collared Peccary appeared to avoid getting close to the Mine while the Agouti and Paca seem indifferent. The Trumpeter, Tapir, Deer and White-lipped Peccaries were found in significantly larger numbers within closer distances to the Mine edge. No clear pattern was observed in the 2017 survey data that would indicate reduced diversity or abundance in, overall, endemic, protected or threatened species close to the Mine footprint and Access road. Species diversity was in fact quite similar at any sampled distance from the Mine.

Species diversity and abundance was assessed from the Control cameras placed on the North and South side of the forest fragment (access road). Findings showed similar species diversity on both sides indicating that the road did not hinder animal movement or created isolated populations. Further studies must be carried out to validate this finding.

Camera data showed the presence and often large numbers of virtually all large and small bodied mammals and terrestrial birds typical for undisturbed tropical Amazon forests (and typically hunted) at both sites, with indication of only one species that may avoid proximity to the Mine. Together, this forms strong evidence that there is no hunting taking place at the two sites. Similar diversity and relative abundances at both sites show no indication of the Mine site acting as a refugium.

Camera traps also showed a notably higher species diversity during the 2016 survey (27 vs 17 species). Sixteen (16) species were common to both surveys, with one (1) species in 2017 but not in 2016 and eleven (11) species detected in 2016 but not in 2017. Despite this, it was concluded that there was very little indication that the Project's presence and operations have (any longer) an impact on terrestrial birds and mammals.

1.3.2.1.3 2018 Survey

The 2018 point count surveys were conducted on the 20th of February - 1st of March, and on the 27th March to the 5th of April. The control and mine site were surveyed a month apart by different specialist. Camera trap data was collected from the 6th of February to the 27th of March and then again from the 27th of March to the 6th of May. Twenty-four (24) cameras were deployed at the control site and thirty (30) cameras were deployed at the mine site, however, six (6) of the cameras deployed at the mine and twelve (12) of the cameras deployed at the control site produced no data due to poor functioning. Overall, thirty-one (31) protected or globally threatened animal species were detected.

A total of one hundred and thirty-four (134) bird species were observed using the point count method. One hundred and thirteen (113) species were observed in the mine site and seventy-four (74) in the control area. Fifty (50) species were observed at both sites. These results suggest that the mine area is more diverse than the control site which can partly be attributed to difference in observers. Thirty-one (31) species recorded were considered endemic, protected or threatened. The most abundant bird families documented were Antbirds and Parrots. A list of all species documented during this survey is shown in appendix B.

Camera traps documented a total of eighteen (18) species; sixteen (16) identified at the mine site and fifteen (15) detected at the control site. A list of all species documented during this survey is shown in appendix B. All species detected in the Control area were also present in the Mine forest. This suggests that the presence of the Mine footprint and its continued operational activities did not lead to a decrease in species diversity. However, ten (10) of the eighteen (18) species were rarely detected at both sites suggesting low densities.

The Red Brocket Deer was the only species that avoided the Mine. The Agouti and White-lipped Peccary seemed indifferent, while Curassow, Trumpeter, Collared Peccary and particularly Tapir were found in significantly larger numbers within 500m from the Mine edge.

Species diversity and abundance was assessed from the Control cameras placed on the North and South side of the forest fragment (access road). The data suggest that the Trumpeter, Deer, Collared Peccary and Tapir are not too fond of the forest fragment, while White-lipped Peccary was detected more often in the northern side of the forest fragment

Both large and small bodied mammals and terrestrial birds are present at both sites, either in similar numbers or in lower numbers in the concession forest. This suggests that there is little hunting at both sites and that the concession does not act as a refugium for typical hunted species.

1.3.3 Opportunistic Sightings

Wildlife observations were recorded in a wildlife-sighting logbook. These records were examined to determine if there were any significant changes in species abundance and/or distribution. All collisions with wildlife on the access and/or haul roads were recorded. The record noted the proximity to cleared areas, the animal involved and the time of the collision etc. These records were used to evaluate the success of the measures outlined in the Management Plan. Records were made of all animal mortality associated with Tailings and Water Management Ponds. The location of the fatality, the time of day and the process discharge at that time among other parameters were recorded

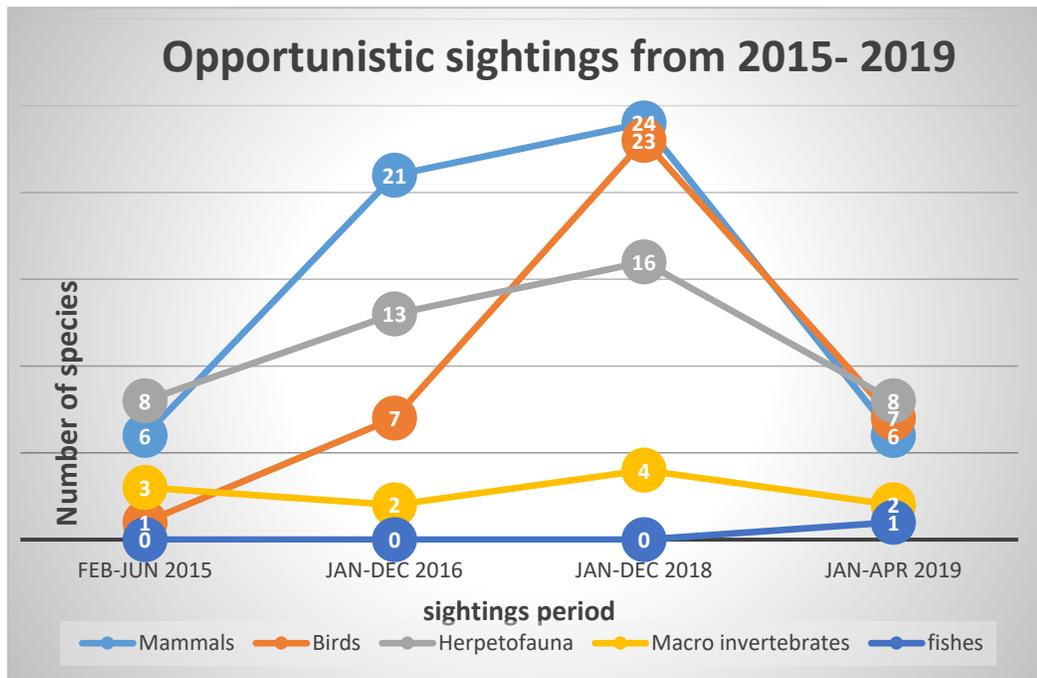
Opportunistic sightings were documented for the years 2015, 2016, 2018 and 2019. No experts were involved in the identification of these species. In addition, many species were identified in the same vicinity on different days and as such there was no way of deducing accurate species abundance as the same animal could have been sighted on different days.

Fish species count could not accurately be deduced even though there were many sightings. Most species were identified as unknown. Table five shows a list of opportunistic sightings from 2015-2019.

Table 6: Opportunistic sightings from 2015-2019

Observation period	Species number						Release and capture	Mortality
	Mammals	Birds	Herpeto fauna	Macro invertebrates	fishes	Total		
FEB-JUN 2015	6	1	8	3	-	18	-	-
JAN-DEC 2016	21	7	13	2	-	43	12	23
JAN-DEC 2018	24	23	16	4	2*	69	40	35
JAN-APR 2019	6	7	8	2	1	24	9	16
Total	47	38	45		3	150	61	74

FIG 3. opportunistic sightings for the 2015- 2017



Sightings documented a steady increase in the first three years with 2018 having the largest number of species with the exception of fishes. A large decrease was seen in 2019. However, the sightings period for each year varied and provided clear bias for the years with longer sightings periods.

1.3.4 Trend analysis

1.3.4.1 Point Count Method 2016-2018

A total of one hundred and seventy-nine (179) bird species were observed using the point count method over the three (3) year period. Analysis shows there was no species only present in the Control, but not at the Mine and only four (4) species were frequent at the Control but not at the Mine site. This is an indication that the Mine footprint and ongoing operations have not had any large permanent effects of reducing nearby species biodiversity. Eighteen (18) species, including two (2) Threatened species (Blue-cheeked Parrot, and Ruddy Pigeon) and two (2) endemic species (Capuchinbird and Yellow-green Grosbeak), displayed signs of returning to the Mine forest indicated by their absence in the 2016 surveys but presence in the 2017 and 2018 surveys.

In terms of species abundance, signals of a return trend were displayed by 12 species, as their abundance steadily increased over the three-year period. Three (3) of the twelve (12) species were endemic (Red-and-black Grosbeak, Yellow-green grosbeak, Spot-tailed Antwren) and one (1) threatened (Red-and-black Grosbeak). A declining trend was displayed by one (1) species (Chestnut-rumped Woodcreeper) which is a Guiana Shield endemic species. Its abundance is decreasing at both sites.

When comparing trends at the family level, analysis shows ten (10) of the thirty-seven (37) families documented, displayed a returning signal including the Falcons, Passerines, Jackmarts, hummingbird, Cardinals, Wood peckers, and birds, true Parrots, Tyrant Flycatchers and Tanagers. Two (2) families showed a declining trend which were the Swifts and the Formicariids

None of the Project's specific interventions, i.e. Mine Footprint, Access Road and Forest Fragment, appeared to have an impact on the 2016-2018 aggregate diversity of bird species, nor on the diversity of specialty (endemic, threatened or protected) bird species. Species diversity with distance from the Mine edge and Access road showed no discernable patterns. Diversity of birds and specialty birds was in fact slightly higher in the Forest Fragment.

Based on these results, no indication was found that the Project's ongoing operations have resulted in any substantial reduction in bird species diversity and that with time, bird species diversity is slowly recovering. However, the annual BMEP effort is not large enough, and was additionally obscured by implementation shortcomings, to assess return trends with a high level of confidence.

Table 7: Comparison of bird diversity from 2016 - 2018 using point count method.

Variable	2016		2017		2018	
	Mine	Control	Mine	Control	Mine	Control
# of point counts	89	100	100	100	100	100
#of bird species	74	70	88	93	113	74
# of bird families	29	25	30	32	34	24
Guiana Shield endemic species	11	13	12	15	12	9
Protected species in Guyana	5	7	3	4	7	5
Species with IUCN status 'Near-threatened' or worse	1	3	8	11	9	7
Total species observed	114		118		134	

1.3.4.2 Camera trap method 2016-2018

A total of twenty-eight (28) different species have been detected in the two forests (6 ground dwelling birds and 22 mammals). Thirteen (13) species documented were either protected or endemic in Guyana, or both. The total number of species detected in both forest sites each year was very similar but substantially higher in 2016 in both forests. Over this three (3) year survey period, no Critically Endangered or Endangered ground mammals and birds were detected.

Of the six (6) terrestrial bird species documented, only two (2) were frequently detected during surveys over 2016–2018, the Black Curassow and Grey-winged Trumpeter. Both species display a quite marked decline in numbers over time in the Mine forest compared to the Control forest.

Mammal diversity, showed a clear increasing trend (detection frequencies) with time in the Mine forest with species like the Agouti, Red Brocket Deer, Collared Peccary and Tapir, attaining abundance numbers similar to those found in the Control forest. The Puma detections increased in the Mine forest, while detections of other cats like the Jaguar, Ocelot, and Jaguarundi, were rare and remained at similar levels at both sites. Detections of top predator in both forests gives an indication of a healthy forest. The White-lipped Peccary was detected in all the survey years at both sites and in large numbers, suggesting it is generally not affected by the Project's footprint and daily operations. Armadillo and Paca numbers are in decline in both forests.

No indications of decreased abundance among targeted species is detected in the forest fragments formed by the Mine footprint and access road. These results suggest that the road forms no barrier for these species. The agouti, paca Jaguar and Ocelet were often detected close to the road while some species like the curassow, seemed indifferent and large herbivores like the deer as well as the giant anteater, all appeared to avoid close proximity to the roadas. Overall species diversity close to the road was also considerably less

Table 8: A Comparison of species diversity during the 2016, 2017 and 2018 surveys using camera trap method.

Variable	2016		2017		2018	
	Mine	Control	Mine	Control	Mine	Control
# of cameras at site	27	22	30	30	30	24
Total # of species detected	23	23	15	16	16	15
• Total # of Birds detected	6	4	2	3	2	2
• Total # of Mammals detected	17	19	7	7	14	13
IUCN status NT or higher (including DD)	9	10	7	7	7	7
Guyana Protected species	5	6	5	5	5	5
Endangered or critically endangered	0	0	0	0	0	0
# of species found at both sites	17		27		14	

Research Question three (3) sought to identify whether the protection of the AGM concession from hunting is creating a refugium for the species likely subjected to the heaviest hunting pressure by artesinal small scale mining (ASM) in the area. Field technicians implementing the Point Count and Camera Trap surveys have reported no human signs in both forests over 2016–2018. Neither were any hunters detected by the cameras. In addition, aggregate diversity and abundance of typical game species saw no decrease of abundance in the Control forest. Therefore, no refugium effect is observed due to the absence of hunting pressures. Human signs will continue to be monitored to detect possible future changes in hunting pressure

The camera trap surveys over 2016–2018 revealed that terrestrial mammal and bird diversity was quite constant over time. While species diversity peaked in 2016 at both sites, most additional species were a single or few individuals, and the difference in season of the 2016 survey may have played a role. Several, mostly larger-bodied, species displayed increasing abundance over time at the Mine site, attaining abundance levels of the Control forest.

1.3.4.3 Simpsons diversity index

Simpson's Diversity Index or Simpson's Index, is a measure of diversity which takes into account the number of species present, as well as the relative abundance of each species. This index provides a mathematical representation of how diversity differs on both a temporal scale (pre Mine vs post Mine commencement) and on a spatial scale (Control vs Mine area). The index values ranges from 0-1 with 0 being the most diverse and 1 having no diversity.

To assess total diversity changes on a temporal scale, the Simpson's Index values for baseline surveys (2006, 2009, 2010, 2011) and the rapid biodiversity assessment carried out in 2015 (post commencement of Mine activities) were compared. Each of these assessments surveyed five (5) taxa. The BMEP surveys focused on two (2) taxa, therefore, to prevent bias in analysis, the Simpson's Diversity Index for the BMEP surveys are calculated separately. Table x presents the Simpson's index for surveys carried out in 2006, 2009, 2011 and 2015.

Table 9: Simpson's Index for surveys carried out in 2006, 2007, 2009, 2011 and 2015.

Survey year	Simpson's Diversity Index
2006	0.35
2009	0.40
2011	0.41
2015	0.58

These findings indicate that there was a significant decrease in biodiversity from 2006-2015. These differences can partly be attributed to survey effort but Mine activities could have possibly played a role in the decreased species diversity. The 2015 rapid assessment was the only effort, post commencement of mining activities, to survey all terrestrial fauna. This singular survey is not enough to make conclusive statements on impacts of mining to biodiversity. A bigger data set is needed to help deduce the impacts of Mine activities on fauna.

The BMEP surveys assessed avian and mamillian diversity changes. Table 8 shows biodiversity change overtime for the BMEP surveys.

Table 10: Simpson's Index showing Biodiversity change overtime

BMEP survey Year	Simpson's Diversity Index
2016	0.71
2017	0.77
2018	0.78

These findings indicate a decrease in mammalian and bird species diversity overtime. The 2016 surveys were conducted in the wet (fruiting) season which possibly may account for the increase in bird and mammal species.

To assess spatial difference in biodiversity, the Simptons Index for the Mine and Control area was compared. In 2016, the Simpson's Index for the Mine site is calculated as 0.70 and for the control, 0.61. This indicates that the Mine site was slightly less diverse than the control area. In 2017, the Simpsons Index for the Mine site is calculated as 0.86 and for the control 0.86. This indicates that both sites had equal diversity and that bidodiversity in the mine had somewhat recovered from 2016. In 2018, the index for the mine site is 0.78 and 0.71 for the Control area, making the control area slightly more diverse than the mine site. The BMEP surveys recorded the highest level in species diversity with a slow decrease over 2017 and 2018. This can be attributed in part to survey effort and seasonal differences.

1.3.5 Conclusions

The aggregate analyses of the BMEP surveys conducted from 2016-2017 showed that, although no Endangered or Critically endangered species were detected, the forests around the Mine footprint, contains large numbers of specialty species (endemic, protected, threatened); a quarter of all observed bird species, and almost half of all detected mammal species.

No long-term impacts of project activites were detected on bird diversity and terrestrial mammal biodiversity. Mammal species diversity was, however, considerably less near the Mine edge and near the Road possibly attributed to difference in sampling effort. There was no detected impacts to bird species abundance but in the mine area with the exception of the Black Curassow. Half of the mammal species displayed a lower abundance in the Mine forest. These recordings of lower abundances can partly be attributed to small differences in habitat between the two sites. No mammal abundance differences were found in the forest fragment created by the Access road. Conversely, large herbivores such as the deer and giant anteater avoided close proximity to the access road. (Q1)

Within the confines of the research effort, and the imperfections of field survey implementation, trend analysis over the first three years of the BMEP monitoring program displayed indications of recovering biodiversity for several bird families and mammal species. The biodiversity recovery is not in species numbers but in species abundance. In addition, few signs of declines in species numbers were observed with the Point Count and Camera Trap surveys. Observed declines in presence and abundance of ground-

dwelling bird species is of concern. Overall, the analysis shows signs that population numbers of animal species may be resettling, getting accustomed to the presence of the Project, very probably aided by AGM's no hunting or fishing policy. (Q2)

No signs of hunting were observed in either forest over 2016–2018 and combined with the relatively stable abundances of game species in the Control forest, it is concluded that AGM does not produce a refugium effect for hunted species. (Q3)

1.4 ECOSYSTEM SERVICES

1.4.1 Baseline

Flora surveys were conducted in the years 2006, 2009, 2010 and 2011 at the AGM concession while faunal surveys were conducted in aforementioned years as well as 2015, 2016 and 2017. Early works construction was conducted in 2011, 2012 and early 2013. Mining commenced in 2015 at AGM concession. Floral and faunal species plays a pivotal role in the functioning of Ecosystem services.

Ecosystem services are the direct and indirect contributions created by ecosystems for the benefit of humans. Ecosystem services can be categorized into four main groups:

Provisioning services – the material or energy output from the ecosystem such as food, fresh water and other resources found within the ecosystem

Regulating services – the provision of services to humans obtained from the regulation of ecosystem processes such as local climate and air quality, carbon sequestration and storage, moderation of extreme events, waste-water treatment, erosion prevention and maintenance of soil fertility, pollination, seed dispersal and biological control.

Supporting services – the services that is required for maintaining all other ecosystem services namely, Provisioning, Regulating and Cultural services. These three ecosystems services that is maintained by supporting services provides contributions through various biological processes which include provision of habitats, maintenance of genetic diversity, water cycling, nutrient cycling, soil formation and retention and the production of atmospheric oxygen and biomass.

Cultural services – the non-material contributions of ecosystems to human well-being, such as recreation, spiritual values, and aesthetics enjoyment

1.4.1.1 Soil

The soil in the Aurora Gold Mine (AGM) Concession comprise of residual materials derived from weathered acidic crystalline rocks (i.e, granite, schist, dolerite, granodiorite and phyllite), alluvial sediments derived from stratified and unconsolidated deposits of sands, silts and clays. In the upland areas, the soils consist of deep, well drained, yellow and reddish-brown sandy clay loams and gravelly clays. In the riverine and alluvial fan areas, the solid are also deep but range from poorly- to excessively well drained brown to white clay loams and sands.

The Ecosystem found within AGM concession is influenced by the roles of soils. Soils play a major role in all of the natural ecological cycles such as carbon, nitrogen, oxygen, water and nutrient. They provide benefits through their contribution to the various ecosystem services and these benefits include waste decomposition, water filtration and degradation of environmental contaminants.

1.4.2 Provisioning services

Provisioning services are the forest resources output that benefit both humans and animals. Diverse forest resources were observed and documented at the AGM concession that are of benefit to humans as well as animals. These forest resources included trees used for food, potential commercial uses and freshwater. The initial survey in 2006 documented a number of tree species, with the potential to provide raw materials for construction, shelter/home to surrounding species, and food to humans as well as animals. This survey documented a total of one hundred and thirty-seven (137) species from fifty (50) families, of which Black Kakarallie (*Eschweilera sagotiana*), Haiawaballi (*Tetragastris altrissima*) and Hairaballi (*Alexa imperatric*) were most dominant and Mora (*Mora excels*) was abundant. In 2010, the Environmental and Social Impact Assessment (ESIA) documented thirty-seven (37) tree species that are used specifically for food, timber and medicine. Black Kakarallie is used specifically for timber, Mora is used for timber and food while Buroda (*Parinari campestris*) is used for timber, food, firewood and medicine.

Some arboreal species were identified at the AGM concession such as Guiana Red Howler Monkey (*Alouatta macconelli*), Bicoloured Arboreal Rice Rat (*Oecomys bicolor*), Hylidae family (tree frogs), Picidae family (wood peckers), Phyllostomidae family (bats).

A reduction of these tree species would impact provisioning services by reducing the amount of output that the ecosystem is providing to humans and animals.

Table 11: Species of Commercial interest documented in baseline surveys

Common name	Scientific name	Commercial Usage
Asepoko	<i>Pouteria guianensis</i>	Timber
Aromata	<i>Clathrotropis macrocarpa</i>	Timber & Medicine
Aromata	<i>Clathrotropis brachypetala</i>	Timber & Medicine
Baramalli	<i>Casostoma commune</i>	Timber
Black kakaralli	<i>Eschweilera subglandulosa</i>	Timber
Wallaba	<i>Eperua falcate</i>	Timber
Smooth leaf kakaralli	<i>Eschweilera coriacea</i>	Timber
Fine leaf kakaralli	<i>Eschweilera wachenheimii</i>	Timber
Buroda	<i>Parinari campestris</i>	Timber, food, firewood & medicine
Mora	<i>Mora excels</i>	Timber & Medicine
Corkwood	<i>Pterocarpus officinalis</i>	Timber & Medicine
Crabwood	<i>Carapa guianensis</i>	Timber, Medicine & NTFP
Haiawa	<i>Protium guianense</i>	Timber & NTFP
Duru	<i>Annona symphyocarpa</i>	Timber & Firewood
Futi	<i>Jacaranda copaia</i>	Timber
Antwood	<i>Cordia nodosa</i>	Timber
Yari-yari	<i>Duguetia neglecta</i>	NTFP
Yari-yari	<i>Duguetia calycina</i>	NTFP
Yari-yari	<i>Duguetia guianensis</i>	NTFP
Trysel	<i>Pentaclethra macroloba</i>	Timber & Medicine
Monkey pot		Timber
Wamara	<i>Swartzia leiocalycina</i>	Timber

Whitey	<i>Inga sp.</i>	Timber
Nibi	<i>Heteropsis jenmanii</i>	NTFP
Turu palm	<i>Jessenia bataua</i>	Roofing material, NTFP
Manicole Palm	<i>Euterpe oleracea</i>	Food
Monkey ladder	<i>Bauhinia guianensis</i>	Medicine
Batrics palms	<i>Bactris oligoclada</i>	Some species are used as food in forest communities
Conga Pong/Cecropia	<i>Bactris oligoclada</i>	Medicine
Conga Pong/Cecropia	<i>Cecropia scrdophylla</i>	Medicine
Conga Pong/Cecropia	<i>Cecropia surunamensis</i>	Medicine
Maho	<i>Sterculia guianensis</i>	Medicine
Mukru	<i>Ischmosiphon arouma</i>	NTFP
Dali		Timber
Kurokai	<i>Protium decandrum</i>	Timber
Simarupa	<i>Quassia simarouba</i>	Timber
Habudiballi	<i>Anacardium giganteum</i>	Timber

1.4.3 Regulating services

In 2006, the initial biodiversity survey documented one hundred and thirty-seven (137) species of trees while the last survey documented one hundred and fifty-seven (159) tree species in 2011. All these trees documented at the concession help regulate air quality by removing pollutants from the atmosphere, converting carbon-dioxide to oxygen through photosynthesis and absorbing toxic gases. Additionally, they contribute heavily to waste-water treatment through their root-system and their role in nutrient cycling. Major forest clearance reduces the forest potential to regulate air quality.

Vegetation cover acts as a prevention for soil erosion and promotes soil fertility through natural biological processes such as nitrogen fixation. Major forest clearance and infrastructure construction was done to develop the mine site at the AGM concession, as a result vegetation cover was removed. The removal of vegetation cover is a form of soil degradation and will result in soil erosion.

Various surveys conducted at the AGM concession documented the presence of faunal species which plays a major role in regulating the ecosystem. Macro-invertebrates and scavenger organisms (listed in table 10) observed at the concession, are responsible for decomposing dead plant materials to create organic layers. Other faunal species observed that play a key role in regulating ecosystems include; pollinating agents (listed in table 11), frugivorous fauna (listed in table 12), and insectivorous fauna (listed in table 5). The aforementioned faunal species play a major role in reforestation with the exception of insectivorous fauna. Insectivorous fauna manages the forest through predation of various insects. The reduction of insect pest population will promote a healthy ecosystem

Table 12: Macro-invertebrates (involved in decomposition) and scavenger birds observed at Aurora Gold Mine Concession

Common name	Scientific name
Macro-invertebrates	
Earthworm	<i>Haplotaxida</i>

Beetle	<i>Coleoptera</i>
Scorpion	<i>Scorpiones</i>
Scavenger Birds	
White hawk	<i>Leucopternis albicollis</i>
Ornate Hawk	<i>Spizaetus ornatus</i>
Turkey Vulture	<i>Cathartes aura</i>
Greater yellow-headed Vulture	<i>Cathartes melambrotus</i>
Black Vulture	<i>Coragypus atratus</i>
Slaty-backed Forest-Falcon	<i>Micrastur mirandollei</i>
Barred Forest-Falcon	<i>Micrastur ruficollis</i>
Lined-Forest Falcon	<i>Micrastur gilvicolis</i>
Forest-Falcon	<i>Micraster sp</i>
Red-throated Caracara	<i>Ibycter americanus</i>

Table 13: Pollinators observed at the Aurora Gold Mine Concession

Birds	
Common name	Scientific name
Reddish hermit	<i>Phaethornis ruber</i>
Hermit	<i>Phaethornis sp.</i>
Eastern Long-tailed Hermit	<i>Phaethornis supercilliosus</i>
Long-tailed Hermit	<i>Phaethornis bourcieri</i>
White-bearded Hermit	<i>Phaethornis hispidus</i>
Streak-throated Hermit	<i>Phaethornis rufurumi</i>
Speckled Hummingbird	<i>Adelomyia melanogenys</i>
Hummingbird	<i>Amazillia sp</i>
Fork-tailed Woodnymph	<i>Thalurania furcate</i>
Macro-invertebrates (Families/Orders)	
Bees	Hymenoptera
Wasp	Hymenoptera
Butterflies	Riodinae
Butterflies	Lycaeniidae
Butterflies	Morphidae
Butterflies	Satyridae
Butterflies	Heliconidae
Butterflies	Papilionidae

Table 14: Frugivorous Fauna observe at the Aurora Gold Mine Concession

Birds	
Common name	Scientific name
Yellow-green Grosbeak	<i>Caryothraustes canadensis</i>

Slate-colored Grosbeak	<i>Saltator grossus</i>
Red-and-black Grosbeak	<i>Periporphyrus erythromelas</i>
Fulvous-crested Tanager	<i>Tachyphonus surinamus</i>
Bay-headed Tanager	<i>Tangara gryola</i>
Turquoise Tanager	<i>Tangara mexicana</i>
Tanager	<i>Tangara sp</i>
Mammals	
Paca/Laba	<i>Cuniculus paca</i>
Red-rumped Agouti	<i>Dasyprocta leporina</i>
Lowland Tapir	<i>Tapirus terrestris</i>
Bats	
Silky short-tailed bat	<i>Carollia brevicauda</i>
Seba's short-tailed bat	<i>Carollia perspicillata</i>
Dwarf Little Fruit Bat	<i>Rhinophylla pumilio</i>
White-throated Round eared Bat	<i>Lophostoma silvicolium</i>

Table 15: Insectivorous fauna observe at the Aurora Gold Mine Concession

Birds	
Common name	Scientific name
Black-tailed Tityra	<i>Tityra cayana</i>
Musician Wren	<i>Cyphorhinus arada</i>
Buff-breasted Wood-Wren	<i>Campylorhynchus griseus</i>
White-breasted Wood-wren	<i>Henicorhina leucosticta</i>
Coraya Wren	<i>Thryothorus coraya</i>
Buff-breasted Wren	<i>Thryothorus leucotics</i>
Southern House Wren	<i>Troglodytes musculus</i>
Bats	
Sebas short-tailed bate	<i>Carollia perspicillata</i>
White throated round eared bat	<i>Lophostoma silvicolium</i>
Mammals	
Giant Anteater	<i>Myrmecophaga tridactyla</i>

1.4.4 Supporting services

Floral and faunal organisms documented at Aurora Gold Mine (AGM) concession, plays major roles in the formation of soil. Plant vegetative residues are added to soil and this dissipates the energy available to cause soil erosion, thus all floral species identified offer supporting services to the ecosystem.

Animals that engage in burrowing activities such as amphibians from the Leptodactylidae and Bufonidae family influences soil chemical composition through changes in nutrient and mineral cycling rates and related pathways. Species from the Leptodactylidae family (*Hydrolaetare schmidti*, *Leptodactylus mystaceus*, *Leptodactylus knudensi*, *Leptodactylus lineatus* and *Leptodactylus longirostris*) and Bufonidae family (*Rhaebo guttatus*, *Rhaebo nasicus*, *Rhinella cf. margartifera*, *Rhinella marina*) were identified at the Aurora Gold Mine

concession. Many small mammals from the Rodentia Order display subterranean lifestyles which influence the sediment processes in the soil and vegetation (Gray et al., 2015). The black vulture and other scavengers and decomposers at the concession are integral in recycling nutrients by breaking down decaying organism.

2 Landscape and Visual Resources

Landscape is defined as a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors. This definition reflects the idea that landscapes evolve through time, as a result of being acted upon by natural forces and human beings. It also underlines that a landscape forms a whole, and its natural and cultural elements must be taken together, not separately.

Landscape character is defined as a distinct, recognizable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. Landscape character comprises combinations of landscape elements and characteristics, such as landform, geology, soils, waterbodies and catchments, trees and woodlands, boundary features and patterns, agriculture, habitats and species, settlement and development patterns, historic sites and features, recreation and access, and experiential qualities. This can also include description of social structures.

2.1 BASELINE

The Aurora Gold Mine property is located approximately 170 km west of the capital city of Georgetown and 130 km northwest of Bartica, a settlement at the junction of the Essequibo and Cuyuni Rivers. The property is in a remote, forested and largely uninhabited area and the center of the property is located at latitude 6°45'N, longitude 59°45'W (Fig. 5). The hills in the area range up to an elevation of 130 m. A series of flat-topped hills that rise approximately 200m above river level are present southeast of the property. Small hills are also present to the southwest of the property and rise approximately 40 m above the river level. These hills are formed of granitic rocks and clay-rich residual deposits that are cut by streams that drain into the Cuyuni River.

The Cuyuni River serves as the main drainage conduit for Aurora Gold Mine. The Cuyuni River turns southeastward, flowing to its confluence with the Mazaruni just above Bartica which in turn flows into the Essequibo River (Fig. 4). The Essequibo and its main tributaries drain about a third of Guyana. The Essequibo River basin occupies an area of approximately 69,300 sq. km (26,757sq.mi) and flows to the north for 1,014 kilometers (630 mi) and has its origins in the Acarai Mountains near the Brazil-Guyana border. The Essequibo River serves as a biological corridor for the transport of aquatic biota (Watkins et al., 2004)

2.2 RESULTS

Reports compiled in 2011, 2013, 2015 and 2016 stipulated that there are no recognized unique assemblages or species of unique phylogeny associated with the landscape of the Aurora concession. It was stated that the absence of unique assemblages and lineages reflects the absence of isolated landscape features of importance to evolutionary processes, such as caves, plateaus, springs, barrens, or lagoons, as well as the absence of major barriers to dispersal such as high mountain ranges, expansive open vegetation formations, or larger rivers. There are no outstanding terrestrial ecological features or functions of the landscape and/or the Project concession site of critical importance to maintaining regional biodiversity. The ecological features and functions of the Aurora concession and the surrounding area are replicated across ecoregions.

The IFC (2012) standards treat landscape under the heading of PS6 Biodiversity Conservation and Natural Resources. The 2013 Aurora ESIA report stipulated that PS 6 requires that projects in natural habitats implement mitigation measures designed to achieve “no net loss” wherever feasible. PS 6 defines “no net loss” as “the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project’s impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (i.e., local, landscape-level, national, regional).” In order to achieve this “no net loss” goal, where feasible, the Project will promote the restoration of basic ecological processes in areas of existing degraded habitat (i.e., restore and, where appropriate, revegetate land areas impacted by historical ASM or other intrusive human activities) within the Aurora concession, in addition to the progressive rehabilitation of lands affected by the Project.

FIG 4. Showing Cuyuni-Mazaruni Drainage River Basin



FIG 5. Showing the center of Aurora Gold Mine



FIG 6. Compositd aerial view of Concession



3 Gap Analysis

3.1 METHODOLOGY

Gap analysis considered the following:

1. Reviewing existing Environmental Impact Assessments (EIA);
2. Reviewing existing Biodiversity Management Plan (BMP) and Biodiversity Monitoring and Evaluation Plan (BMEP);
3. Analyzing project impacts to biodiversity and mitigation measures initially outlined in the EIA;
4. Analyzing use and implementation of mitigation measures to date
5. Providing recommendations to help achieve mitigation goals.

3.2 DOCUMENTS REVIEWED

Table 16 provides a list of documents that were reviewed during Gap Analysis

Table 16: Documents reviewed for Gap analysis.

	Documents
1.	Aurora Biodiversity Protocols, 2006
2.	WWF Biodiversity Report February, 2006
3.	Aurora Baseline I Report May, 2006
4.	Aurora Baseline II Report September, 2006
5.	Aurora Baseline III Report December, 2006
6.	Aurora Final Baseline Report April 2007
7.	Aurora Biodiversity Assessment 2009
8.	Aurora Floral Assessment 2009
9.	Giant Otters Survey 2009
10.	Bio Assessment of the Cuyuni River 2009
11.	Aurora Gold Mines Final ESIA March 2010
12.	Aurora Gold Mine Biodiversity Baseline 2011
13.	Guyana Goldfields ESIA 2013
14.	Revegetation Management Plan 2013
15.	Biodiversity Management Plan 2014 revised

16.	Rapid Biodiversity Assessment April 2015
17.	Biodiversity Monitoring and Evaluation Plan (BMEP) 2015
18.	BMEP I Survey 2016
19.	Offset Implementation Plan 2016
20.	Revegetation Maps and Updated 2016 Foot Print
21.	BMEP II Survey 2017
22.	BMEP III Survey 2018

3.3 MATRIX OF COMPARISON FOR GAP ANALYSIS OF AURORA GOLD MINE BIODIVERSITY MITIGATION AND MONITORING PLAN

Aspect Category	Potential Impacts	Mitigation Measures outlined in ESIA's	Action taken to date	Gaps and Recommendations
Biological Environment	<ul style="list-style-type: none"> • Impacts on terrestrial biota and habitat • Loss/alteration of 146.2 ha of terrestrial habitats • Impact to specialty species (endemic, protected and threatened) 	<ul style="list-style-type: none"> • Revegetation of 60.8 ha of road verges, reducing total road footprint to 85.4 ha. • Revegetation of Aurora (M3) extension road ROWs using non-invasive species • Implementation of a routine biodiversity monitoring program within the Aurora concession. • Prohibition on hunting, fishing, harboring of wild animals, or introduction of invasive species by the Project workforce or contractors • Implementation of progressive restoration and stabilization procedures for rights of way (ROWs) and artisanal/small-scale mining-(ASM-) disturbed areas. • Implementation of specific mitigation measures for the protection of sensitive species and habitats, as directed by the Biodiversity Management Plan • Restoration of ASM mined lands in Project Concession will partially offset reduction of forest areas by the Project. 	<ul style="list-style-type: none"> • Iterative design approach was adopted and reduced the mine footprint from 2000 ha to 900 ha • Revegetation of 57 ha of cleared land, West of the Cuyuni river • Revegetation of M3 extension road ROWs in 2012 • A BMEP was developed in 2015 to survey avian and mammalian diversity. Three (3) monitoring surveys were conducted subsequently to assess mine impacts to this subset of biodiversity. • A no hunting, fishing, harboring of wild animals, or introduction of invasive species policy is in effect 	<ul style="list-style-type: none"> • Since the commencement of mine activities, sightings of several endangered Giant River Otters have been documented in the main tailings dam. Baseline studies undertaken in the area did not identify any resident population. As such, new studies should be conducted to identify the extent of the Giant River Otter population and mitigation methods developed accordingly. • Monitoring surveys patterned from the BMEP did not encompass aquatic habitats. The BMEP should be updated to include surveying fish and benthic populations to determine mine effects on aquatic life • The BMEP should be updated to include surveying all major
	<ul style="list-style-type: none"> • Impacts to aquatic biota and habitat • Loss/ degradation of aquatic 	<ul style="list-style-type: none"> • Implementation of Erosion Prevention and Control Plan and Water Management Plan to manage stockpiles, and to detect and mitigate erosional issues in other disturbed areas. 	<ul style="list-style-type: none"> • A no hunting fishing, harboring of wild animals, or introduction of invasive species policy is in effect 	

	<p>habitats; 55 crossings of streams resulted in loss of approximately 2 km of impacts to existing streams</p> <ul style="list-style-type: none"> • Spills of fuel and other chemicals during transport to aquatic habitat. • Sediment loading of surface water • Cumulative heavy metal contamination of aquatic habitats 	<ul style="list-style-type: none"> • Maintenance of compliance with the ICMC and implementation of the <i>Cyanide Management Plan</i> • Purchase of cyanide exclusively in solid briquette form, transported in dedicated stainless steel ISO delivery/mixing tanks, delivered by an ICMC certified transporter • Implementation of routine water quality monitoring program at stream crossings per the <i>ESHS Monitoring Plan</i> • Design culverts to properly handle natural surface water flows, per the Project Erosion Prevention and Control Plan; line with grass and/or riprap, where necessary to control flow rates/velocities and minimize erosion • No use of Hg in mineral separation or other industrial process Collection and controlled disposal of Hg ballast/fluorescent light waste per hazardous waste provisions of Project Waste Management Plan • Establishment of contractual requirements for the trucking companies transporting fuel and other hazardous chemicals to have spill contingency plans and spill kits • Establish emergency spill response stations at Tapir Crossing and other selected • Placement of spill kits on all heavy equipment and passenger vehicles 	<ul style="list-style-type: none"> • Cyanide is used instead of Mercury for mineral separation processes. • An Erosion Prevention and Control Plan and Water Management Plan was established in - that addresses the design of culverts to handle natural surface water flow. 	<p>terrestrial taxa to obtain a more holistic view of impacts of mine operations to biodiversity.</p>
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4 Appendix

4.1 APPENDIX A: SPECIES DOCUMENTED DURING BASELINE STUDIES

Table 17: Mammals documented during baseline surveys

Common Name	Scientific Name	Family	2006	2009	2011	IUCN	CITES
Bush Hog			✓				
Forest rat	<i>Rodentia Sp</i>			✓			
Wild Hog			✓				
Agouti; Labba	<i>Agouti paca</i>	Agoutidae	✓			LC	III
Red Howler Monkey	<i>Alouatta macconnelli</i>	Atelidae			✓	LC	II
Capuchin Monkey	<i>Cebus sp.</i>	Cebidae	✓				
Red Howler Monkey	<i>Alouatta seniculus</i>	Cebidae	✓	✓		LC	II
South American Squirrel Monkey	<i>Saimiri sciureus</i>	Cebidae	✓		✓	LC	II
Wedge-Capped or Weeper Capuchin	<i>Cebus olivaceus</i>	Cebidae	✓		✓	LC	II
	<i>Ateles paniscus</i>	Cebidae	✓			VU	II
Red Brocket Deer	<i>Mazama americana</i>	Cervidae	✓	✓	✓	DD	III
Amazonian Brown Brocket Deer	<i>Mazama nemorivaga</i>	Cervidae			✓	LC	NA
Dear	<i>Odocoileus virginianus</i>	Cervidae	✓			LC	III
Grey Brocket Deer	<i>Mazama gouazoupira</i>	Cervidae	✓	✓		LC	NA
Tree bat	<i>Molossus sp.</i>	Chiroptera		✓			
Giant Armadillo	<i>Priodontes maximus</i>	Chlamyphoridae		✓		VU	I
Paca/ Labba	<i>Cuniculus paca</i>	Cuniculidae			✓	LC	III
Nine-banded Armadillo	<i>Dasypus novemcinctus</i>	Dasypodidae	✓	✓	✓	LC	NA
Agouti	<i>Cabassous unciatus</i>	Dasyproctidae	✓				NA
Acouri	<i>Dasyprocta fulginosa</i>	Dasyproctidae	✓			LC	NA
Agouti	<i>Dasyprocta agouti</i>	Dasyproctidae		✓		LC	NA
Red Acouchy	<i>Myoprocta acouchy</i>	Dasyproctidae			✓	LC	NA
Red Rumped Agouti	<i>Dasyprocta leporina</i>	Dasyproctidae	✓	✓	✓	LC	NA
Common Opossum; Yawari	<i>Didelphis marsupialis</i>	Didelphidae	✓		✓	LC	NA
River Bat	<i>Rhynchonycteris naso</i>	Emballonuridae		✓		LC	NA
Shaggy Bat	<i>Centronycteris maximiliani</i>	Emballonuridae			✓	LC	NA
Common Porcupine	<i>Coendou prehensilis</i>	Erethizontidae		✓		LC	NA
Leopard	<i>Leopardus pardalis</i>	Felidae	✓			LC	I

Ocelot	<i>Leopardus pardalis</i>	Felidae		✓	✓	LC	I
Jaguar	<i>Panthera onca</i>	Felidae	✓	✓	✓	NT	I
Margay	<i>Leopardus wiedii</i>	Felidae			✓	NT	I
Tiger	<i>Leopardus tigrinus</i>	Felidae	✓			VU	I
Capybara	<i>Hydrochaeris hydrochaeris</i>	Hydrochaeridae	✓	✓	✓	LC	NA
Two-toed Sloth	<i>Choloepus didactylus</i>	Megalonydidae	✓			LC	NA
Common Mastif bat	<i>Molossus rufus</i>	Molossidae		✓		LC	NA
Bicoloured Arboreal Rice Rat	<i>Oecomys bicolor</i>	Muridae			✓	LC	NA
Water Dog	<i>Lutra enudris</i>	Mustelidae		✓			
Giant River Otter	<i>Pteronura brasiliensis</i>	Mustelidae	✓	✓		EN	I
Neotropical Otter	<i>Lontra longicaudis</i>	Mustelidae		✓		NT	I
Tayra	<i>Eira barbara</i>	Mustilidae			✓	LC	III
Tamandua	<i>Tamandua tetradactyla</i>	Myrmecophagidae	✓	✓	✓	LC	NA
Giant Anteater	<i>Mymecophaga tridactyla</i>	Myrmecophagidae	✓	✓		VU	II
Leaf nose Bat	<i>Artibeus sp.</i>	Phyllastomidae	✓				
Leaf nose Bat	<i>Glossophaga sp.</i>	Phyllastomidae	✓				
Bidentate Yellow- eared Bat	<i>Vampyressa bidens</i>	Phyllostomidae			✓	LC	NA
Common Vampire Bat	<i>Desmodus rotundus</i>	Phyllostomidae		✓	✓	LC	NA
Dwarf Little Fruit Bat	<i>Rhinophylla pumilio</i>	Phyllostomidae			✓	LC	NA
Fringe- lipped Bat	<i>Trachops cirrhosis</i>	Phyllostomidae			✓	LC	NA
Greater Spear- nosed Bat	<i>Phyllostomus hastatus</i>	Phyllostomidae			✓	LC	NA
Northern Little Yellow- eared Bat	<i>Vampyressa thyone</i>	Phyllostomidae			✓	LC	NA
Pale-faced Bat	<i>Phylloderma stenops</i>	Phyllostomidae			✓	LC	NA
Pygmy Round- eared Bat	<i>Lophostoma brasiliensis</i>	Phyllostomidae			✓	LC	NA
Seba's Short- tailed Bat	<i>Carollia perspicillata</i>	Phyllostomidae			✓	LC	NA
Silky Short- tailed Bat	<i>Carollia brevicauda</i>	Phyllostomidae		✓	✓	LC	NA
White- throated Round- eared Bat	<i>Lophostoma silvicolum</i>	Phyllostomidae			✓	LC	NA
False Vampire Bat	<i>Vampyrum spectrum</i>	Phyllostomidae			✓	NT	NA
Bearded Saki	<i>Chiropotes satanas</i>	Pitheciidae			✓	CR	II
Guianan Saki	<i>Pithecia pithecia</i>	Pitheciidae			✓	LC	II
Coati	<i>Nasua nasua</i>	Procyonidae			✓	LC	III
Kinkajou	<i>Potos flavus</i>	Procyonidae			✓	LC	III
Racoon	<i>Nasua nasua</i>	Procyonidae	✓			LC	III

Spiny rat	<i>Proechimys sp.</i>	Rodentia		✓				
Fruit Bat		Stemodermatinae	✓					
Lowland Tapir	<i>Tapirus terrestris</i>	Tapiridae	✓	✓	✓	VU	II	
Collard Peccary	<i>Pecari tajacu</i>	Tayassuidae		✓		LC	II	
Pecary	<i>Pecari tajacu</i>	Tayassuidae	✓			LC	II	
Pecary	<i>Tayassu pecari</i>	Tayassuidae	✓			VU	II	
White-Lipped Peccary	<i>Tayassu pecari</i>	Tayassuidae			✓	VU	II	
Spix's Disk-winged Bat	<i>Thyroptera tricolor</i>	Thyropteridae			✓	LC	NA	

*NA- Not Assessed

Table 18: Birds documented during baseline surveys

Common Name	Scientific Name	Family	2006	2009	2011	IUCN	CITES
Black raptor	<i>Unknown species</i>	Accipitridae	✓				
Common Black-Hawk	<i>Buteogallus anthracinus</i>	Accipitridae	✓	✓		LC	II
Gray Hawk	<i>Asturina nitida</i>	Accipitridae		✓		LC	II
Plumbeous Kite	<i>Ictinia plumbea</i>	Accipitridae		✓		LC	II
Swallow-tailed Kite	<i>Elanoides forficatus</i>	Accipitridae		✓		LC	NA
White Hawk	<i>Leucopternis albicollis</i>	Accipitridae			✓	LC	II
Harpy Eagle	<i>Harpia harpyja</i>	Accipitridae		✓	✓	NT	I
Ornate Hawk-Eagle	<i>Spizaetus ornatus</i>	Accipitridae			✓	NT	II
Amazon Kingfisher	<i>Chloroceryle amazona</i>	Alcedinidae	✓		✓	LC	NA
American Pygmy Kingfisher	<i>Chloroceryle aenea</i>	Alcedinidae			✓	LC	NA
Green Kingfisher	<i>Chloroceryle Americana</i>	Alcedinidae		✓	✓	LC	NA
Ringed Kingfisher	<i>Ceryle torquata</i>	Alcedinidae		✓	✓	LC	NA
Anhinga	<i>Anhinga anhinga</i>	Anhingidae	✓	✓		LC	NA
Horned Screamer	<i>Anhima cornuta</i>	Ankimidae	✓			LC	NA
Band-rumped Swift	<i>Chaetura spinicaudus</i>	Apodidae			✓	LC	NA
Chaetura Swift	<i>Chaetura sp.</i>	Apodidae			✓	LC	NA
Fork-tailed Palm-Swift	<i>Tachornis squamata</i>	Apodidae		✓		LC	NA
Gray-rumped Swift	<i>Chaetura cinereiventris</i>	Apodidae			✓	LC	NA
Short-tailed Swift	<i>Chaetura brachyura</i>	Apodidae		✓	✓	LC	NA
White tipped Swift	<i>Aeronautes montivagus</i>	Apodidae	✓			LC	NA

Agami Heron	<i>Agamia agami</i>	Ardeidae		✓		LC	NA
Cocoi Heron	<i>Ardea cocoi</i>	Ardeidae		✓		LC	NA
Great Egret	<i>Ardea alba</i>	Ardeidae		✓		LC	NA
Little Blue Heron	<i>Florida caerulea</i>	Ardeidae	✓			LC	NA
Pinnated Bittern	<i>Botaurus pinnatus</i>	Ardeidae		✓		LC	NA
Rufescent Tiger-Heron	<i>Tigrisoma lineatum</i>	Ardeidae	✓		✓	LC	NA
Striated Heron	<i>Butorides striatus</i>	Ardeidae	✓	✓		LC	NA
Redish Egret	<i>Egretta rufescens</i>	Ardeidae	✓			NT	NA
Black Nunbird	<i>Monasa atra</i>	Bucconidae		✓		LC	NA
Guyana Puffbird	<i>Notharchus macrorhynchos</i>	Bucconidae			✓	LC	NA
Swallow-wing Puff Bird	<i>Chelidoptera tenebrosa</i>	Bucconidae	✓	✓		LC	NA
Blackish Nightjar	<i>Caprimulgus nigrescens</i>	Caprimulgidae		✓		LC	NA
Common Pauraque	<i>Nyctidromus albicollis</i>	Caprimulgidae		✓	✓	LC	NA
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Caprimulgidae		✓		LC	NA
Little Night Jar	<i>Setopagis parvula</i>	Caprimulgidae	✓	✓		LC	NA
White tailed Nightjar	<i>Caprimulgus cayennensis</i>	Caprimulgidae		✓		LC	NA
Blue-black Grosbeak	<i>Cyanocompsa cyanoides</i>	Cardinalidae		✓		LC	NA
Buff-throated Saltator	<i>Saltator maximus</i>	Cardinalidae		✓		LC	NA
Slate-colored Grosbeak	<i>Saltator grossus</i>	Cardinalidae			✓	LC	NA
Yellow green Grosbeak	<i>Caryothraustes Canadensis</i>	Cardinalidae		✓	✓	LC	NA
Red-and-black Grosbeak	<i>Periporphyrus erythromelas</i>	Cardinalidae		✓	✓	NT	NA
Hawk	<i>Buteogallus sp.</i>	Cathartidae	✓	✓			
Black Vulture	<i>Coragyps atratus</i>	Cathartidae		✓	✓	LC	NA
Greater Yellow- headed Vulture	<i>Cathartes melambrotus</i>	Cathartidae			✓	LC	NA
King Vulture	<i>Sarcoramphus papa</i>	Cathartidae		✓		LC	III
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	Cathartidae		✓		LC	NA
Turkey Vulture	<i>Cathartes aura</i>	Cathartidae		✓	✓	LC	NA
Kingfisher	<i>Chloroceryle aenea</i>	Cerylidae	✓			LC	NA
Wood Stork	<i>Mycteria Americana</i>	Ciconiidae	✓			LC	NA
White-capped Dipper	<i>Cinclus leucocephalus</i>	Cinclidae	✓			LC	NA
Common ground dove	<i>Columbina passerina</i>	Columbidae		✓		LC	NA

Gray-fronted Dove	<i>Leptotila rufaxilla</i>	Columbidae			✓	LC	NA
Plumbeous Pigeon	<i>Columba plumbea</i>	Columbidae			✓	LC	NA
Ruddy Quail-Dove	<i>Geotrygon montana</i>	Columbidae			✓	LC	NA
Scaled Pigeon	<i>Patagioenas speciosa</i>	Columbidae		✓		LC	NA
White tipped dove	<i>Leptotila verreauxi</i>	Columbidae		✓		LC	NA
Ruddy Pigeon	<i>Patagioenas subvinacea</i>	Columbidae	✓	✓	✓	VU	NA
Cayenne Jay	<i>Cyanocorax cayanus</i>	Corvidae		✓	✓	LC	NA
Capuchin bird	<i>Perissocephalus tricolor</i>	Cotingidae		✓	✓	LC	NA
Guianan red-Cotinga	<i>Phoenicircus carnifex</i>	Cotingidae			✓	LC	NA
Purple-throated Fruitcrow	<i>Querula purpurata</i>	Cotingidae		✓		LC	NA
Little chachalaca	<i>Ortalis motmot</i>	Cracidae		✓	✓	LC	NA
Spix's Guan	<i>Penelope jacquacu</i>	Cracidae	✓		✓	LC	NA
Black Curassow	<i>Crax alector</i>	Cracidae	✓	✓	✓	VU	NA
Black-bellied Cuckoo	<i>Piaya melanogaster</i>	Cuculidae			✓	LC	NA
Cuckoo	<i>Coccyzus americanus</i>	Cuculidae	✓			LC	NA
Marail Guan	<i>Penelope marail</i>	Cuculidae			✓	LC	NA
Smoothed-billed Ani	<i>Crotophaga ani</i>	Cuculidae		✓	✓	LC	NA
Squirrel cuckoo	<i>Piaya cayana</i>	Cuculidae	✓	✓	✓	LC	NA
Striped Cuckoo	<i>Tapera naevia</i>	Cuculidae		✓		LC	NA
Amazonian Woodcreeper	<i>Dendrocolaptes certhia</i>	Dendrocolaptidae	✓			LC	NA
Black headed Woodcreeper	<i>Dendrocolaptes picumnus</i>	Dendrocolaptidae	✓			LC	NA
Buff throat Woodcreeper	<i>Xiphorhynchus guttatus</i>	Dendrocolaptidae	✓		✓	LC	NA
Curved bill Scythebill	<i>Campylorhamphus procurvoides</i>	Dendrocolaptidae	✓			LC	NA
Long tailed Woodcreeper	<i>Deconychura longicauda</i>	Dendrocolaptidae	✓			LC	NA
Olivaceous Woodcreeper	<i>Sittasomus griseicapillus</i>	Dendrocolaptidae	✓			LC	NA
Plain brown Woodcreeper	<i>Dendrocincla fuliginosa</i>	Dendrocolaptidae	✓	✓	✓	LC	NA
Straight-billed Woodcreeper	<i>Xiphorhynchus picus</i>	Dendrocolaptidae		✓		LC	NA
Wedge billed Woodcreeper	<i>Glyphorhynchus spirurus</i>	Dendrocolaptidae	✓	✓	✓	LC	NA
White chinned Woodcreeper	<i>Dendrocincla merula</i>	Dendrocolaptidae	✓			LC	NA
Blue-black Grassquit	<i>Volatinia jacarina</i>	Emberizidae		✓		LC	NA
Sun bittern	<i>Eurypyga helias</i>	Eurypigidae	✓	✓	✓	LC	NA

Forest-Falcon	<i>Micrastur sp.</i>	Falconidae			✓		
Barred forest-Falcon	<i>Micrastur ruficollis</i>	Falconidae			✓	LC	II
Bat Falcon	<i>Falco rufigularis</i>	Falconidae		✓		LC	II
Black Caracara	<i>Daptrius ater</i>	Falconidae	✓	✓		LC	II
Collared forest-Falcon	<i>Micrastur semitorquatus</i>	Falconidae		✓		LC	II
Crested caracara	<i>Caracara plancus</i>	Falconidae		✓		LC	NA
Laughing Falcon	<i>Herpetotheres cachinnans</i>	Falconidae		✓		LC	II
Lined forest-Falcon	<i>Micrastur gilvicollis</i>	Falconidae			✓	LC	II
Red throated Caracara	<i>Daptrius americanus</i>	Falconidae	✓	✓	✓	LC	II
Slaty-backed Forest-Falcon	<i>Micrastur mirandollei</i>	Falconidae			✓	LC	II
Vulture	<i>Cathartes melambrotus</i>	Falconidae	✓			LC	NA
Yellow headed caracara	<i>Milvago chimachima</i>	Falconidae		✓		LC	II
Black-faced Ant-thrush	<i>Formicarius analis</i>	Formicariidae			✓	LC	NA
Rufous-capped Ant-thrush	<i>Formicarius colma</i>	Formicariidae			✓	LC	NA
Violaceous Euphonia	<i>Euphonia violacea</i>	Fringillidae		✓		LC	NA
Black-banded Woodcreeper	<i>Dendrocolaptes picumnus</i>	Furnariidae		✓		LC	NA
Chestnut-rumped Woodcreeper	<i>Xiphorhynchus pardalotus</i>	Furnariidae	✓		✓	LC	NA
Gleaner	<i>Automolus infuscatus</i>	Furnariidae	✓			LC	NA
Plain Woodcreeper	<i>Dendrocincla merula</i>	Furnariidae	✓			LC	NA
Plain Xenops	<i>Xenops minutus</i>	Furnariidae			✓	LC	NA
Ruddy spinetail	<i>Synallaxis rutilans</i>	Furnariidae	✓			LC	NA
Great Jacamar	<i>Jacamerops aureus</i>	Galbulidae			✓	LC	NA
Paradise Jacamar	<i>Galbula dea</i>	Galbulidae	✓	✓	✓	LC	NA
Yellow-billed Jacamar	<i>Galbula albirostris</i>	Galbulidae			✓	LC	NA
Spotted Antpitta	<i>Hylopezus macularius</i>	Grallariidae		✓	✓	LC	NA
Thrush-like Antpitta	<i>Myrmothera campanisona</i>	Grallariidae		✓	✓	LC	NA
Black collared Swallow	<i>Atticora melanoleuca</i>	Hirundinidae	✓		✓	LC	NA
Brown-chested Martin	<i>Progne tapera</i>	Hirundinidae		✓		LC	NA
Gray-breasted Martin	<i>Progne chalybea</i>	Hirundinidae		✓	✓	LC	NA
Southern rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>	Hirundinidae		✓		LC	NA
Swallow	<i>Atticora melanoleuca</i>	Hirundinidae	✓			LC	NA

White banded Swallow	<i>Atticora fasciata</i>	Hirundinidae		✓	✓	LC	NA
White winged Swallow	<i>Tachycineta albiventer</i>	Hirundinidae		✓	✓	LC	NA
Carib Grackle	<i>Quiscalus lugubris</i>	Icteridae	✓			LC	NA
Crested Oropendula	<i>Psarocolius decumanus</i>	Icteridae	✓	✓		LC	NA
Giant Cowbird	<i>Scaphidura oryzivora</i>	Icteridae		✓		LC	NA
Green Oropendola	<i>Psarocolius viridis</i>	Icteridae		✓	✓	LC	NA
Moriche Oriole	<i>Icterus cayanensis</i>	Icteridae	✓			LC	NA
Red-rumped Cacique	<i>Cacicus haemorrhous</i>	Icteridae		✓	✓	LC	NA
Yellow Oriole	<i>Icterus nigrogularis</i>	Icteridae	✓	✓		LC	NA
Yellow rumped Cacique	<i>Cacicus cela</i>	Icteridae	✓	✓		LC	NA
Cinereous Becard	<i>Pachyrhamphus rufus</i>	Incertae Sedis		✓		LC	NA
Blue - crowned Motmot	<i>Momotus momota</i>	Momotidae		✓		LC	NA
Great Potoo	<i>Nyctibius grandis</i>	Nyctibccdae		✓		LC	NA
Common Potoo	<i>Nyctibius griseus</i>	Nyctibiidae		✓	✓	LC	NA
Crested Bobwhite	<i>Colinus cristatus</i>	Odontophoridae	✓			LC	NA
Marbled Wood-Quail	<i>Odontophorus gujanensis</i>	Odontophoriidae			✓	NT	NA
River Warbler	<i>Phaeothlypis rivularis</i>	Parulidae			✓	LC	NA
Grassland Sparrow	<i>Ammodramus humeralis</i>	Passerellidae		✓		LC	NA
Reddish Hermit	<i>Phaethornis ruber</i>	Phaethornis		✓	✓	LC	II
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>	Phalacrocoracidae	✓	✓		LC	NA
Egret	<i>Egretta rufescens</i>	Phoenicopteridae	✓			NT	NA
Woodpecker	<i>Unidentified sp.</i>	Picidae	✓				
Chestnut Woodpecker	<i>Celeus elegans</i>	Picidae	✓	✓		LC	NA
Cream-colored Woodpecker	<i>Celeus flavus</i>	Picidae		✓		LC	NA
Crimson-crested Woodpecker	<i>Campephilus melanoleucos</i>	Picidae	✓	✓		LC	NA
Golden Olive Woodpecker	<i>Piculus rubiginosus</i>	Picidae	✓			LC	NA
Golden spangle Piculet	<i>Picumnus exilis</i>	Picidae	✓			LC	NA
Lineated Woodpecker	<i>Dryocopus lineatus</i>	Picidae	✓	✓	✓	LC	NA
Little Woodpecker	<i>Veniliornis passerinus</i>	Picidae			✓	LC	NA
Red-necked Woodpecker	<i>Campephilus rubricollis</i>	Picidae		✓	✓	LC	NA
Waved Woodpecker	<i>Celeus undatus</i>	Picidae			✓	LC	NA

Woodpecker	<i>Dryocopus lineatus</i>	Picidae	✓			LC	NA
Yellow tufted Woodpecker	<i>Melanerpes cruentatus</i>	Picidae		✓	✓	LC	NA
Yellow-throated Woodpecker	<i>Piculus flavigula</i>	Picidae			✓	LC	NA
Ringed Woodpecker	<i>Celeus torquatus</i>	Picidae	✓	✓		NT	NA
Blue-backed Manakin	<i>Chiroxiphia pareola</i>	Pipridae		✓		LC	NA
Golden headed Manakin	<i>Pipra erythrocephala</i>	Pipridae	✓	✓	✓	LC	NA
Saffron-crested Tyrant-Manakin	<i>Neopelma chrysocephalum</i>	Pipridae		✓		LC	NA
Tiny Tyrant-Manakin	<i>Tyrannetes virescens</i>	Pipridae		✓	✓	LC	NA
White crowned Manakin	<i>Pipra pipra</i>	Pipridae		✓	✓	LC	NA
White throated Manakin	<i>Corapipo gutturalis</i>	Pipridae		✓		LC	NA
White-bearded Manakin	<i>Manacus manacus</i>	Pipridae			✓	LC	NA
Long-billed Gnatwren	<i>Ramphocaenus melanurus</i>	Poliophtidae			✓	LC	NA
Grey winged Trumpeter	<i>Psophia crepitans</i>	Psophidae	✓	✓	✓	NT	NA
Macaw	<i>Ara sp.</i>	Psittacidae			✓		
Parrot	<i>Amazona sp.</i>	Psittacidae	✓				
Sun Parakeet	<i>Aratinga solstitialis</i>	Psittacidae	✓			EN	II
Black headed Parrot	<i>Pionites melanocephala</i>	Psittacidae	✓	✓	✓	LC	II
Blue and yellow Macaw	<i>Ara ararauna</i>	Psittacidae	✓	✓	✓	LC	II
Blue-headed Parrot	<i>Pionus menstruus</i>	Psittacidae		✓	✓	LC	II
Dusky bill Parrotlet	<i>Psittacula sclateri</i>	Psittacidae	✓			LC	II
Dusky Parrot	<i>Pionus fuscus</i>	Psittacidae	✓	✓	✓	LC	II
Golden-winged Parakeet	<i>Brotogeris chrysopterus</i>	Psittacidae		✓	✓	LC	II
Green-rumped Parrotlet	<i>Forpus passerinus</i>	Psittacidae		✓	✓	LC	II
Macaw	<i>Ara chloroptera</i>	Psittacidae	✓			LC	II
Orange -winged Parrot	<i>Amazona amazonica</i>	Psittacidae		✓	✓	LC	II
Painted Parakeet	<i>Pyrrhura picta</i>	Psittacidae		✓		LC	II
Red and Green Macaw	<i>Ara chloropterus</i>	Psittacidae	✓	✓		LC	II
Red fan Parrot	<i>Deroptyus accipitrinus</i>	Psittacidae	✓	✓	✓	LC	II
Red-shouldered Macaw	<i>Ara nobilis</i>	Psittacidae		✓		LC	II
Scarlet Macaw	<i>Ara macao</i>	Psittacidae		✓		LC	I
Screaming Piha	<i>Lipaugus vociferans</i>	Psittacidae	✓	✓	✓	LC	NA

White-eyed Parakeet	<i>Aratinga leucophthalmus</i>	Psittacidae	✓			LC	II
Yellow crowned Parrot	<i>Amazona ochrocephala</i>	Psittacidae	✓	✓		LC	I
Blue-cheeked Parrot	<i>Amazona dufresniana</i>	Psittacidae		✓		NT	II
Caica Parrot	<i>Pionopsitta caica</i>	Psittacidae	✓	✓	✓	NT	II
Parrotlets	<i>Forpus sp.</i>	Psitticidae	✓		✓		
Parakeet	<i>Aratinga pertinax</i>	Psitticidae	✓			LC	II
Mealey Parrot (White eyed)	<i>Amazona farinosa</i>	Psitticidae	✓	✓	✓	NT	II
Gray-necked Wood-Rail	<i>Aramides cajanea</i>	Rallidae		✓		LC	NA
Russet-crowned Crake	<i>Anurolimnas viridis</i>	Rallidae		✓		LC	NA
Yellow breasted Crake	<i>Porzana flaviventer</i>	Rallidae		✓		LC	NA
Toucan	<i>Ramphastos sp.</i>	Ramphastidae	✓				
Black necked Aracari	<i>Pteroglossus aracari</i>	Ramphastidae	✓	✓	✓	LC	II
Green Aracari	<i>Pteroglossus viridis</i>	Ramphastidae		✓		LC	II
Channel-billed Toucan	<i>Ramphastos vitellinus</i>	Ramphastidae	✓	✓	✓	VU	II
Red billed Toucan	<i>Ramphastos tucanus</i>	Ramphastidae	✓	✓	✓	VU	II
Solitary Sandpiper	<i>Tringa solitaria</i>	Scolopacidae	✓			LC	NA
Spotted-sandpiper	<i>Actitis macularius</i>	Scolopacidae		✓		LC	NA
White collared Swift	<i>Streptoprocne zonaris</i>	Streptoprocne		✓		LC	NA
Short-eared Owl	<i>Asio Flammeus</i>	Strigidae		✓		LC	NA
Spectacled Owl	<i>Pulsatrix perspicillata</i>	Strigidae		✓		LC	NA
Striped Owl	<i>Pseudoscops clamator</i>	Strigidae		✓		LC	NA
White plumed Antbird	<i>Pithys albifrons</i>	Thamnophidae	✓	✓	✓	LC	NA
White shouldered Antshrike	<i>Thamnophilus aethiops</i>	Thamnophidae	✓			LC	NA
Silver red Antbird	<i>Sclater naevia</i>	Thamnophidae	✓			NA	NA
Antbird	<i>Hylophylax sp.</i>	Thamnophilidae			✓	LC	NA
Barred Antshrike	<i>Thamnophilus doliatus</i>	Thamnophilidae		✓		LC	NA
Black-chested Antshrike	<i>Sakesphorus Canadensis</i>	Thamnophilidae		✓		LC	NA
Black-throated Antbird	<i>Myrmeciza atrothorax</i>	Thamnophilidae		✓		LC	NA
Cinereus Antshrike	<i>Thamnomanes caesius</i>	Thamnophilidae	✓		✓	LC	NA
Dusky Antbird	<i>Cercomacra tyrannina</i>	Thamnophilidae	✓		✓	LC	NA
Dusky throated Antshrike	<i>Thamnomanes ardesiacus</i>	Thamnophilidae	✓		✓	LC	NA

Fasciated Antshrike	<i>Cymbilaimus lineatus</i>	Thamnophilidae			✓	LC	NA
Ferruginous-backed Antbird	<i>Myrmeciza ferruginea</i>	Thamnophilidae		✓		LC	NA
Gray Antbird	<i>Cercomacra cinerascens</i>	Thamnophilidae			✓	LC	NA
Gray Antwren	<i>Myrmotherula menetriesii</i>	Thamnophilidae	✓		✓	LC	NA
Great Antshrike	<i>Taraba major</i>	Thamnophilidae		✓		LC	NA
Guianan Slaty Antshrike	<i>Thamnophilus punctatus</i>	Thamnophilidae	✓			LC	NA
Mouse colored Antshrike	<i>Thamnophilus murinus</i>	Thamnophilidae	✓		✓	LC	NA
Plain-winged Antwren	<i>Myrmotherula behni</i>	Thamnophilidae			✓	LC	NA
Pygmy Antwren	<i>Myrmotherula brachyura</i>	Thamnophilidae			✓	LC	NA
Rufous-bellied Antwren	<i>Myrmotherula guttata</i>	Thamnophilidae		✓	✓	LC	NA
Rufous-throated Antbird	<i>Gymnopithys rufigula</i>	Thamnophilidae			✓	LC	NA
Soft black Antwren	<i>Herpsilochmus dosimaculatus</i>	Thamnophilidae	✓			LC	NA
Spot-tailed Antwren	<i>Herpsilochmus sticturus</i>	Thamnophilidae			✓	LC	NA
Spotted back Antbird	<i>Hylophylax naevia</i>	Thamnophilidae	✓			LC	NA
Todd's Antwren	<i>Herpsilochmus stictocephalus</i>	Thamnophilidae			✓	LC	NA
White flanked Antwren	<i>Myrmotherula axillaris</i>	Thamnophilidae	✓	✓		LC	NA
White fringed Antwren	<i>Formicivora grisea</i>	Thamnophilidae		✓		LC	NA
White-browed Antbird	<i>Myrmoborus leucophrys</i>	Thamnophilidae			✓	LC	NA
Silvered Antbird	<i>Sclater naevia</i>	Thamnophilidae	✓			NA	NA
Brown belly Antwren	<i>Epinecophylla gutturalis</i>	Thamnophilidae	✓			NT	NA
Guianan Warbling Antbird	<i>Hypocnemis cantator</i>	Thamnophilidae		✓	✓	NT	NA
Longed-winged Antwren	<i>Myrmotherula longipennis</i>	Thamnophilidae			✓	VU	NA
Blue-backed Tanager	<i>Cyanicterus cyanicterus</i>	Thraupidae		✓		LC	NA
Turquoise Tanager	<i>Tangara mexicana</i>	Thraupidae		✓	✓	LC	NA
White shouldered Tanager	<i>Tachyphonus luctuosus</i>	Thraupidae		✓		LC	NA
Tanager	<i>Tangara sp.</i>	Thraupidae			✓		
Bananaquit	<i>Coereba flaveola</i>	Thraupidae		✓	✓	LC	NA
Bay-headed Tanager	<i>Tangara gyrola</i>	Thraupidae		✓	✓	LC	NA
Blue Dacnis	<i>Dacnis cayana</i>	Thraupidae		✓		LC	NA
Blue-grey Tanager	<i>Thraupis episcopus</i>	Thraupidae	✓	✓		LC	NA
Chestnut-bellied Seed eater	<i>Sporophila castaneiventris</i>	Thraupidae		✓		LC	NA

Fulvous Shrike-Tanager	<i>Lanio fulvus</i>	Thraupidae		✓		LC	NA
Fulvous-crested Tanager	<i>Tachyphonus surinamus</i>	Thraupidae			✓	LC	NA
Green Honeycreeper	<i>Chlorophanes spiza</i>	Thraupidae		✓		LC	NA
Palm Tanager	<i>Thraupis palmarum</i>	Thraupidae	✓	✓		LC	NA
Purple Honeycreeper	<i>Cyanerpes caeruleus</i>	Thraupidae		✓		LC	NA
Red capped Cardinal	<i>Paroaria gularis</i>	Thraupidae	✓	✓		LC	NA
Red-legged Honeycreeper	<i>Cyanerpes cyaneus</i>	Thraupidae		✓		LC	NA
Ruddy-breasted Seedeater	<i>Sporophila minuta</i>	Thraupidae		✓		LC	NA
Silver-beaked Tanager	<i>Ramphocelus carbo</i>	Thraupidae	✓	✓		LC	NA
Superciliaried Tanager	<i>Superciliaris chrysophys</i>	Thraupidae	✓			LC	NA
White-lined Tanager	<i>Tachyphonus rufus</i>	Thraupidae	✓	✓		LC	NA
Green Ibis	<i>Mesembrinibis cayennensis</i>	Threskiornithidae		✓	✓	LC	NA
Tinamou	<i>Crypturellus sp.</i>	Tinamidae			✓		
Little Tinamou	<i>Crypturellus soui</i>	Tinamidae	✓	✓		LC	NA
Variiegated Tinamou	<i>Crypturellus variegatus</i>	Tinamidae	✓	✓	✓	LC	NA
Great Tinamou	<i>Tinamus major</i>	Tinamidae	✓	✓	✓	NT	NA
Gray Tinamous	<i>Tinamus tao</i>	Tinamidae	✓			VU	NA
Black-tailed Tityra	<i>Tityra cayana</i>	Tityridae		✓	✓	LC	NA
Emerald	<i>Amazilia sp. 2</i>	Trochilidae			✓		
Emerald	<i>Amazilia sp. 3</i>	Trochilidae			✓		
Hermit	<i>Phaethornis sp.</i>	Trochilidae			✓		
Hummingbird	<i>Amazilia sp.</i>	Trochilidae	✓	✓	✓		
Hummingbird	<i>Chlorestes sp.</i>	Trochilidae	✓				
Black-eared Fairy	<i>Heliothryx auritus</i>	Trochilidae			✓	LC	II
Blue chinned Sapphire	<i>Chlorestes notatus</i>	Trochilidae			✓	LC	II
Blue-fronted Lancebill	<i>Doryfera johannae</i>	Trochilidae			✓	LC	II
Crimson Topaz	<i>Topaza pella</i>	Trochilidae			✓	LC	II
Eastern long-tailed Hermit	<i>Phaethornis superciliosus</i>	Trochilidae			✓	LC	NA
Fork tailed Woodnymph	<i>Thalurania furcata</i>	Trochilidae	✓		✓	LC	II
Gray-breasted Sabrewing	<i>Campylopterus largipennis</i>	Trochilidae		✓	✓	LC	II
Long-tailed Hermit	<i>Phaethornis bourcierii</i>	Trochilidae		✓	✓	LC	II

Rupurumii Hermit	<i>Phaethornis rupurumii</i>	Trochilidae	✓			LC	II
Speckled Hummingbird	<i>Adelomyia melanogenys</i>	Trochilidae	✓		✓	LC	II
Streak-throated Hermit	<i>Phaethornis rupurumii</i>	Trochilidae			✓	LC	II
White beard Hermit	<i>Phaethornis hispidus</i>	Trochilidae	✓		✓	LC	II
White chested Emerald	<i>Amazilia brevirostris</i>	Trochilidae		✓	✓	LC	II
White-chinned Sapphire	<i>Hylocharis cyanus</i>	Trochilidae	✓		✓	LC	II
White-crested Emerald	<i>Amazilia chionopectus</i>	Trochilidae	✓			LC	II
Hummingbird	<i>Djohanna guineensis</i>	Trochilidae	✓				
Bronzy Inca Hummingbird	<i>Coeligena coeligena</i>	Trochilidae	✓		✓	LC	II
Copper rump Hummingbird	<i>Amazilia tobaci</i>	Trochilidae	✓		✓	LC	II
Green Violot ear Hummingbird	<i>Colibri thalassinus</i>	Trochilidae	✓		✓	LC	II
Grey breasted Hummingbird	<i>Campylopterus largipennis</i>	Trochilidae	✓			LC	II
Hummingbird	<i>Phaethornis rupurumii</i>	Trochilidae	✓			LC	II
Buff-breasted Wood-Wren	<i>Campylorhynchus griseus</i>	Troglodytidae			✓	LC	NA
Buff-breasted Wren	<i>Thryothorus leucotis</i>	Troglodytidae		✓	✓	LC	NA
Coraya Wren	<i>Thryothorus coraya</i>	Troglodytidae		✓	✓	LC	NA
Musician Wren	<i>Cyphorhinus arada</i>	Troglodytidae	✓	✓	✓	LC	NA
White breasted Wood Wren	<i>Henicorhina leucosticta</i>	Troglodytidae	✓	✓	✓	LC	NA
Southern house-Wren	<i>Troglodytes musculus</i>	Troglodytidae		✓	✓	NA	NA
Black - tailed Trogon	<i>Trogon melanurus</i>	Trogonidae		✓		LC	NA
Black-throated Trogon	<i>Trogon rufus</i>	Trogonidae			✓	LC	NA
Violaceous Trogon	<i>Trogon violaceus</i>	Trogonidae		✓	✓	LC	NA
White tailed Trogon	<i>Trogon viridis</i>	Trogonidae		✓	✓	LC	NA
Bare-eyed Thrush	<i>Turdus nudigenis</i>	Turdidae		✓		LC	NA
Pale-eyed Thrush	<i>Platycichla leucops</i>	Turdidae		✓	✓	LC	NA
White necked Thrush	<i>Turdus albicollis</i>	Turdidae		✓		LC	NA
Brown Capped	<i>Arrhithion dilatatum</i>	Tyrannidae	✓				
Yellow throated Flycatcher	<i>Conopias parvus</i>	Tyrannidae	✓		✓	LC	NA
Myiarchus Flycatcher	<i>Myiarchus sp.</i>	Tyrannidae			✓		
Tolmomyias Flycatcher	<i>Tolmomyias sp.</i>	Tyrannidae			✓		
Boat-billed Flycatcher	<i>Megarynchus pitangua</i>	Tyrannidae		✓	✓	LC	NA

Bright-rumped Attila	<i>Attila spadiceus</i>	Tyrannidae			✓	LC	NA
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	Tyrannidae		✓		LC	NA
Cinnamon Attila	<i>Attila cinnamomeus</i>	Tyrannidae		✓	✓	LC	NA
Common Tody-Flycatcher	<i>Todirostrum cinereum</i>	Tyrannidae		✓		LC	NA
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	Tyrannidae		✓	✓	LC	NA
Dusky-chested Flycatcher	<i>Myiozetetes luteiventris</i>	Tyrannidae		✓		LC	NA
Fork-tailed Flycatcher	<i>Tyrannus dominicensis</i>	Tyrannidae		✓	✓	LC	NA
Golden-crowned spadebill	<i>Platyrinchus coronatus</i>	Tyrannidae			✓	LC	NA
Gray Kinbird	<i>Tyrannus dominicensis</i>	Tyrannidae		✓		LC	NA
Great Kiskadee	<i>Pitangus sulphuratus</i>	Tyrannidae	✓	✓		LC	NA
Helmited Pygmy-Tyrant	<i>Lophotriccus galeatus</i>	Tyrannidae			✓	LC	NA
Lesser Kiskadee	<i>Philohydor lictor</i>	Tyrannidae	✓	✓		LC	NA
Long-tailed Tyrant	<i>Colonia colonus</i>	Tyrannidae		✓	✓	LC	NA
Pale-eyed Pygmy-Tyrant	<i>Atalotriccus pilaris</i>	Tyrannidae		✓		LC	NA
Pied Water Tyrant	<i>Fluvicola pica</i>	Tyrannidae	✓		✓	LC	NA
Piratic Flycatcher	<i>Legatus leucophaeus</i>	Tyrannidae		✓	✓	LC	NA
Rusty-margined Flycatcher	<i>Myiozetetes cayanensis</i>	Tyrannidae		✓		LC	NA
Streaked Flycatcher	<i>Myiodynastes maculatus</i>	Tyrannidae		✓		LC	NA
Thrush-like Schiffornis	<i>Schiffornis turdina</i>	Tyrannidae	✓		✓	LC	NA
Tropical Kingbird	<i>Tyrannus melancholicus</i>	Tyrannidae	✓	✓	✓	LC	NA
Water Tyrant	<i>Fluvicola pica</i>	Tyrannidae	✓			LC	NA
Whiskered Flycatcher	<i>Myiobius barbatus</i>	Tyrannidae			✓	LC	NA
White throated Kingbird	<i>Tyrannus albogularis</i>	Tyrannidae		✓		LC	NA
Yellow bellied Elaenia	<i>Elaenia flavogaster</i>	Tyrannidae		✓		LC	NA
Yellow throated Tyrant	<i>Satrapa icterophrys</i>	Tyrannidae	✓			LC	NA
Yellow Tyrannulet	<i>Capsiempis flaveola</i>	Tyrannidae		✓		LC	NA
Yellow-breasted Flycatcher	<i>Tolmomyias flaviventris</i>	Tyrannidae			✓	LC	NA
Zimmer's Flycatcher	<i>Tolmomyias assimilis</i>	Tyrannidae			✓	LC	NA
Tropical Screech-Owl	<i>Megascops choliba</i>	Tytonidae		✓		LC	II
Buff-cheeked Greenlet	<i>Hylophilus muscicapinus</i>	Vireonidae			✓	LC	NA
Lemon-chested Greenlet	<i>Hylophilus thoracicus</i>	Vireonidae			✓	LC	NA

Red-eyed Vireo	<i>Vireo olivaceus</i>	Vireonidae		✓		LC	NA
Slaty-capped Shrike-Vireo	<i>Vireolanius leucotis</i>	Vireonidae			✓	LC	NA
Common Name	<i>Scientific Name</i>	Family	2006	2009	2011	IUCN	CITES
Black raptor	<i>Unknown species</i>	Accipitridae	✓				
Common Black-Hawk	<i>Buteogallus anthracinus</i>	Accipitridae	✓	✓		LC	II
Gray Hawk	<i>Asturina nitida</i>	Accipitridae		✓		LC	II
Plumbeous Kite	<i>Ictinia plumbea</i>	Accipitridae		✓		LC	II
Swallow-tailed Kite	<i>Elanoides forficatus</i>	Accipitridae		✓		LC	NA
White Hawk	<i>Leucopternis albigollis</i>	Accipitridae			✓	LC	II
Harpy Eagle	<i>Harpia harpyja</i>	Accipitridae		✓	✓	NT	I
Ornate Hawk-Eagle	<i>Spizaetus ornatus</i>	Accipitridae			✓	NT	II
Amazon Kingfisher	<i>Chloroceryle amazona</i>	Alcedinidae	✓		✓	LC	NA
American Pygmy Kingfisher	<i>Chloroceryle aenea</i>	Alcedinidae			✓	LC	NA
Green Kingfisher	<i>Chloroceryle Americana</i>	Alcedinidae		✓	✓	LC	NA
Ringed Kingfisher	<i>Ceryle torquata</i>	Alcedinidae		✓	✓	LC	NA
Anhinga	<i>Anhinga anhinga</i>	Anhingidae	✓	✓		LC	NA
Horned Screamer	<i>Anhima cornuta</i>	Ankimidae	✓			LC	NA
Band-rumped Swift	<i>Chaetura spinicaudus</i>	Apodidae			✓	LC	NA
Chaetura Swift	<i>Chaetura sp.</i>	Apodidae			✓	LC	NA
Fork-tailed Palm-Swift	<i>Tachornis squamata</i>	Apodidae		✓		LC	NA
Gray-rumped Swift	<i>Chaetura cinereiventris</i>	Apodidae			✓	LC	NA
Short-tailed Swift	<i>Chaetura brachyura</i>	Apodidae		✓	✓	LC	NA
White tipped Swift	<i>Aeronautes montivagus</i>	Apodidae	✓			LC	NA
Agami Heron	<i>Agamia agami</i>	Ardeidae		✓		LC	NA
Cocoi Heron	<i>Ardea cocoi</i>	Ardeidae		✓		LC	NA
Great Egret	<i>Ardea alba</i>	Ardeidae		✓		LC	NA
Little Blue Heron	<i>Florida caerulea</i>	Ardeidae	✓			LC	NA
Pinnated Bittern	<i>Botaurus pinnatus</i>	Ardeidae		✓		LC	NA
Rufescent Tiger-Heron	<i>Tigrisoma lineatum</i>	Ardeidae	✓		✓	LC	NA
Striated Heron	<i>Butorides striatus</i>	Ardeidae	✓	✓		LC	NA
Redish Egret	<i>Egretta rufescens</i>	Ardeidae	✓			NT	NA

Black Nunbird	<i>Monasa atra</i>	Bucconidae		✓		LC	NA
Guyana Puffbird	<i>Notharchus macrorhynchos</i>	Bucconidae			✓	LC	NA
Swallow-wing Puff Bird	<i>Chelidoptera tenebrosa</i>	Bucconidae	✓	✓		LC	NA
Blackish Nightjar	<i>Caprimulgus nigrescens</i>	Caprimulgidae		✓		LC	NA
Common Pauraque	<i>Nyctidromus albicollis</i>	Caprimulgidae		✓	✓	LC	NA
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Caprimulgidae		✓		LC	NA
Little Night Jar	<i>Setopagis parvula</i>	Caprimulgidae	✓	✓		LC	NA
White tailed Nightjar	<i>Caprimulgus cayennensis</i>	Caprimulgidae		✓		LC	NA
Blue-black Grosbeak	<i>Cyanocompsa cyanoides</i>	Cardinalidae		✓		LC	NA
Buff-throated Saltator	<i>Saltator maximus</i>	Cardinalidae		✓		LC	NA
Slate-colored Grosbeak	<i>Saltator grossus</i>	Cardinalidae			✓	LC	NA
Yellow green Grosbeak	<i>Caryothraustes Canadensis</i>	Cardinalidae		✓	✓	LC	NA
Red-and-black Grosbeak	<i>Periporphyrus erythromelas</i>	Cardinalidae		✓	✓	NT	NA
Hawk	<i>Buteogallus sp.</i>	Cathartidae	✓	✓			
Black Vulture	<i>Coragyps atratus</i>	Cathartidae		✓	✓	LC	NA
Greater Yellow- headed Vulture	<i>Cathartes melambrotus</i>	Cathartidae			✓	LC	NA
King Vulture	<i>Sarcoramphus papa</i>	Cathartidae		✓		LC	III
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	Cathartidae		✓		LC	NA
Turkey Vulture	<i>Cathartes aura</i>	Cathartidae		✓	✓	LC	NA
Kingfisher	<i>Chloroceryle aenea</i>	Cerylidae	✓			LC	NA
Wood Stork	<i>Mycteria Americana</i>	Ciconiidae	✓			LC	NA
White-capped Dipper	<i>Cinclus leucocephalus</i>	Cinclidae	✓			LC	NA
Common ground dove	<i>Columbina passerina</i>	Columbidae		✓		LC	NA
Gray-fronted Dove	<i>Leptotila rufaxilla</i>	Columbidae			✓	LC	NA
Plumbeous Pigeon	<i>Columba plumbea</i>	Columbidae			✓	LC	NA
Ruddy Quail-Dove	<i>Geotrygon montana</i>	Columbidae			✓	LC	NA
Scaled Pigeon	<i>Patagioenas speciosa</i>	Columbidae		✓		LC	NA
White tipped dove	<i>Leptotila verreauxi</i>	Columbidae		✓		LC	NA
Ruddy Pigeon	<i>Patagioenas subvinoacea</i>	Columbidae	✓	✓	✓	VU	NA
Cayenne Jay	<i>Cyanocorax cayanus</i>	Corvidae		✓	✓	LC	NA
Capuchin bird	<i>Perissocephalus tricolor</i>	Cotingidae		✓	✓	LC	NA

Guianan red-Cotinga	<i>Phoenicircus carnifex</i>	Cotingidae			✓	LC	NA
Purple-throated Fruitcrow	<i>Querula purpurata</i>	Cotingidae		✓		LC	NA
Little chachalaca	<i>Ortalis motmot</i>	Cracidae		✓	✓	LC	NA
Spix's Guan	<i>Penelope jacquacu</i>	Cracidae	✓		✓	LC	NA
Black Curassow	<i>Crax alector</i>	Cracidae	✓	✓	✓	VU	NA
Black-bellied Cuckoo	<i>Piaya melanogaster</i>	Cuculidae			✓	LC	NA
Cuckoo	<i>Coccyzus americanus</i>	Cuculidae	✓			LC	NA
Marail Guan	<i>Penelope marail</i>	Cuculidae			✓	LC	NA
Smoothed-billed Ani	<i>Crotophaga ani</i>	Cuculidae		✓	✓	LC	NA
Squirrel cuckoo	<i>Piaya cayana</i>	Cuculidae	✓	✓	✓	LC	NA
Striped Cuckoo	<i>Tapera naevia</i>	Cuculidae		✓		LC	NA
Amazonian Woodcreeper	<i>Dendrocolaptes certhia</i>	Dendrocolaptidae	✓			LC	NA
Black headed Woodcreeper	<i>Dendrocolaptes picumnus</i>	Dendrocolaptidae	✓			LC	NA
Buff throat Woodcreeper	<i>Xiphorhynchus guttatus</i>	Dendrocolaptidae	✓		✓	LC	NA
Curved bill Scythebill	<i>Campylorhamphus procurviroides</i>	Dendrocolaptidae	✓			LC	NA
Long tailed Woodcreeper	<i>Deconychura longicauda</i>	Dendrocolaptidae	✓			LC	NA
Olivaceous Woodcreeper	<i>Sittasomus griseicapillus</i>	Dendrocolaptidae	✓			LC	NA
Plain brown Woodcreeper	<i>Dendrocincla fuliginosa</i>	Dendrocolaptidae	✓	✓	✓	LC	NA
Straight-billed Woodcreeper	<i>Xiphorhynchus picus</i>	Dendrocolaptidae		✓		LC	NA
Wedge billed Woodcreeper	<i>Glyphorhynchus spirurus</i>	Dendrocolaptidae	✓	✓	✓	LC	NA
White chinned Woodcreeper	<i>Dendrocincla merula</i>	Dendrocolaptidae	✓			LC	NA
Blue-black Grassquit	<i>Volatinia jacarina</i>	Emberizidae		✓		LC	NA
Sun bittern	<i>Eurypyga helias</i>	Eurypigidae	✓	✓	✓	LC	NA
Forest-Falcon	<i>Micrastur sp.</i>	Falconidae			✓		
Barred forest-Falcon	<i>Micrastur ruficollis</i>	Falconidae			✓	LC	II
Bat Falcon	<i>Falco ruficularis</i>	Falconidae		✓		LC	II
Black Caracara	<i>Daptrius ater</i>	Falconidae	✓	✓		LC	II
Collared forest-Falcon	<i>Micrastur semitorquatus</i>	Falconidae		✓		LC	II
Crested caracara	<i>Caracara plancus</i>	Falconidae		✓		LC	NA
Laughing Falcon	<i>Herpetotheres cachinnans</i>	Falconidae		✓		LC	II
Lined forest-Falcon	<i>Micrastur gilvicollis</i>	Falconidae			✓	LC	II

Red throated Caracara	<i>Daptrius americanus</i>	Falconidae	✓	✓	✓	LC	II
Slaty-backed Forest-Falcon	<i>Micrastur mirandollei</i>	Falconidae			✓	LC	II
Vulture	<i>Cathartes melambrotus</i>	Falconidae	✓			LC	NA
Yellow headed caracara	<i>Milvago chimachima</i>	Falconidae		✓		LC	II
Black-faced Ant-thrush	<i>Formicarius analis</i>	Formicariidae			✓	LC	NA
Rufous-capped Ant-thrush	<i>Formicarius colma</i>	Formicariidae			✓	LC	NA
Violaceous Euphonia	<i>Euphonia violacea</i>	Fringillidae		✓		LC	NA
Black-banded Woodcreeper	<i>Dendrocolaptes picumnus</i>	Furnariidae		✓		LC	NA
Chestnut-rumped Woodcreeper	<i>Xiphorhynchus pardalotus</i>	Furnariidae	✓		✓	LC	NA
Gleaner	<i>Automolus infuscatus</i>	Furnariidae	✓			LC	NA
Plain Woodcreeper	<i>Dendrocincla merula</i>	Furnariidae	✓			LC	NA
Plain Xenops	<i>Xenops minutus</i>	Furnariidae			✓	LC	NA
Ruddy spinetail	<i>Synallaxis rutilans</i>	Furnariidae	✓			LC	NA
Great Jacamar	<i>Jacamerops aureus</i>	Galbulidae			✓	LC	NA
Paradise Jacamar	<i>Galbula dea</i>	Galbulidae	✓	✓	✓	LC	NA
Yellow-billed Jacamar	<i>Galbula albirostris</i>	Galbulidae			✓	LC	NA
Spotted Antpitta	<i>Hylopezus macularius</i>	Grallariidae		✓	✓	LC	NA
Thrush-like Antpitta	<i>Myrmothera campanisona</i>	Grallariidae		✓	✓	LC	NA
Black collared Swallow	<i>Atticora melanoleuca</i>	Hirundinidae	✓		✓	LC	NA
Brown-chested Martin	<i>Progne tapera</i>	Hirundinidae		✓		LC	NA
Gray-breasted Martin	<i>Progne chalybea</i>	Hirundinidae		✓	✓	LC	NA
Southern rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>	Hirundinidae		✓		LC	NA
Swallow	<i>Atticora melanoleuca</i>	Hirundinidae	✓			LC	NA
White banded Swallow	<i>Atticora fasciata</i>	Hirundinidae		✓	✓	LC	NA
White winged Swallow	<i>Tachycineta albiventer</i>	Hirundinidae		✓	✓	LC	NA
Carib Grackle	<i>Quiscalus lugubris</i>	Icteridae	✓			LC	NA
Crested Oropendula	<i>Psarocolius decumanus</i>	Icteridae	✓	✓		LC	NA
Giant Cowbird	<i>Scaphidura oryzivora</i>	Icteridae		✓		LC	NA
Green Oropendola	<i>Psarocolius viridis</i>	Icteridae		✓	✓	LC	NA
Moriche Oriole	<i>Icterus cayanensis</i>	Icteridae	✓			LC	NA
Red-rumped Cacique	<i>Cacicus haemorrhous</i>	Icteridae		✓	✓	LC	NA

Yellow Oriole	<i>Icterus nigrogularis</i>	Icteridae	✓	✓		LC	NA
Yellow rumped Cacique	<i>Cacicus cela</i>	Icteridae	✓	✓		LC	NA
Cinereous Becard	<i>Pachyrhamphus rufus</i>	Incertae Sedis		✓		LC	NA
Blue - crowned Motmot	<i>Momotus momota</i>	Momotidae		✓		LC	NA
Great Potoo	<i>Nyctibius grandis</i>	Nyctibccdae		✓		LC	NA
Common Potoo	<i>Nyctibius griseus</i>	Nyctibiidae		✓	✓	LC	NA
Crested Bobwhite	<i>Colinus cristatus</i>	Odontophoridae	✓			LC	NA
Marbled Wood-Quail	<i>Odontophorus gujanensis</i>	Odontophoriidae			✓	NT	NA
River Warbler	<i>Phaeothlypis rivularis</i>	Parulidae			✓	LC	NA
Grassland Sparrow	<i>Ammodramus humeralis</i>	Passerellidae		✓		LC	NA
Reddish Hermit	<i>Phaethornis ruber</i>	Phaethornis		✓	✓	LC	II
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>	Phalacrocoracidae	✓	✓		LC	NA
Egret	<i>Egretta rufescens</i>	Phoenicopteridae	✓			NT	NA
Woodpecker	<i>Unidentified sp.</i>	Picidae	✓				
Chestnut Woodpecker	<i>Celeus elegans</i>	Picidae	✓	✓		LC	NA
Cream-colored Woodpecker	<i>Celeus flavus</i>	Picidae		✓		LC	NA
Crimson-crested Woodpecker	<i>Campephilus melanoleucos</i>	Picidae	✓	✓		LC	NA
Golden Olive Woodpecker	<i>Piculus rubiginosus</i>	Picidae	✓			LC	NA
Golden spangle Piculet	<i>Picumnus exilis</i>	Picidae	✓			LC	NA
Lineated Woodpecker	<i>Dryocopus lineatus</i>	Picidae	✓	✓	✓	LC	NA
Little Woodpecker	<i>Veniliornis passerinus</i>	Picidae			✓	LC	NA
Red-necked Woodpecker	<i>Campephilus rubricollis</i>	Picidae		✓	✓	LC	NA
Waved Woodpecker	<i>Celeus undatus</i>	Picidae			✓	LC	NA
Woodpecker	<i>Dryocopus lineatus</i>	Picidae	✓			LC	NA
Yellow tufted Woodpecker	<i>Melanerpes cruentatus</i>	Picidae		✓	✓	LC	NA
Yellow-throated Woodpecker	<i>Piculus flavigula</i>	Picidae			✓	LC	NA
Ringed Woodpecker	<i>Celeus torquatus</i>	Picidae	✓	✓		NT	NA
Blue-backed Manakin	<i>Chiroxiphia pareola</i>	Pipridae		✓		LC	NA
Golden headed Manakin	<i>Pipra erythrocephala</i>	Pipridae	✓	✓	✓	LC	NA
Saffron-crested Tyrant-Manakin	<i>Neopelma chrysocephalum</i>	Pipridae		✓		LC	NA
Tiny Tyrant-Manakin	<i>Tyranneutes virescens</i>	Pipridae		✓	✓	LC	NA

White crowned Manakin	<i>Pipra pipra</i>	Pipridae		✓	✓	LC	NA
White throated Manakin	<i>Corapipo gutturalis</i>	Pipridae		✓		LC	NA
White-bearded Manakin	<i>Manacus manacus</i>	Pipridae			✓	LC	NA
Long-billed Gnatwren	<i>Ramphocaenus melanurus</i>	Poliophtidae			✓	LC	NA
Grey winged Trumpeter	<i>Psophia crepitans</i>	Posphidae	✓	✓	✓	NT	NA
Macaw	<i>Ara sp.</i>	Psittacidae			✓		
Parrot	<i>Amazona sp.</i>	Psittacidae	✓				
Sun Parkeet	<i>Aratinga solstitialis</i>	Psittacidae	✓			EN	II
Black headed Parrot	<i>Pionites melanocephala</i>	Psittacidae	✓	✓	✓	LC	II
Blue and yellow Macaw	<i>Ara ararauna</i>	Psittacidae	✓	✓	✓	LC	II
Blue-headed Parrot	<i>Pionus menstruus</i>	Psittacidae		✓	✓	LC	II
Dusky bill Parrotlet	<i>Psittacula sclateri</i>	Psittacidae	✓			LC	II
Dusky Parrot	<i>Pionus fuscus</i>	Psittacidae	✓	✓	✓	LC	II
Golden-winged Parakeet	<i>Brotogeris chrysopterus</i>	Psittacidae		✓	✓	LC	II
Green-rumped Parrotlet	<i>Forpus passerinus</i>	Psittacidae		✓	✓	LC	II
Macaw	<i>Ara chloroptera</i>	Psittacidae	✓			LC	II
Orange -winged Parrot	<i>Amazona amazonica</i>	Psittacidae		✓	✓	LC	II
Painted Parakeet	<i>Pyrrhura picta</i>	Psittacidae		✓		LC	II
Red and Green Macaw	<i>Ara chloropterus</i>	Psittacidae	✓	✓		LC	II
Red fan Parrot	<i>Deropterus accipitrinus</i>	Psittacidae	✓	✓	✓	LC	II
Red-shouldered Macaw	<i>Ara nobilis</i>	Psittacidae		✓		LC	II
Scarlet Macaw	<i>Ara macao</i>	Psittacidae		✓		LC	I
Screaming Piha	<i>Lipaugus vociferans</i>	Psittacidae	✓	✓	✓	LC	NA
White-eyed Parakeet	<i>Aratinga leucophthalmus</i>	Psittacidae	✓			LC	II
Yellow crowned Parrot	<i>Amazona ochrocephala</i>	Psittacidae	✓	✓		LC	I
Blue-cheeked Parrot	<i>Amazona dufresniana</i>	Psittacidae		✓		NT	II
Caica Parrot	<i>Pionopsitta caica</i>	Psittacidae	✓	✓	✓	NT	II
Parrot	<i>Pionopsitta caica</i>	Psittacidae	✓			NT	II
Parrotlets	<i>Forpus sp.</i>	Psittacidae	✓		✓		
Parakeet	<i>Aratinga pertinax</i>	Psittacidae	✓			LC	II
Mealey Parrot (White eyed)	<i>Amazona farinosa</i>	Psittacidae	✓	✓	✓	NT	II

Gray-necked Wood-Rail	<i>Aramides cajanea</i>	Rallidae		✓		LC	NA
Russet-crowned Crake	<i>Anurolimnas viridis</i>	Rallidae		✓		LC	NA
Yellow breasted Crake	<i>Porzana flaviventer</i>	Rallidae		✓		LC	NA
Toucan	<i>Ramphastos sp.</i>	Ramphastidae	✓				
Black necked Aracari	<i>Pteroglossus aracari</i>	Ramphastidae	✓	✓	✓	LC	II
Green Aracari	<i>Pteroglossus viridis</i>	Ramphastidae		✓		LC	II
Channel-billed Toucan	<i>Ramphastos vitellinus</i>	Ramphastidae	✓	✓	✓	VU	II
Red billed Toucan	<i>Ramphastos tucanus</i>	Ramphastidae	✓	✓	✓	VU	II
Solitary Sandpiper	<i>Tringa solitaria</i>	Scolopacidae	✓			LC	NA
Spotted-sandpiper	<i>Actitis macularius</i>	Scolopacidae		✓		LC	NA
White collared Swift	<i>Streptoprocne zonaris</i>	Streptoprocne		✓		LC	NA
Short-eared Owl	<i>Asio Flammeus</i>	Strigidae		✓		LC	NA
Spectacled Owl	<i>Pulsatrix perspicillata</i>	Strigidae		✓		LC	NA
Striped Owl	<i>Pseudoscops clamator</i>	Strigidae		✓		LC	NA
White plumed Antbird	<i>Pithys albifrons</i>	Thamnophidae	✓	✓	✓	LC	NA
White shouldered Antshrike	<i>Thamnophilus aethiops</i>	Thamnophilidae	✓			LC	NA
Silver red Antbird	<i>Sclater naevia</i>	Thamnophidae	✓			NA	NA
Antbird	<i>Hylophylax sp.</i>	Thamnophilidae			✓	LC	NA
Barred Antshrike	<i>Thamnophilus doliatus</i>	Thamnophilidae		✓		LC	NA
Black-chested Antshrike	<i>Sakesphorus Canadensis</i>	Thamnophilidae		✓		LC	NA
Black-throated Antbird	<i>Myrmeciza atrothorax</i>	Thamnophilidae		✓		LC	NA
Cinereus Antshrike	<i>Thamnomanes caesius</i>	Thamnophilidae	✓		✓	LC	NA
Dusky Antbird	<i>Cercomacra tyrannina</i>	Thamnophilidae	✓		✓	LC	NA
Dusky throated Antshrike	<i>Thamnomanes ardesiacus</i>	Thamnophilidae	✓		✓	LC	NA
Fasciated Antshrike	<i>Cymbilaimus lineatus</i>	Thamnophilidae			✓	LC	NA
Ferruginous-backed Antbird	<i>Myrmeciza ferruginea</i>	Thamnophilidae		✓		LC	NA
Gray Antbird	<i>Cercomacra cinerascens</i>	Thamnophilidae			✓	LC	NA
Gray Antwren	<i>Myrmotherula menetriesii</i>	Thamnophilidae	✓		✓	LC	NA
Great Antshrike	<i>Taraba major</i>	Thamnophilidae		✓		LC	NA
Guianan Slaty Antshrike	<i>Thamnophilus punctatus</i>	Thamnophilidae	✓			LC	NA
Mouse colored Antshrike	<i>Thamnophilus murinus</i>	Thamnophilidae	✓		✓	LC	NA

Plain-winged Antwren	<i>Myrmotherula behni</i>	Thamnophilidae			✓	LC	NA
Pygmy Antwren	<i>Myrmotherula brachyura</i>	Thamnophilidae			✓	LC	NA
Rufous-bellied Antwren	<i>Myrmotherula guttata</i>	Thamnophilidae		✓	✓	LC	NA
Rufous-throated Antbird	<i>Gymnopithys rufigula</i>	Thamnophilidae			✓	LC	NA
Soft black Antwren	<i>Herpsilochmus dosimaculatus</i>	Thamnophilidae	✓			LC	NA
Spot-tailed Antwren	<i>Herpsilochmus sticturus</i>	Thamnophilidae			✓	LC	NA
Spotted back Antbird	<i>Hylophylax naevia</i>	Thamnophilidae	✓			LC	NA
Todd's Antwren	<i>Herpsilochmus stictocephalus</i>	Thamnophilidae			✓	LC	NA
White flanked Antwren	<i>Myrmotherula axillaris</i>	Thamnophilidae	✓	✓		LC	NA
White fringed Antwren	<i>Formicivora grisea</i>	Thamnophilidae		✓		LC	NA
White-browed Antbird	<i>Myrmoborus leucophrys</i>	Thamnophilidae			✓	LC	NA
Silvered Antbird	<i>Sclater naevia</i>	Thamnophilidae	✓			NA	NA
Brown belly Antwren	<i>Epinecophylla gutturalis</i>	Thamnophilidae	✓			NT	NA
Guianan Warbling Antbird	<i>Hypocnemis cantator</i>	Thamnophilidae		✓	✓	NT	NA
Longed-winged Antwren	<i>Myrmotherula longipennis</i>	Thamnophilidae			✓	VU	NA
Blue-backed Tanager	<i>Cyanicterus cyanicterus</i>	Thraupidae		✓		LC	NA
Turquoise Tanager	<i>Tangara mexicana</i>	Thraupidae		✓	✓	LC	NA
White shouldered Tanager	<i>Tachyphonus luctuosus</i>	Thraupidae		✓		LC	NA
Tanager	<i>Tangara sp.</i>	Thraupidae			✓		
Bananaquit	<i>Coereba flaveola</i>	Thraupidae		✓	✓	LC	NA
Bay-headed Tanager	<i>Tangara gyrola</i>	Thraupidae		✓	✓	LC	NA
Blue Dacnis	<i>Dacnis cayana</i>	Thraupidae		✓		LC	NA
Blue-grey Tanager	<i>Thraupis episcopus</i>	Thraupidae	✓	✓		LC	NA
Chestnut-bellied Seedeater	<i>Sporophila castaneiventris</i>	Thraupidae		✓		LC	NA
Fulvous Shrike-Tanager	<i>Lanio fulvus</i>	Thraupidae		✓		LC	NA
Fulvous-crested Tanager	<i>Tachyphonus surinamus</i>	Thraupidae			✓	LC	NA
Green Honeycreeper	<i>Chlorophanes spiza</i>	Thraupidae		✓		LC	NA
Palm Tanager	<i>Thraupis palmarum</i>	Thraupidae	✓	✓		LC	NA
Purple Honeycreeper	<i>Cyanerpes caeruleus</i>	Thraupidae		✓		LC	NA
Red capped Cardinal	<i>Paroaria gularis</i>	Thraupidae	✓	✓		LC	NA
Red-legged Honeycreeper	<i>Cyanerpes cyaneus</i>	Thraupidae		✓		LC	NA

Ruddy-breasted Seedeater	<i>Sporophila minuta</i>	Thraupidae		✓		LC	NA
Silver-beaked Tanager	<i>Ramphocelus carbo</i>	Thraupidae	✓	✓		LC	NA
Superciliaried Tanager	<i>Superciliaris chrysocephalus</i>	Thraupidae	✓			LC	NA
White-lined Tanager	<i>Tachyphonus rufus</i>	Thraupidae	✓	✓		LC	NA
Green Ibis	<i>Mesembrinibis cayennensis</i>	Threskiornithidae		✓	✓	LC	NA
Tinamou	<i>Crypturellus sp.</i>	Tinamidae			✓		
Little Tinamou	<i>Crypturellus soui</i>	Tinamidae	✓	✓		LC	NA
Variiegated Tinamou	<i>Crypturellus variegatus</i>	Tinamidae	✓	✓	✓	LC	NA
Great Tinamou	<i>Tinamus major</i>	Tinamidae	✓	✓	✓	NT	NA
Gray Tinamous	<i>Tinamus tao</i>	Tinamidae	✓			VU	NA
Black-tailed Tityra	<i>Tityra cayana</i>	Tityridae		✓	✓	LC	NA
Emerald	<i>Amazilia sp. 2</i>	Trochilidae			✓		
Emerald	<i>Amazilia sp. 3</i>	Trochilidae			✓		
Hermit	<i>Phaethornis sp.</i>	Trochilidae			✓		
Hummingbird	<i>Amazilia sp.</i>	Trochilidae	✓	✓	✓		
Hummingbird	<i>Chlorestes sp.</i>	Trochilidae	✓				
Black-eared Fairy	<i>Heliothryx auritus</i>	Trochilidae			✓	LC	II
Blue chinned Sapphire	<i>Chlorestes notatus</i>	Trochilidae			✓	LC	II
Blue-fronted Lancebill	<i>Doryfera johanna</i>	Trochilidae			✓	LC	II
Crimson Topaz	<i>Topaza pella</i>	Trochilidae			✓	LC	II
Eastern long-tailed Hermit	<i>Phaethornis superciliosus</i>	Trochilidae			✓	LC	NA
Fork tailed Woodnymph	<i>Thalurania furcata</i>	Trochilidae	✓		✓	LC	II
Gray-breasted Sabrewing	<i>Campylopterus largipennis</i>	Trochilidae		✓	✓	LC	II
Long-tailed Hermit	<i>Phaethornis bourcierii</i>	Trochilidae		✓	✓	LC	II
Rupurumii Hermit	<i>Phaethornis rupurumii</i>	Trochilidae	✓			LC	II
Speckled Hummingbird	<i>Adelomyia melanogenys</i>	Trochilidae	✓		✓	LC	II
Streak-throated Hermit	<i>Phaethornis rupurumii</i>	Trochilidae			✓	LC	II
White beard Hermit	<i>Phaethornis hispidus</i>	Trochilidae	✓		✓	LC	II
White chested Emerald	<i>Amazilia brevirostris</i>	Trochilidae		✓	✓	LC	II
White-chinned Sapphire	<i>Hylocharis cyanus</i>	Trochilidae	✓		✓	LC	II
White-crested Emerald	<i>Amazilia chionopectus</i>	Trochilidae	✓			LC	II

Hummingbird	<i>Djohanna guineensis</i>	Trocholidae	✓				
Bronzy Inca Hummingbird	<i>Coeligena coeligena</i>	Trocholidae	✓		✓	LC	II
Copper rump Hummingbird	<i>Amazilia tobaci</i>	Trocholidae	✓		✓	LC	II
Green Violt ear Hummingbird	<i>Colibri thalassinus</i>	Trocholidae	✓		✓	LC	II
Grey breasted Hummingbird	<i>Campylopterus largipennis</i>	Trocholidae	✓			LC	II
Hummingbird	<i>Phaethornis rupurumii</i>	Trocholidae	✓			LC	II
Buff-breasted Wood-Wren	<i>Campylorhynchus griseus</i>	Troglodytidae			✓	LC	NA
Buff-breasted Wren	<i>Thryothorus leucotis</i>	Troglodytidae		✓	✓	LC	NA
Coraya Wren	<i>Thryothorus coraya</i>	Troglodytidae		✓	✓	LC	NA
Musician Wren	<i>Cyphorhinus arada</i>	Troglodytidae	✓	✓	✓	LC	NA
White breasted Wood Wren	<i>Henicorhina leucosticta</i>	Troglodytidae	✓	✓	✓	LC	NA
Southern house-Wren	<i>Troglodytes musculus</i>	Troglodytidae		✓	✓	NA	NA
Black - tailed Trogon	<i>Trogon melanurus</i>	Trogonidae		✓		LC	NA
Black-throated Trogon	<i>Trogon rufus</i>	Trogonidae			✓	LC	NA
Violaceous Trogon	<i>Trogon violaceus</i>	Trogonidae		✓	✓	LC	NA
White tailed Trogon	<i>Trogon viridis</i>	Trogonidae		✓	✓	LC	NA
Bare-eyed Thrush	<i>Turdus nudigenis</i>	Turdidae		✓		LC	NA
Pale-eyed Thrush	<i>Platycichla leucops</i>	Turdidae		✓	✓	LC	NA
White necked Thrush	<i>Turdus albicollis</i>	Turdidae		✓		LC	NA
Brown Capped	<i>Arrithion dilatatum</i>	Tyrannidae	✓				
Yellow throated Flycatcher	<i>Conopias parvus</i>	Tyrannidae	✓		✓	LC	NA
Myiarchus Flycatcher	<i>Myiarchus sp.</i>	Tyrannidae			✓		
Tolmomyias Flycatcher	<i>Tolmomyias sp.</i>	Tyrannidae			✓		
Boat-billed Flycatcher	<i>Megarynchus pitangua</i>	Tyrannidae		✓	✓	LC	NA
Bright-rumped Attila	<i>Attila spadiceus</i>	Tyrannidae			✓	LC	NA
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	Tyrannidae		✓		LC	NA
Cinnamon Attila	<i>Attila cinnamomeus</i>	Tyrannidae		✓	✓	LC	NA
Common Tody-Flycatcher	<i>Todirostrum cinereum</i>	Tyrannidae		✓		LC	NA
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	Tyrannidae		✓	✓	LC	NA
Dusky-chested Flycatcher	<i>Myiozetetes luteiventris</i>	Tyrannidae		✓		LC	NA
Fork-tailed Flycatcher	<i>Tyrannus dominicensis</i>	Tyrannidae		✓	✓	LC	NA

Golden-crowned spadebill	<i>Platyrrinchus coronatus</i>	Tyrannidae			✓	LC	NA
Gray Kinbird	<i>Tyrannus dominicensis</i>	Tyrannidae		✓		LC	NA
Great Kiskadee	<i>Pitangus sulphuratus</i>	Tyrannidae	✓	✓		LC	NA
Helmented Pygmy-Tyrant	<i>Lophotriccus galeatus</i>	Tyrannidae			✓	LC	NA
Lesser Kiskadee	<i>Philohydor lictor</i>	Tyrannidae	✓	✓		LC	NA
Long-tailed Tyrant	<i>Colonia colonus</i>	Tyrannidae		✓	✓	LC	NA
Pale-eyed Pygmy-Tyrant	<i>Atalotriccus pilaris</i>	Tyrannidae		✓		LC	NA
Pied Water Tyrant	<i>Fluvicola pica</i>	Tyrannidae	✓		✓	LC	NA
Piratic Flycatcher	<i>Legatus leucophaeus</i>	Tyrannidae		✓	✓	LC	NA
Rusty-margined Flycatcher	<i>Myiozetetes cayanensis</i>	Tyrannidae		✓		LC	NA
Streaked Flycatcher	<i>Myiodynastes maculatus</i>	Tyrannidae		✓		LC	NA
Thrush-like Schiffornis	<i>Schiffornis turdina</i>	Tyrannidae	✓		✓	LC	NA
Tropical Kingbird	<i>Tyrannus melancholicus</i>	Tyrannidae	✓	✓	✓	LC	NA
Water Tyrant	<i>Fluvicola pica</i>	Tyrannidae	✓			LC	NA
Whiskered Flycatcher	<i>Myiobius barbatus</i>	Tyrannidae			✓	LC	NA
White throated Kingbird	<i>Tyrannus albogularis</i>	Tyrannidae		✓		LC	NA
Yellow bellied Elaenia	<i>Elaenia flavogaster</i>	Tyrannidae		✓		LC	NA
Yellow throated Tyrant	<i>Satrapa icterophrys</i>	Tyrannidae	✓			LC	NA
Yellow Tyrannulet	<i>Capsiempis flaveola</i>	Tyrannidae		✓		LC	NA
Yellow-breasted Flycatcher	<i>Tolmomyias flaviventris</i>	Tyrannidae			✓	LC	NA
Zimmer's Flycatcher	<i>Tolmomyias assimilis</i>	Tyrannidae			✓	LC	NA
Tropical Screech-Owl	<i>Megascops choliba</i>	Tytonidae		✓		LC	II
Buff-cheeked Greenlet	<i>Hylophilus muscicapinus</i>	Vireonidae			✓	LC	NA
Lemon-chested Greenlet	<i>Hylophilus thoracicus</i>	Vireonidae			✓	LC	NA
Red-eyed Vireo	<i>Vireo olivaceus</i>	Vireonidae		✓		LC	NA
Slaty-capped Shrike-Vireo	<i>Vireolanius leucotis</i>	Vireonidae			✓	LC	NA

Table 19: Macro-invertebrates documented during baseline surveys

Common Name	Scientific Name	Class	Family / Order	2006	2009
Beetles	<i>Unidentified Species</i>		Coleoptera	✓	✓
Acoushi anta	<i>Atta sexdens</i>		Hymenoptera	✓	✓
Black Scorpion	<i>Centruroides sp.</i>		Scorpiones	✓	
Bugs; Water strider	<i>Unidentified Species</i>		Hemiptera	✓	
Bumble bee	<i>Xylocopa sp.</i>		Hymenoptera	✓	
Bush bug	<i>Nazera sp.</i>		Hemiptera	✓	
Butterflies and Moths	<i>Unidentified Species</i>		Lepidoptera	✓	
Butterfly	<i>Morpho hyacinthus</i>		Lepidoptera	✓	
Butterfly	<i>Unidentified Species</i>		Riodiniae		✓
Butterfly	<i>Unidentified Species</i>		Lycaeniidae		✓
Butterfly	<i>Unidentified Species</i>		Morphidae		✓
Butterfly	<i>Unidentified Species</i>		Satyridae		✓
Butterfly	<i>Unidentified Species</i>		Heliconidae		✓
Butterfly	<i>Helicopsis cupido</i>		Papilionidae		✓
Butterfly	<i>Mesosemia sp.</i>		Papilionidae		✓
Butterfly	<i>Stalachits sp.</i>		Papilionidae		✓
Butterfly	<i>Themone sp.</i>		Papilionidae		✓
Butterfly	<i>Arawacus sp.</i>		Papilionidae		✓
Butterfly	<i>Pelion sp.</i>		Papilionidae		✓
Butterfly	<i>Malvina sp.</i>		Papilionidae		✓
Butterfly	<i>Morpho rhetenor</i>		Papilionidae		✓
Butterfly	<i>Deidamia sp.</i>		Papilionidae		✓
Butterfly	<i>Pierella sp.</i>		Papilionidae		✓
Butterfly	<i>Euptychia-Tricolor</i>		Papilionidae		✓
Butterfly	<i>Lea sp.</i>		Papilionidae		✓
Butterfly	<i>Taygetis sp.</i>		Papilionidae		✓
Butterfly	<i>Heliconius numata-cramer</i>		Papilionidae		✓
Butterfly	<i>Deris sp.</i>		Papilionidae		✓
Butterfly	<i>Philaethria sp.</i>		Papilionidae		✓

Butterfly	<i>Doris sp.</i>		Papilionidae		✓
Butterfly	<i>Arcas-antheas</i>		Papilionidae		✓
Centipede	<i>Unidentified Species</i>	Chilopoda		✓	
Click Beetle	<i>Pyrophorus sp.</i>		Coleoptera	✓	
Cockroach	<i>Unidentified Species</i>		Blattodea	✓	✓
Crab	<i>Unidentified Species</i>		Brachyura		✓
Crab	<i>Uca sp.</i>		Decapoda	✓	
Cricket	<i>Pyrophorus sp.</i>		Orthoptera	✓	
Cricket	<i>Scapteriscus sp.</i>		Orthoptera	✓	
Damsel flies	<i>Unidentified Species</i>		Odonata	✓	
Dipluran	<i>Unidentified Species</i>		Diplura	✓	
Dragon flies	<i>Unidentified Species</i>		Odonata	✓	✓
Dragon fly	<i>Anax sp.</i>		Odonata	✓	
Earthworm	<i>Pheretima sp.</i>	Annelida		✓	
Earthworms	<i>Unidentified Species</i>		Haplotaxida	✓	
Fireflies	<i>Unidentified Species</i>		Lampyridae		✓
Flies	<i>Unidentified Species</i>		Diptera	✓	
Grass-hopper	<i>Ophullela sp.</i>			✓	
Grasshopper; cricket	<i>Unidentified Species</i>		Orthoptera	✓	✓
Katydids	<i>Unidentified Species</i>		Tettigoniidae		✓
Land crab	<i>Unidentified Species</i>		Decapoda	✓	
Millipedes	<i>Unidentified Species</i>	Diplopoda		✓	✓
Mosquitoes	<i>Anopheles sp.</i>		Diptera	✓	
Mosquitos	<i>Unidentified Species</i>		Culicidae		✓
Moth	<i>Hamadryas sp.</i>		Lepidoptera	✓	✓
Pond fly	<i>Unidentified Species</i>		Odonata	✓	
Praying Mantis	<i>Tespis trifasciata</i>		Mantodea	✓	
Sawari ants	<i>Unidentified Species</i>		Hymenoptera	✓	
Scorpions	<i>Unidentified Species</i>		Scorpiones	✓	✓
Segmented worms	<i>Unidentified Species</i>		Annelidae		✓
Shrimp	<i>Unidentified Species</i>		Caridea		✓

Shrimp	<i>Unidentified Species</i>		Decapoda		✓
Silver fish	<i>Unidentified Species</i>		Dermaptera	✓	
Snail	<i>Pornecea</i>		Gastropoda	✓	
Snail	<i>Pomacea sp.</i>		Gastropoda	✓	
Snails	<i>Unidentified Species</i>		Gastropoda	✓	✓
Spider	<i>Unidentified Species</i>		Araneae	✓	✓
Stick insects	<i>Unidentified Species</i>		Plasmidae		✓
Stink bug	<i>Nazera sp.</i>		Hemiptera	✓	
Termites	<i>Unidentified Species</i>		Isoptera	✓	
True bugs	<i>Unidentified Species</i>		Hemiptera		✓
True flies-cowfly	<i>Unidentified Species</i>		Diptera		✓
Two tailed insect	<i>Unidentified Species</i>		Diplura	✓	
Walking Sticks	<i>Unidentified Species</i>		Pharmatoptera	✓	
Wasp	<i>Polistes sp.</i>		Hymenoptera	✓	
Wasps, Ants, Bees	<i>Unidentified Species</i>		Hymenoptera	✓	✓
Water threaders	<i>Unidentified Species</i>		Hydrometridae		✓

4.2 APPENDIX B: SPECIES DOCUMENTED DURING MONITORING STUDIES.

Table 20: Birds documented during monitoring studies

Monitoring Method	Common Name	Scientific Name	Family	2016 (Mine)	2016 (Control)	2017 (Mine)	2017 (Control)	2018 (Mine)	2018 (Control)	IUCN	CITES
Camera Traps	Black Curassow	<i>Crax alector</i>	Cracidae	✓	✓	✓	✓	✓	✓	VU	NA
	Great Tinamou	<i>Tinamus major</i>	Tinamidae	✓	✓					NT	NA
	Grey-winged Trumpeter	<i>Psophia crepitans</i>	Psophiidae	✓	✓	✓	✓	✓	✓	NT	NA
	Little Tinamou	<i>Crypturellus soui</i>	Tinamidae	✓	✓					LC	NA
	Marail Guan	<i>Penelope marail</i>	Cracidae	✓			✓			LC	NA
	Variegated Tinamou	<i>Crypturellus variegatus</i>	Tinamidae	✓						LC	NA
Point Counts	Amazonian Antshrike	<i>Thamnophilus amazonicus</i>	Thamnophilidae						✓	LC	NA
	Amazonian-barred Woodcreeper	<i>Dendrocolaptes certhia</i>	Furnariidae			✓				LC	NA
	Bananaquit	<i>Coereba flaveola</i>	Thraupidae	✓			✓	✓	✓	LC	NA
	Band-rumped Swift	<i>Chaetura spinicaudus</i>	Apodidae	✓						LC	NA
	Barred Forest-falcon	<i>Micrastur ruficollis</i>	Falconidae				✓	✓		LC	NA
	Bay-headed Tanager	<i>Tangara gyrola</i>	Thraupidae	✓						LC	NA
	Black Caracara	<i>Daptrius ater</i>	Falconidae		✓					LC	NA
	Black Currassow	<i>Crax alector</i>	Cracidae					✓		VU	NA
	Black-banded Woodcreeper	<i>Dendrocolaptes picumnus</i>	Furnariidae						✓	LC	NA
	Black-bellied Cuckoo	<i>Piaya melanogaster</i>	Cuculidae	✓				✓		LC	NA
	Black-chinned Antbird	<i>Hypocnemoides melanopogon</i>	Thamnophilidae					✓	✓	LC	NA
	Black-eared Fairy	<i>Heliothryx auritus</i>	Trochilidae					✓		LC	NA
	Black-faced Hawk	<i>Leucopternis melanops</i>	Accipitridae				✓	✓		LC	NA

Musician Wren	<i>Cyphorhinus arada</i>	Troglodytidae	✓		✓		✓		LC	NA
Northern Riverbank Warbler	<i>Myiothlypis mesoleuca</i>	Parulidae					✓	✓	LC	NA
Ochre-bellied Flycatcher	<i>Mionectes oleagineus</i>	Tyrannidae					✓		LC	NA
Olivaceous Flatbill	<i>Rhynchocyclus olivaceus</i>	Tyrannidae		✓					LC	NA
Olivaceous Mourner	<i>Schiffornis olivacea</i>	Tityridae			✓	✓		✓	LC	NA
Opal-rumped Tanager	<i>Tangara velia</i>	Thraupidae					✓		LC	NA
Orange-winged Amazon	<i>Amazona amazonica</i>	Psittacidae			✓	✓	✓		LC	II
Painted Parakeet	<i>Pyrrhura picta</i>	Psittacidae					✓		LC	II
Pale-tailed Barbthroat	<i>Threnetes leucurus</i>	Trochilidae	✓		✓			✓	LC	II
Paradise Jacamar	<i>Galbula dea</i>	Galbulidae	✓	✓	✓	✓			LC	NA
Pavonine Cuckoo	<i>Dromococcyx pavoninus</i>	Cuculidae					✓		LC	NA
Pectoral Sparrow	<i>Arremon taciturnus</i>	Emberizidae			✓				LC	NA
Piratic Flycatcher	<i>Legatus leucophaeus</i>	Tyrannidae					✓		LC	NA
Plain Xenops	<i>Xenops minutus</i>	Furnariidae		✓					LC	NA
Plain-brown Woodcreeper	<i>Dendrocincla fuliginosa</i>	Furnariidae		✓					LC	NA
Plumbeous Kite	<i>Ictinia plumbea</i>	Accipitridae					✓		LC	II
Plumbeous Pigeon	<i>Patagioenas plumbea</i>	Columbidae	✓		✓	✓	✓	✓	LC	NA
Purple Honeycreeper	<i>Cyanerpes caeruleus</i>	Thraupidae		✓		✓	✓		LC	NA
Purple-throated Fruitcrow	<i>Querula purpurata</i>	Cotingidae	✓		✓		✓		LC	NA
Pygmy Antwren	<i>Myrmotherula brachyura</i>	Thamnophilidae		✓	✓	✓		✓	LC	NA

Red-and-Black Grosbeak	<i>Caryothraustes erythromelas</i>	Cardinalidae	✓	✓	✓	✓	✓	✓	NT	NA
Red-and-Green Macaw	<i>Ara chloropterus</i>	Psittacidae	✓	✓		✓	✓	✓	LC	II
Red-billed Toucan	<i>Ramphastos tucanus</i>	Ramphastidae	✓	✓	✓	✓	✓	✓	VU	II
Reddish Hermit	<i>Phaethornis ruber</i>	Trochilidae	✓	✓			✓	✓	LC	II
Red-fan Parrot	<i>Deroptyus accipitrinus</i>	Psittacidae						✓	LC	II
Red-necked Woodpecker	<i>Campephilus rubricollis</i>	Picidae	✓	✓	✓	✓	✓	✓	LC	NA
Red-rumped Cacique	<i>Cacicus haemorrhous</i>	Icteridae	✓		✓		✓		LC	NA
Red-throated Caracara	<i>Ibycter americanus</i>	Falconidae	✓			✓	✓	✓	LC	II
Ringed Antpiper	<i>Corythopis torquatus</i>	Tyrannidae				✓			LC	NA
Riverbank Warbler	<i>Myiothlypis rivularis</i>	Parulidae	✓		✓	✓			LC	NA
Rose-breasted Chat	<i>Granatellus pelzelni</i>	Cardinalidae	✓						LC	NA
Ruddy Pigeon	<i>Patagioenas subvinacea</i>	Columbidae		✓	✓	✓	✓	✓	VU	NA
Rufous-bellied Antwren	<i>Isleria guttata</i>	Thamnophilidae	✓	✓	✓	✓	✓	✓	LC	NA
Rufous-capped Antthrush	<i>Formicarius colma</i>	Formicariidae	✓			✓	✓		LC	NA
Rufous-tailed Flatbill	<i>Ramphotrigon ruficauda</i>	Tyrannidae	✓		✓				LC	NA
Rufous-tailed Flycatcher	<i>Myiarchus validus</i>	Tyrannidae		✓					LC	NA
Rufous-throated Antbird	<i>Gymnopithys rufigula</i>	Thamnophilidae	✓	✓		✓	✓		LC	NA
Rufous-winged Ground Cuckoo	<i>Neomorphus rufipennis</i>	Cuculidae	✓			✓		✓	LC	NA
Saffron-crested Tyrant Manakin	<i>Neopelma chrysocephalum</i>	Pipridae				✓		✓	LC	NA

Sapphire-Rumped Parrotlet	<i>Touit purpuratus</i>	Psittacidae		✓					LC	II
Scale-backed Antbird	<i>Willisornis poecilinotus</i>	Thamnophilidae			✓				LC	NA
Screaming Piha	<i>Lipaugus vociferans</i>	Cotingidae	✓	✓	✓	✓	✓	✓	LC	NA
Short-tailed Pygmy-Tyrant	<i>Myiornis ecaudatus</i>	Tyrannidae						✓	LC	NA
Short-tailed Swift	<i>Chaetura brachyura</i>	Apodidae	✓		✓				LC	NA
Silver-beaked Tanager	<i>Ramphocelus carbo</i>	Thraupidae					✓		LC	NA
Slate-collared Grosbeak	<i>Saltator grossus</i>	Cardinalidae			✓		✓		LC	NA
Slaty-capped Shrike-Vireo	<i>Vireolanius leucotis</i>	Vireonidae	✓	✓	✓	✓	✓	✓	LC	NA
Southern Beardless Tyrannulet	<i>Camptostoma obsoletum</i>	Tyrannidae					✓		LC	NA
Southern Mealy Amazon	<i>Amazona farinosa</i>	Psittacidae					✓	✓	NT	II
Southern Wing-banded Antbird	<i>Myrmornis torquata</i>	Thamnophilidae					✓		LC	NA
Spot-tailed Antwren	<i>Herpsilochmus sticturus</i>	Thamnophilidae	✓	✓	✓	✓	✓	✓	LC	NA
Spotted Antpitta	<i>Hylopezus macularius</i>	Grallariidae		✓	✓				LC	NA
Spot-winged Antbird	<i>Myrmelastes leucostigma</i>	Thamnophilidae						✓	LC	NA
Squirrel Cuckoo	<i>Piaya cayana</i>	Cuculidae	✓		✓	✓			LC	NA
Straight-billed Hermit	<i>Phaethornis bourcieri</i>	Trochilidae					✓	✓	LC	II
Striped Woodpecker	<i>Xiphorhynchus obsoletus</i>	Furnariidae		✓					LC	NA
Swallow-winged Puffbird	<i>Chelidoptera tenebrosa</i>	Bucconidae	✓				✓		LC	NA
Thrush-like Antpitta	<i>Myrmothera campanisona</i>	Grallariidae	✓	✓	✓	✓	✓		LC	NA

Tiny-tyrant Manakin	<i>Tyrannetes virescens</i>	Pipridae	✓	✓	✓	✓	✓	✓	LC	NA
Todd's Antwren	<i>Herpsilochmus stictocephalus</i>	Thamnophilidae	✓	✓	✓	✓	✓	✓	LC	NA
Turkey Vulture	<i>Cathartes aura</i>	Cathartidae					✓		LC	NA
Variiegated Tinamou	<i>Crypturellus variegatus</i>	Tinamidae	✓	✓	✓	✓	✓	✓	LC	NA
Violaceous Trogon	<i>Trogon violaceus</i>	Trogonidae					✓	✓	LC	NA
Waved Woodpecker	<i>Celeus undatus</i>	Picidae		✓		✓	✓	✓	LC	NA
Wedge-billed Woodcreeper	<i>Glyphorynchus spirurus</i>	Furnariidae	✓		✓	✓	✓		LC	NA
Whiskered Flycatcher	<i>Myiobius barbatus</i>	Tityridae			✓		✓		LC	NA
White-bearded Manakin	<i>Manacus manacus</i>	Pipridae					✓		LC	NA
White-breasted Wood Wren	<i>Henicorhina leucosticta</i>	Troglodytidae	✓		✓	✓	✓	✓	LC	NA
White-browed Antbird	<i>Myrmoborus leucophrys</i>	Thamnophilidae	✓						LC	NA
White-chinned Woodcreeper	<i>Dendrocincla merula</i>	Furnariidae					✓		LC	NA
White-chinned Sapphire	<i>Hylocharis cyaneus</i>	Trochilidae		✓					LC	II
White-crested Spadebill	<i>Platyrinchus platyrhynchos</i>	Tyrannidae				✓	✓		LC	NA
White-crowned Manakin	<i>Pseudopipra pipra</i>	Pipridae		✓	✓	✓	✓	✓	LC	NA
White-flanked Antwren	<i>Myrmotherula axillaris</i>	Thamnophilidae	✓	✓	✓	✓	✓	✓	LC	NA
White-lored Tyrannulet	<i>Ornithion inerme</i>	Tyrannidae	✓		✓				LC	NA
White-necked Thrush	<i>Turdus albicollis</i>	Turdidae		✓	✓	✓		✓	LC	NA
White-plumed Antbird	<i>Pithys albifrons</i>	Thamnophilidae	✓					✓	LC	NA
White-tailed Trogon	<i>Trogon chionurus</i>	Trogonidae	✓						LC	NA
White-throated Manakin	<i>Corapipo gutturalis</i>	Pipridae	✓		✓				LC	NA

Wing-banded Antbird	<i>Myrmornis torquata</i>	Thamnophilidae	✓		✓	✓			LC	NA
Wing-banded Wren	<i>Microcerculus bambla</i>	Troglodytidae			✓				LC	NA
Yellow-billed Jacamar	<i>Galbula albirostris</i>	Galbulidae		✓		✓			LC	NA
Yellow-crowned Tyrannulet	<i>Tyrannulus elatus</i>	Tyrannidae	✓	✓	✓	✓			LC	NA
Yellow-green Grosbeak	<i>Caryothraustes canadensis</i>	Cardinalidae		✓	✓	✓	✓		LC	NA
Yellow-margined Flatbill	<i>Tolmomyias assimilis</i>	Tyrannidae	✓	✓	✓	✓	✓	✓	LC	NA
Yellow-rumped Cacique	<i>Cacicus cela</i>	Icteridae					✓		LC	NA
Yellow-throated Flycatcher	<i>Conopias parvus</i>	Tyrannidae				✓	✓		LC	NA
Yellow-throated Woodpecker	<i>Piculus flavigula</i>	Picidae	✓				✓		LC	NA
Yellow-tufted Woodpecker	<i>Melanerpes cruentatus</i>	Picidae			✓				LC	NA

Table 21: Mammals documented during monitoring studies

Monitoring Method	Common Name	Scientific Name	Family	2016 (Mine)	2016 (Control)	2017- (Mine)	2017 (Control)	2018 (Mine)	2018 (Control)	IUCN	CITES
Camera Traps	Amazonian Brown Brocket Deer	<i>Mazama nemorivaga</i>	Cervidae		✓					LC	NA
	Black -eared Opossum	<i>Didelphis marsupialis</i>	Didelphidae		✓					LC	NA
	Brown Four -eyed Opossum	<i>Metachirus nudicaudatus</i>	Didelphidae	✓	✓			✓		LC	NA
	Bush Dog	<i>Speothos venaticus</i>	Canidae		✓					NT	I
	Collared Peccary	<i>Pecari tajacu</i>	Tayassuidae	✓	✓	✓	✓	✓	✓	LC	II
	Giant Anteater	<i>Myrmecophaga tridactyla</i>	Myrmecophagidae	✓	✓	✓	✓	✓	✓	VU	II
	Greater Long-nosed Armadillo	<i>Dasybus kappleri</i>	Dasypodidae	✓	✓					LC	NA
	Jaguar	<i>Panthera onca</i>	Felidae	✓	✓	✓	✓	✓	✓	NT	I
	Jaguarundi	<i>Puma yagouaroundi</i>	Felidae	✓		✓	✓	✓		LC	II
	Lowland Tapir	<i>Tapirus terrestris</i>	Tapiridae	✓	✓	✓	✓	✓	✓	VU	II
	Nine Banded Armadillo	<i>Dasybus novemcinctus</i>	Dasypodidae	✓	✓	✓	✓	✓	✓	LC	NA
	Ocelot	<i>Leopardus pardalis</i>	Felidae	✓	✓	✓	✓	✓	✓	LC	I
	Oncilla (Little Spotted Cat)	<i>Leopardus tigrinus</i>	Felidae	✓	✓					VU	I
	Puma	<i>Puma concolor</i>	Felidae		✓	✓	✓	✓	✓	LC	II
	Red -rumped Agouti	<i>Dasyprocta leporina</i>	Dasyproctidae	✓	✓	✓	✓	✓	✓	LC	NA
	Red Acouchy	<i>Myoprocta acouchy</i>	Dasyproctidae	✓						LC	NA
	Red Brocket Deer	<i>Mazama americana</i>	Cervidae	✓	✓	✓	✓	✓	✓	DD	III
	South American Coati	<i>Nasua nasua</i>	Procyonidae	✓	✓			✓	✓	LC	III
	Southern Tamandua	<i>Tamandua tetradactyla</i>	Myrmecophagidae				✓			LC	NA

