

# A Rapid Biodiversity Assessment of the Macro - Fauna at the Sophia Point Area; Lower Essequibo River, Guyana.



*BY: Waldyke Prince BSc. & Devya Hemraj  
September 2019*

---



## 1. Summary

This preliminary report presents the results of a survey of the rapid biodiversity assessment of the Sophia Point area located on the eastern bank of the Essequibo River in the Essequibo Islands – West Demerara District (Region 3), Guyana. Fieldwork was conducted from 16 to 20 August, 2019, which coincided with the end of the delayed rainy season. The purpose of this survey was to assess the biological diversity of amphibians and reptiles, birds, bats, non-volant mammals, fishes within the area of Sophia Point. Macro-invertebrates sighted were recorded, but no formal methodology was applied to survey this faunal group.

Day and night visual encounter surveys (VES), auditory encounter surveys (AES), patch sampling with respect to small pools, and transect surveys were used to identify the presence of the terrestrial vertebrates.

A total of seventeen species of amphibians and reptiles were documented comprising 10 amphibian species and 7 reptile species, 107 species of birds, 11 species of bats and 15 species of non-volant mammals. Sixteen orders of macro-invertebrates was also identified for the Sophia Point study area.

The amphibians comprised of representatives of the order Anura (toads and frogs). More than half of the recorded anurans were treefrogs (Hylidae) with six species, followed by the Bufonidae, with two species and Centrolenidae and Dendrobatidae represented by one species each. The dominant anurans observed were *Rhinella murinus* and *Hypsiboas boans*, and the dominant reptiles observed was *Ameiva ameiva*. No species of snakes, crocodylians or tortoises/turtles was recorded during this survey.

Logging, infrastructure development, agro-industrial farming, shifting cultivation, fire and water pollution are all contributing factors that will impact the local populations of amphibians and reptiles.

The Rapid Biodiversity Assessment shows that the known bird fauna diversity within the study area numbers at least 107 species including several species with limited geographical ranges. 102 species were identified by transect survey and opportunistic sightings and 5 species was recorded exclusively via mist-netting.

Field identification was done using Birds of Northern South America; Vol 2 (Install *et al.* 2006), Birds of South America: Non-Passerines (Erize *et al.* 2006), and a pair of binoculars. Vocal identifications of many of the cryptic and canopy bird species were verified by using playback of pre-recorded bird songs, via an Olympus digital recorder.

26 species of mammals were recorded for the study area, comprising of 11 bat species and 15 non-volant mammals species. Two mammals recorded, the Jaguarondi (*Puma yagouaroundi*) and the Jaguar (*Panthera onca*) are classified as CITES Appendix I, and the remaining 13 species are CITES Appendix II.

## **2. Background**

### **2.1. Areas of Recognized Global, National and Local Importance to Biodiversity**

The IFC biodiversity guidelines require consideration of areas of recognized global, national or local importance to biodiversity. This includes consideration of legally protected areas, World Heritage Sites, Ramsar Sites, Important Bird Areas, Key Biodiversity Areas, Community reserves, and natural reserves, as well as ecoregional planning areas.

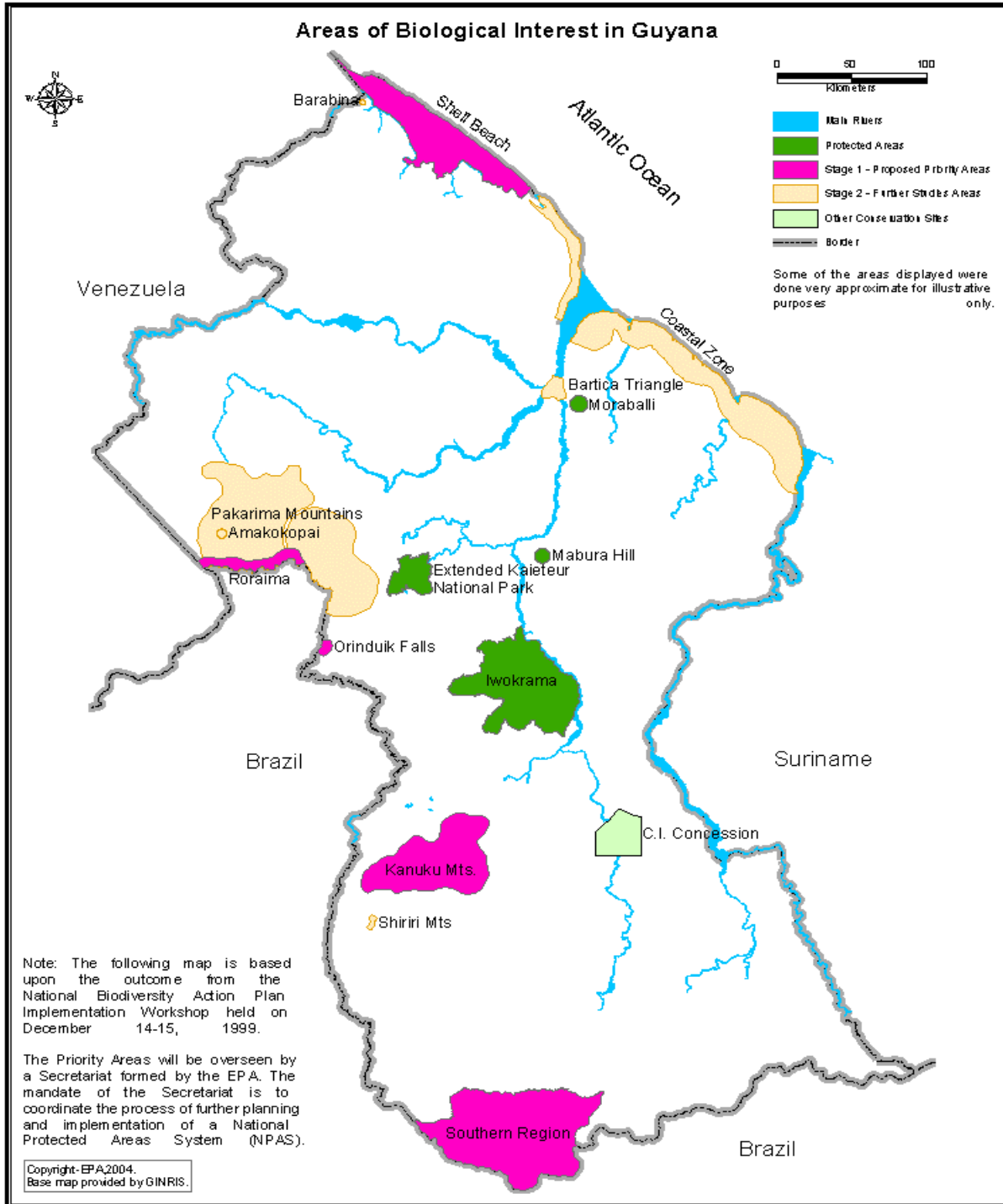
The location of Sophia Point and its surrounding areas (areas bordered by the Linden – Rockstone Road, Demerara River, Essequibo River and the Atlantic Ocean) has not been protected by the Government of Guyana (GOG) as a priority for conservation interest. The conservation initiatives in Guyana are largely focused on the larger forested landscapes of central and southern Guyana or in the Rupununi Savannas region.

According to the National Protected Areas Act, 2011, the Kaieteur National Park and the Iwokrama International Forest Reserve are the only legally protected areas in Guyana. The GOG officially proposed a protected areas system for Guyana in the National Forestry Action Plan (NFAP) in 1989. In 1999, a national workshop was held by the Environmental Protection Agency (EPA). That workshop which was sponsored by the Global Environmental Facility (GEF) on the implementation of the National Biodiversity Action Plan (NBAP) was focused on protected areas. This workshop identified five additional priority sites for conservation and inclusion in the protected area system of Guyana, in addition to the Kaieteur National Park and Iwokrama Forest Reserve which were initially proposed by the GOG. The Five additional areas identified for immediate action and labeled Phase I sites were:

- Shell Beach
- Orinduik Area
- Mount Roraima Area
- Kanuku Mountains
- Southern Guyana Region

A 2005 Global Environment Facility (GEF) proposal for the Guyana Protected Areas System, Project Phase I identified (purple coded on Figure 1) as areas of conservation interest, and the areas color-coded as ‘cream-colored’, are the Phase 2 priority areas. The proposal characterized the areas as having evidence of unique flora and fauna that are poorly studied.

An area of historical biological interest is located near the Sophia Point site: William Beebe’s Tropical Research Center at Kartabo Point – British Guiana, which was in the Bartica Triangle area which is approximately 5km downstream of the study area as is depicted in Figure 1.



**Figure 1: Priority Areas identified as part of the Protected Areas System for Guyana**



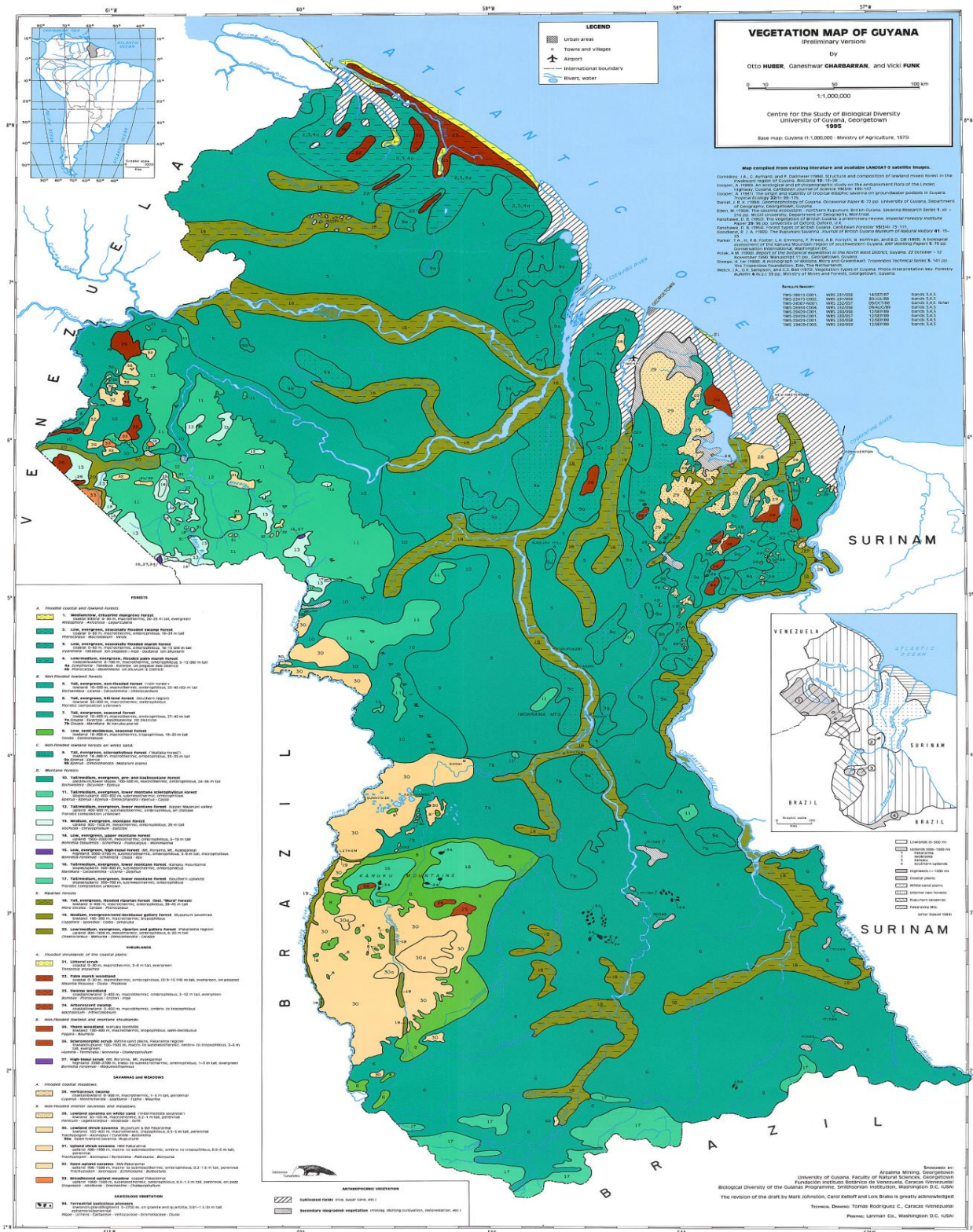


Figure 2: Vegetation Map of Guyana: The vegetation maps of Guyana which were prepared in 1995 (Figure 2) and in 2001 (Figure 3) by Hans Steege (Steege, 2001), which shows the vegetation types across the country.

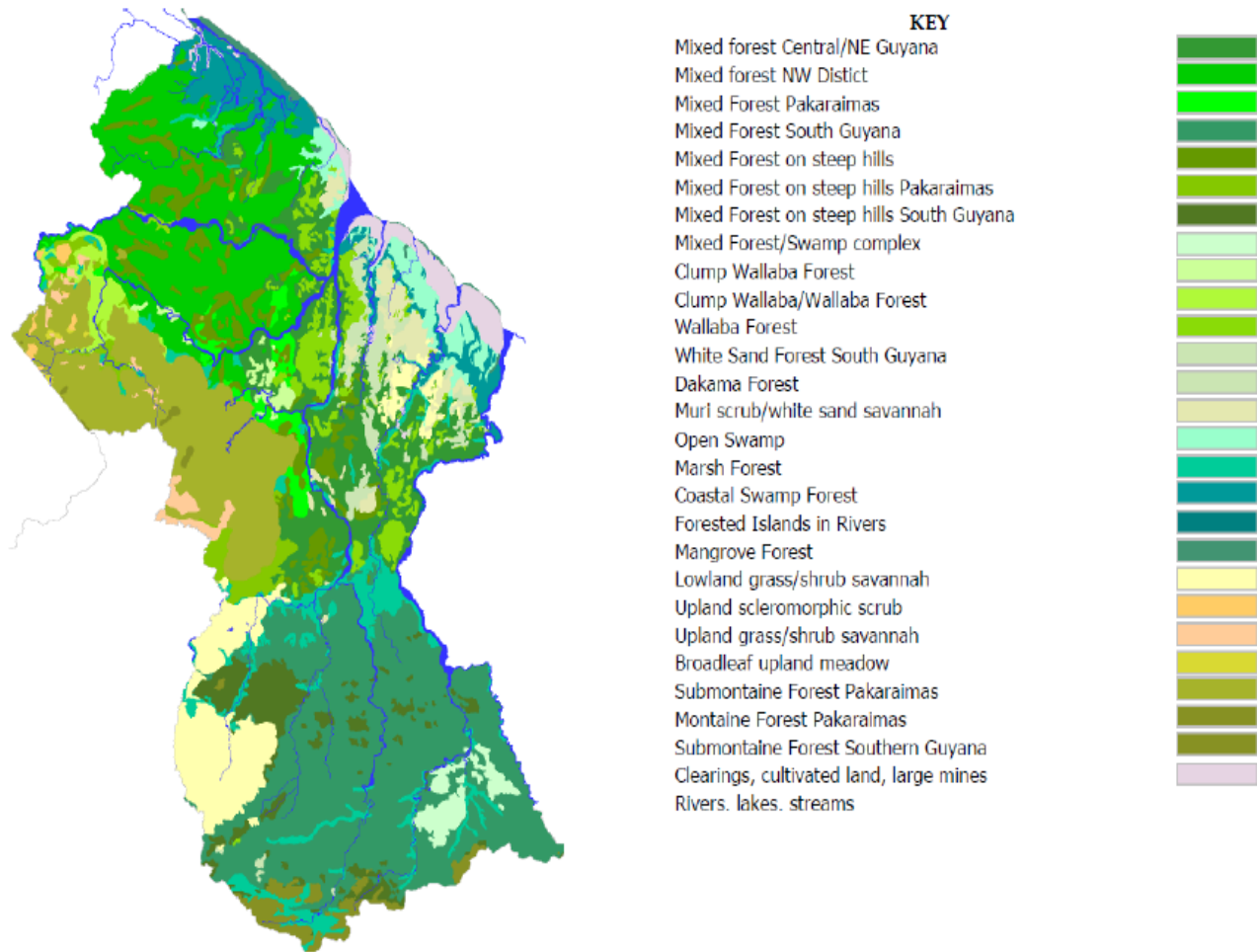


Figure 3: National Vegetation Map (Steege 2001)

Eco-regional planning was done at the level of the Guiana Shield Region in April 2002 through the “Guiana Shield Conservation Priority-setting Workshop” co-sponsored by Conservation International (CI), the Guiana Shield Initiative of the Netherlands Committee for the IUCN, the Caribbean Sub-regional resource Facility of the United Nations Development Programme (UNDP), UNDP Suriname, and UNDP Guyana.

The workshop identified a series of priority areas for biodiversity and conservation within the Guyana Shield Region. The workshop identified the Cuyuni Basin and the Waini-Shell Beach areas in the North-West District as “biological and conservation priority” areas, with the areas being included because of their importance for floristics, plant ecology, amphibians and reptiles. The workshop also established that plant ecology priority areas are relatively well distributed throughout the Guiana Shield region and because plant ecology areas are quite large, they need not be protected in their entirety to preserve and sustain the region’s biodiversity, (Steege 2003).

Guyana is not a signatory of the Ramsar Convention and has no listed Ramsar Wetland Sites, but have potentially two proposed sites, the Rupununi Wetlands comprising of the North and South savannas.

There are no officially designated areas in Guyana identified as Important Bird Areas (IBAs). However, Birdlife International has proposed a total of 10 Important Bird Areas for Guyana with an area of more than 366,600 ha or 1.7% of the country's land area. Table 1 identifies the proposed IBAs for Guyana. None of the IBAs proposed for Guyana is located near or within the concession.

**Table 1: IBA (Important Birding sites) for Guyana:**

IBA CODE	IBA NAME	ADMINISTRATIVE UNIT
1	Shell Beach	Barima-Waini
2	Karaw/Aruka	Barima-Waini
3	Ireng River	Upper Takatu-Upper Essequibo
4	North Rupununi-Karanambu Ranch	Upper Takatu-Upper Essequibo
5	Mapari-Kanuku Mountain	Upper Takatu-Upper Essequibo
6	South Central Rupununi	Upper Takatu-Upper Essequibo
7	Iwokrama	Potaro-Siparuni
8	Karasabai	Upper Takatu-Upper Essequibo
9	Northeast Coastline	Mahaica-Berbice
10	Pakaraima Mountains	Cuyuni Mazaruni

Until recently, the herpetofaunal diversity of much of Guyana had been largely unknown and was inferred primarily from studies conducted in French Guiana. Recently, however, a number of studies have shed some light on the amphibians and reptiles of Guyana (Kok and Kalamandeen, 2008; Pires, 2005; Senaris and MacCulloch, 2005; Noonan and Bonett, 2003; Kok, 2006a; Kok, 2006b; Donnelly et al, 2006).

A few species such as the *Podocnemis* river turtles and the Black Caiman (*Melanosuchus niger*) that are considered Endangered, Rare or Threatened (ERT) species, are found within the Essequibo River, but none was observed during the survey for Sophia Point area, and they are not generally known to occur in the lower Essequibo river.

The upper Essequibo, Rupununi and Rewa rivers appears to have apparently healthy populations of reptiles that are threatened elsewhere in the region, including black caiman (*Melanosuchus niger*), yellow-footed tortoise (*Chelonoidis denticulata*), yellow-spotted river turtle (*Podocnemis unifilis*) and South American river turtle (*Podocnemis expansa*) (report for EIA of SSILI, 2012).

According to Lim et al (2005), there are fifteen mammalian lowland endemic species of the Guiana Shield Region, five of which have restricted distribution occurring in areas outside of Guyana. The others are found throughout the Guiana Shield and include: *Didelphis imperfect*, *Monodelphis brevicaudata*, *Lophostoma schulzi*, *Neacamys guianae*, *Lasiurus atratus*,

*Neacomys paracou, Oecomys auyantepui, Oecomys rex, Oecomys rutilus, Spiggurus melanura, Proechimys hoplomyoides, Isothrix sinnanmariensis, Pithecia pithecia Ateles paniscus,*

Two Primate specie which is known to occur in the Sophia Point study area, *Pithecia pithecia* and *Ateles paniscus*, are lowland Guiana Shield endemics with wide distributions. Both species are listed in CITES Appendix II, while IUCN lists *Ateles paniscus* as Vulnerable. The Black Spider Monkey (*Ateles pansicus*) occurs north of the Rio Amazon, east of the Rios Negro and Branco..The Guianan Saki Monkey *Pithecia pithecia* is herbivorous and insectivorous and have been reported to thrive well in degraded forests. This species is listed as Least Concern in the IUCN Red List given its relatively wide distribution, presence in a number of protected areas, and lack of any apparent major threats.

The Checklist of the Terrestrial vertebrates of the Guiana Shield identified 3 bat species that are specifically endemic to Guyana. These are *Eptesicus andinus* from the family Vespertilionidae, *Eumops bonariensis* and *Molossus* sp, both from the family Molossidae (Hollowell and Reynolds, 2005). None of these bats were recorded by the surveys in the study area.

Three species recorded during the surveys are restricted to the Amazonian (and Guianan) lowlands north of the Amazon. These are the Black Curassaw (*Crax alector*), Spot-tailed Antwren (*Herpsilochmus sticturus*) and Silvered-beak tanager (*Ramphocelus carbo*); (Braun et al, 2000, and Hilty, 2012).

## 2.2. Flora and Fauna of the Guiana Shield Area

The Sophia Point area is located in the northern part of the Guiana Shield Region within Guyana. The Guiana Shield is located in north-eastern South America. It includes the large mountain systems that form the watershed between the Amazon and Orinoco Rivers. It covers 2.5 million km<sup>2</sup> and is bounded roughly by the Amazon River to the south, the Japaura-Caqueta River to the southwest, the Sierra de Chiribiquete to the west, the Orinoco and Guaviare Rivers to the northwest and north and the Atlantic Ocean to the East.

The Guiana Shield accounts for approximately 26% of the Amazonia tropical forests (Bovolo et al 2018). Its diverse landscapes have been recognized for their biological endemism, unique ecosystems, pristine forests and cultural diversity. Table 2 provides the estimated diversity and endemism of flora and fauna of the Guiana Shield. Figure 6 shows the location of Guyana and the RMI concession in relation to the Guiana Shield Region.

**Table 2: Estimated diversity and endemism of Guiana Shield flora and fauna**

Flora/fauna	Number of species	Number of endemic species	Percentage of total species that are endemic
Vascular Plants	20,000	7,000	35%
Birds	975	150	15%
Mammals	282	27	10%
Reptiles	280	76	27%



Amphibians	272	127	47%
Freshwater Fish	2,200	700	32%

*Table taken from Conservation Priorities for the Guyana Shield Consensus Report of 2002*

### **3. Methods and Work Programme**

#### **3.1. Animal Taxa surveyed**

Birds, Bats, non-volant mammals, reptiles, amphibians and fish were surveyed. Birds (and Bats) are excellent indicator species frequently used as surrogate measures of overall biodiversity and/or ecosystem health (Clarke et al. 2012; Ridgley & Agro. 1998). Amphibians are reliable indicators of environmental pollution as their moist, porous skins makes them vulnerable to water-borne toxins and infections and their complex (bi-phasic) life cycle makes them susceptible to changes in environmental quality. Fish are good indicator taxa, showing rapid responses to anthropogenic terrestrial modifications that alter the physical and chemical characteristics of waterways. The presence of ERT species and key indicator species can provide indications of any long term trends caused by significant anthropogenic changes in the area such as access road construction, commercial infrastructure developments and operation. Accidental introduction of alien (invasive) species were also recorded in the biodiversity monitoring exercises.

#### **3.2. Terrestrial Transects and the main vegetation within the study area**

The transects follows the boundary line for over 1km through predominantly clayey soils along with sporadic outcroppings of brown sand and clay. General topography along this transect is undulating, with some steep ravines and lateritic slopes. The second transect is the trail from the yard to the boundary line, which is approximately 600 meters, and passes through tidal swampy areas and upwards unto a hill where it intercepts the boundary line. The entire area is basically heavily forested, with the exception of the homestead compound. The vegetation types can be classified as predominantly Mora Mixed Forest type in the low-lying sections; Mora excels, Trysil, Manni, Aromata, Manicole Palm, Lu Palm, Turu Palm, Koerite Palms, Duka, and Swamp Dalli. While, on the hills/higher grounds, it's a Wallaba mixed evergreen forest of predominantly Soft Wallaba, Greenheart, Suya, with the canopy dominated by Soft Wallaba, Morabukea, Mora, Clump Wallaba, Soft Wallaba, Parakusan, Yarula, and Sand Baromalli. Some of the trees species within forested section of the transect included; Apokaito, Black Kakaralli, Mora Excelsa, Futui, Guava-skin Kakaralli, Common Baromalli, and Turu Palm. The understory vegetation comprises mainly of young saplings of canopy species, Yari-Yari, Bactris Palms, Mukhru, Melastomes, several species of aeroids, and herbaceous plants and lianas. The understory vegetation is dominated by Yari-yari (*Guatteria atra*), Bloodwood (*Vismia* spp.), Congo-pump (*Cecropia* spp.), Monkey Ladder (*Bauhinia* sp.) and other woody vines, and saplings of canopy species and several species of herbaceous plants. The canopy height is approximately 35 – 50m.

#### **3.3. Methods for Surveying Animal Taxa**

### 3.3.1. Amphibians and Reptiles

Surveys were conducted along each transect twice; between 0900 hrs – 1200 hrs and 1800 hrs - 2100 hrs. Visual Encounter Surveys (VES) were used to sample amphibians and reptiles; whereas Auditory Encounter Surveys (AES) were also used to sample and identify frogs. Opportunistic sightings of amphibians and reptiles encountered outside of transect sites were also recorded. All individuals observed were photographed whenever possible.

No collection of herpefauna specimens was done during this survey exercise.

Generally two transects was established within the study area, on which the surveys were conducted, with a focus on micro-habitats and habitat-patches for the reptiles and amphibians.

### 3.3.2. Birds

Two main methods were used to sample birds: VES/AES along transects and mist-netting. Birds observed via VES and/or their vocalizations (AES) were recorded along the established transects, and opportunistically around the house grounds. Birds were identified to species using checklists and field guides for the birds of Guyana and the Neotropics (Hilty, 2001; Braun et al. 2007). Opportunistic sightings of birds encountered outside of transect sites were also recorded.

### 3.3.3. Mammals

Surveys were conducted along each transect twice; between 0900 hrs – 1200 hrs and 1800 hrs - 2100 hrs. Mammals were recorded via VES and AES. Indirect evidence was also used to detect non-volant mammals and included tracts, trails, scat, burrows, feeding ground, prey remains and other cues such as scratches on trees. During nocturnal surveys mammals were detected by their eye shine. The presence of Tapir, Jaguar and Ocelot, within the TRGI area were only determined through indirect evidence.

### 3.3.4. Fish

The aquatic survey was undertaken around the clock to ensure both diurnal and nocturnal fish species were captured. Also, all sampling methods possible were executed to ensure that both large and small species were captured and recorded, including:

Hook and line- Hook and line were used and the fish bait used included earth-worms, flour baits, and chicken skin baits, and gillnets were set throughout the days and nights.

## 3.4. Photography

To document the fauna, the areas surveyed, and the survey methods, a digital still camera was used, in addition to try and possibly photograph as many species encountered as well as the representative habitats.

## 3.5. Survey Team

The members of the fauna survey team are outlined below:

Waldyke Prince (WP) - Team Leader, Wildlife Biologist and Naturalist Tour-guide. WP is a graduate from the University of Guyana and has spent the past 27 years as a field oriented naturalist and has over eleven (11) years' experience working at the Iwokrama International Centre for Rainforest Conservation.

Dave Rovindra (DR) – Research Assistant. DR is a graduate from the University of Guyana, and was the field assistant to Devya Hemraj, acquiring experience in field biology.

Devya Hemraj (DH) – Wildlife Biologist. DH is a graduate from the University of Guyana, with 4 years' experience in field biology, research and aquatic biological surveys.

The team divided the report collation between land and aquatic results which is reflected in the structure of this report.

**Table 3: Schedule of Field Work**

Date	Activities
August 16, 2019	The Biological Team departed GTown at around 3pm-ish and departed Parika for Bartica at 5:30pm, arriving at Bartica at 6:20pm and checked into the Palm Springs Hotel.
August 17, 2019	<p>After breakfast at the hotel, the team shopped for supplies, and some equipment, including batteries etc to facilitate the RBA.</p> <p>Desmond, the caretaker for Sophia Point was given cash to purchase gasoline for the outboard motor and to buy a few minor items. We departed Bartica and arrived at Sophia Point at mid-morning.</p> <p>Convectional afternoon rainfall occurred.</p> <p>After lunch, the team sorted and set up the equipment, and mistnets was set up for Bat survey (2 species were observed via mistnets).</p> <p>The Birds and Herps surveys was done right within the compound of the yard, since it took some time to cut to fully establish the mistnets.</p> <p>WP, DH and Dave worked as a team for this day.</p>
August 18, 2019	<p>It rained for most of the night into the early morning.</p> <p>After breakfast and preparing packed lunch, the team departed with Desmond into the forest to hike the Perimeter of the area and set up camera traps and establish mist-netting sites for the understory birds survey.</p> <p>The boundary line was established as 1 transect, while the trail from the compound to the boundary trail (perpendicular to the perimeter) can be considered as a second transect. VES/AES surveys was done on these transects for birds, herps and mammals.</p> <p>The boundary line was very undulating, with some steep slopes and ravines in some sections, and other sections very swampy and inundated by the high tide.</p> <p>Devya and Dave fished today using several methods and they set out gillnets to overnight. They also checked gill-net that Desmond have set out to catch fish for his own consumption.</p> <p>Nocturnal survey was done for herps and mist-netting for bats.</p> <p>Today, 4 species of birds was caught and 3 species of bats was caught in the mist-nets.</p>
August 19, 2019	<p>Mist-nets for the birds was opened before 7am (and closed at noon), and VES/AES survey was done on 1 transect for birds, herps and mammals.</p> <p>Desmond worked along with Wally as his field assistant.</p> <p>No mist-netting was done in the afternoon, since it poured heavily from 3:15pm – 5:47pm.</p>

Date	Activities
	<p>About 15 species of birds was caught in the mist-nets today.</p> <p>Devya and Dave fished for most of the day.</p> <p>Nocturnal survey was conducted for herps and mist-netting for bats.</p>
August 20, 2019	<p>It rained last night.</p> <p>The mist-nets for birds was opened before 7am, and VES/AES surveys for birds, herps and mammals was done on a section of the boundary line. Only 1 species of bird was caught in the mist-net today.</p> <p>Devya and Rovindra checked the gill-nets for fish and collected the nets to be packed.</p> <p>Devya &amp; Rovindra took down the bat nets, while Wally conducted a morning VES/AES for the birds, herps and mammals.</p> <p>All the equipment was packed and the RBA team departed for Batica after lunch, and onwards to Gtown.</p>

## 4. Results and Discussion

### 4.1. Amphibians and Reptiles:

Surveys of amphibians and reptiles at Sophia Point area recorded anurans (frogs & toads) and lizards. Snakes, crocodylians. Tortoises (*Geochelone* spp.) and *Amphisbaenas* were not recorded during this survey. But they are found within the boundary of the property (pers. comm. Desmond the Caretaker).

A total of ten (10) species of amphibians representing four (4) families. Four species belonging to the Hylidae, 2 species of Bufonidae and 1 specie each for Centrolenidae and Dendrobatidae.

Seven (7) species of lizards representing four (4) families were recorded for this rapid survey. Interviewing Desmond the Caretaker, provided additional information on other reptiles such as Geochelonian tortoises, Boidae, Viperidae and Elapidae snakes, which are Boas, pit-vipers and coral snakes respectively.

**Table 4 – Amphibians recorded:**

FAMILY	COMMON NAME	SPECIES NAME	2019 RBA
Bufonidae	Marine Toad	<i>Rhinella marinus</i>	x
Bufonidae	South American Common Toad	<i>Rhinella typhonius</i>	x
Centrolenidae	Glass Frog	<i>Cochranella</i> spp.	x
Dendrobatidae	Poison Dart Frog	<i>Ameerega hahneli</i>	x
Hylidae	Gladiator Tree-Frog	<i>Hypsiboas boans</i>	x
Hylidae	Map Tree-Frog	<i>Boana geographica</i>	x
Hylidae	White Tree-Frog	<i>Dendropsophus leucophyllatus</i>	x
Hylidae	Tree-frog	<i>Scinax</i> spp.	x
Hylidae	slender-legged' Tree-Frog	<i>Osteocephalus</i> spp 1	x
Hylidae	Manaus Slender-legged' Tree-Frog	<i>Osteocephalus taurinus</i>	x



**Table 5 – Reptiles recorded:**

FAMILY	COMMON NAME	SPECIES NAME	2019 RBA
Sphaerodactylidae	Dwarf Gecko	<i>Gonatodes annularis</i>	x
Gekkonidae	Gecko	<i>Gonatodes spp1.</i>	x
Gekkonidae	Turnip-tailed Gekko	<i>Thecadactylus rapicauda</i>	x
Teiidae	Green Garden Lizard	<i>Ameiva ameiva</i>	x
Teiidae	Striped Forest Whiptail Lizard	<i>Kentropyx calcarata</i>	x
Teiidae	Golden Tegu Lizard	<i>Tupinambis teguixin</i>	x
Iguanidae	Brown Tree Climber	<i>Uronascodon supersilius</i>	x

#### 4.2. Birds

In total, one hundred and seven (107) species of birds representing (32) families were recorded collectively via VES/AES, mist-netting surveying methods and opportunistic sightings (see Table 6 and 7). VES and opportunistic sightings are biased towards large, conspicuous and brightly coloured birds (e.g. Psittacidae and Ramphastidae); whereas mist-netting are especially suitable for the detection of very cryptic species e.g. understory flycatchers, hummingbirds and other less vocal species.

Twenty species was caught via mist-netting of which five (5) species was recorded exclusively via this method, and these two species; *Cyanocompsa cyanoides* and *Conopophaga aurita* added 2 more families to 30 observed via the transect surveys.

The Tyrannidae family (flycatchers) were the most abundant family recorded with nineteen (19) species of that family being recorded. Fourteen and nine species each of the Thamnophilidae family (antbirds, antshrikes and antwrens), and Thraupidae family (tanagers) each and seven species of the Psittacidae family (parrots & macaws) were recorded.

The least abundant families recorded during this survey were the Alcedinidae (Kingfisher), Cardinalidae (cardinals and grosbeaks), Strigidae (owls), Caprimulgidae (nighthawks & nightjars), Bucconidae (puffbirds), Nyctibidae (potoos), Apodidae ((swifts), Laridae (terns), Formicariidae (antthrushes), Polioptilidae (Gnatwren), Euphonidae (euphonias), Troglodytidae (wrens) and Falconidae (falcons, kites, caracaras) with only one species of each family being recorded. The Barred Forest Falcon (*Micrastur ruficollis*) was the only raptor observed during this survey.

Opportunistic sighting during this survey was species and individuals that was observed from the yard, outside of the transect surveys. Thirty-five (35) species was recorded exclusively via this method.

**Table 6 - Bird species (10) recorded during the survey that is distributed exclusively north of the Amazon River.**

Black Curassow ( <i>Crax alector</i> )
Caica Parrot ( <i>Gypopsitta caica</i> )
Green Aracari ( <i>Pteroglossus viridis</i> )
Guianan Toucanet ( <i>Selenidera culik</i> )
Chestnut-rumped Woodcreeper ( <i>Xiphorhynchus pardalotus</i> )
Spot-tailed Antwren ( <i>Herpsilochmus sticturus</i> )
Todd's Antwren ( <i>Herpsilochmus stictocephalus</i> )
Guianan Warbling Antbird ( <i>Hypocnemis cantator</i> )
Cayenne Jay ( <i>Cyanocorax cayanus</i> )
Silver-beaked Tanager ( <i>Ramphocelus carbo</i> )

Avian species encountered during the survey are widely distributed within the lowland habitats of Guyana, and the Guiana Shield. No endangered or critically endangered species or migratory species were recorded in the surveys.

**Table 7 – Birds' transect survey data:**

TAXA			Sophia Point RBA		
FAMILY NAME	Scientific Names	Common name	SP - Trns	SP - Opp	Total
Tinamidae	<i>Tinamus major</i>	Great Tinamou	1	1	2
Cracidae	<i>Penelope jacquacu</i>	Spix's Guan	2		2
Cracidae	<i>Crax alector</i>	Black Curassow		1	1
Cracidae	<i>Ortalis motmot</i>	Rufous-vented Chacalaca	3		3
Laridae	<i>Phaetusa simplex</i>	Large-billed Tern		1	1
Strigidae	<i>Megascops watsonii</i>	Tawny-bellied Screech-Owl		1	1
Falconidae	<i>Micrastur ruficollis</i>	Barred Forest-Falcon	1		1
Nyctibidae	<i>Nyctibeus grandis</i>	Great Potoo		1	1
Columbidae	<i>Patagioenas subvinacea</i>	Ruddy Pigeon	2		2
Columbidae	<i>Leptotila rufaxilla</i>	Gray-fronted Dove	1		1
Columbidae	<i>Geotrygon montana</i>	Ruddy Quail-Dove	1		1
Psittacidae	<i>Ara ararauna</i>	Red-and-Green Macaw		2	2
Psittacidae	<i>Orthopsittaca manilatus</i>	Red-bellied Macaw		4	4
Psittacidae	<i>Amazona amazonica</i>	Orange-winged Parrot	2	43	45
Psittacidae	<i>Pionus menstruus</i>	Blue-headed Parrot	4		4
Psittacidae	<i>Pionopsitta caica</i>	Caica Parrot	2		2
Psittacidae	<i>Brotogeris chrysoptera</i>	Golden-winged Parakeet		2	2
Psittacidae	<i>Touit batavicus</i>	Lilac-tailed Parrotlet		30	30

Apodidae	<i>Chaetura spinicaudus</i>	Band-rumped Swift	3		3
Caprimulgidae	<i>Nyctidromus albicollis</i>	Common Parakee		2	2
Bucconidae	<i>Chelidoptera tenebrosa</i>	Swallow-wing Puffbird		3	3
Trochilidae	<i>Phaethornis ruber</i>	Reddish Hermit	1		1
Trochilidae	<i>Phaethornis bourcieri</i>	Straight-billed Hermit	1		1
Trochilidae	<i>Florisuga mellivora</i>	White-necked Jacobin		1	1
Trochilidae	<i>Thalurania furcate</i>	Fork-tailed Woodnymph	1		1
Trochilidae	<i>Campylopterus largipennis</i>	Grey-breasted Sabrewing	1	1	2
Trochilidae	<i>Amazilia leucogaster</i>	Plain-bellied Emerald	1		1
Trogonidae	<i>Trogon violaceus</i>	Guianan Trogon	2		2
Trogonidae	<i>Trogon rufus</i>	Black-throated Trogon	2		2
Trogonidae	<i>Trogon viridis</i>	Green-backed Trogon	1	1	2
Corvidae	<i>Cyanocorax cayanus</i>	Cayenne Jay		5	5
Alcedinidae	<i>Megaceryle torquata</i>	Ringed Kingfisher		1	1
Alcedinidae	<i>Chloroceryle americana</i>	Green Kingfisher		1	1
Ramphastidae	<i>Ramphastos tucanus</i>	White-throated Toucan	2		2
Ramphastidae	<i>Ramphastos vitellinus</i>	Channel-billed Toucan	2		2
Ramphastidae	<i>Selenidera culik</i>	Guianan Toucanet	3		3
Ramphastidae	<i>Pteroglossus aracari</i>	Black-necked Aracari	4		4
Ramphastidae	<i>Pteroglossus viridis</i>	Green Aracari	3		3
Dendrocolaptidae	<i>Xiphorhynchus guttatus</i>	Buff-throated Woodcreeper	2		2
Dendrocolaptidae	<i>Xiphorhynchus obsoletus</i>	Striped Woodcreeper		1	1
Dendrocolaptidae	<i>Glyphorhynchus spirurus</i>	Wedge-billed Woodcreeper	2		2
Dendrocolaptidae	<i>Xiphorhynchus pardalotus</i>	Chestnut-rumped Woodcreeper	1		1
Picidae	<i>Campephilus melanoleucos</i>	Crimson-crested Woodpecker		2	2
Picidae	<i>Melanerpes cruentatus</i>	Yellow-tufted Woodpecker		3	3
Picidae	<i>Piculus flavigula</i>	Yellow-throated Woodpecker	2		2
Picidae	<i>Celeus elegans</i>	Chestnut Woodpecker	1		1
Picidae	<i>Celeus torquatos</i>	Ringed Woodpecker		1	1
Thamnophilidae	<i>Herpsilochmus stictocephalus</i>	Todd's Antwren	2		2
Thamnophilidae	<i>Herpsilochmus sticturus</i>	Spot-tailed Antwren	2		2
Thamnophilidae	<i>Myrmotherula menestriesii</i>	Gray Antwren	2		2
Thamnophilidae	<i>Myrmotherula axillaris</i>	White-flanked Antwren	2		2

Thamnophilidae	<i>Myrmotherula longipennis</i>	Long-winged Antwren	2		2
Thamnophilidae	<i>Cercomacra cinerascens</i>	Gray Antbird	2		2
Thamnophilidae	<i>Cercomacra tyrannina</i>	Dusky Antbird	2		2
Thamnophilidae	<i>Sclateria naevia</i>	Silvered Antbird	2		2
Thamnophilidae	<i>Hypocnemis cantator</i>	Guianan Warbling Antbird	2		2
Thamnophilidae	<i>Hypocnemoides melanopogon</i>	Black-chinned Antbird	2		2
Thamnophilidae	<i>Thamnomanes ardesiacus</i>	Dusky-throated Antshrike	2		2
Thamnophilidae	<i>Thamnophilus murinus</i>	Mouse-colored Antshrike	2		2
Thamnophilidae	<i>Cymbilaimus lineatus</i>	Fasciated Antshrike	2		2
Thamnophilidae	<i>Frederickena viridis</i>	Black-throated Antshrike	2		2
Formicariidae	<i>Myrmothera campanisoma</i>	Thrush-like Antpitta		1	1
Tyrannidae	<i>Lophotriccus galeatus</i>	Helmented Pygmy-Tyrant	2		2
Tyrannidae	<i>Myiornis ecaudatus</i>	Short-tailed Pygmy-Tyrant	2		2
Tyrannidae	<i>Lophotriccus vitiensis</i>	Double-banded Pygmy-Tyrant	2		2
Tyrannidae	<i>Tolmomyias assimilis</i>	Zimmer's Flycatcher	2		2
Tyrannidae	<i>Pitangus sulphuratus</i>	Great Kiskadee		5	5
Tyrannidae	<i>Tyrannus melancholicus</i>	Tropical Kingbird	3		3
Tyrannidae	<i>Tyrannus savanna</i>	Fork-tailed Flycatcher		1	1
Tyrannidae	<i>Myiodynastes maculatus</i>	Streaked Flycatcher		1	1
Tyrannidae	<i>Platyrinchus coronatus</i>	golden-crowned spadebill	1		1
Tyrannidae	<i>Zimmerius gracilipes</i>	Guianan Tyrannulet	2		2
Tyrannidae	<i>Tyrannulus elatus</i>	Yellow-crowned Tyrannulet		1	1
Tyrannidae	<i>Ornithion inerme</i>	White-lored Tyrannulet	2		2
Tyrannidae	<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher		3	3
Tyrannidae	<i>Mionectes oleagineus</i>	Ochre-bellied Flycatcher	1		1
Tyrannidae	<i>Tityra cayana</i>	Black-tailed Tityra		2	2
Tyrannidae	<i>Attila spadiceus</i>	Bright-rumped Attila	1		1
Tyrannidae	<i>Rhytipterna simplex</i>	Grayish Mourner	1		1
Cotingidae	<i>Querula purpurata</i>	Purple-throated Fruitcrow	4		4
Pipridae	<i>Pipra pipra</i>	White-crowned Manakin		2	2
Pipridae	<i>Pipra erythrocephala</i>	Golden-headed Manakin	2	1	3
Pipridae	<i>Shiffornis turdina</i>	Thrush-like Shiffornis	1		1
Vireonidae	<i>Virolanius leucotis</i>	Slaty-capped Shrike-Vireo	1		1



Vireonidae	<i>Hylophilus musicicapinus</i>	Buff-cheeked Greenlet	2		2
Vireonidae	<i>Hylophilus pectoralis</i>	Ashy-headed Greenlet	2		2
Hirundinidae	<i>Tachycineta albiventer</i>	White-winged Swallow *		1	1
Troglodytidae	<i>Henicorhina leucosticte</i>	White-breasted Wood Wren	2		2
Troglodytidae	<i>Campylorhynchus griseus</i>	Buff-breasted Wren *	2		2
Poliopitilidae	<i>Ramphocaenus melanurus</i>	Long-billed Gnatwren	2		2
Thraupidae	<i>Thraupis palmarum</i>	Palm Tanager		3	3
Thraupidae	<i>Thraupis episcopus</i>	Blue-grey Tanager		2	2
Thraupidae	<i>Coereba flaveola</i>	Bananaquit		2	2
Thraupidae	<i>Tachyphonus surinamus</i>	Fulvous-crested Tanager	2		2
Thraupidae	<i>Ramphocelus carbo</i>	Silver-beaked Tanager		2	2
Thraupidae	<i>Cyanerpes caeruleus</i>	Purple Honeycreeper	4		4
Thraupidae	<i>Chlorophanes spiza</i>	Green Honeycreeper	3		3
Thraupidae	<i>Dacnis cayana</i>	Blue Dacnis		2	2
Euphonidae	<i>Euphonia violacea</i>	Violaceous Euphonia	2	2	4
Icteridae	<i>Icterus cayanensis</i>	Moriche Oriole		2	2
Icteridae	<i>Psarocolius decumanus</i>	Crested Oropendola		2	2
Icteridae	<i>Psarocolius viridis</i>	Green Oropendola		2	2
<b>Number of Individuals</b>			<b>130</b>	<b>145</b>	<b>275</b>
<b>Species Richness</b>			<b>67</b>	<b>35</b>	<b>102</b>

**Table 8 – Bird mist-netting data:**

TAXA			
Family Name	Scientific Name	Common Name	Total
Columbidae	<i>Geotrygon montana</i>	Ruddy Quail-Dove	1
Pipridae	<i>Pipra erythrocephala</i>	Golden-headed Manakin	2
Trochilidae	<i>Campylopterus largipennis</i>	Gray-breasted Sabrewing	1
Alcedinidae	<i>Chloroceryle aenea</i>	American Pygmy Kingfisher **	1
Thamnophilidae	<i>Thamnomanes ardesiacus</i>	Dusky-throated Antshrike	3
Thamnophilidae	<i>Myrmotherula axillaris</i>	White-flanked Antwren	1
Thamnophilidae	<i>Myrmotherula longipennis</i>	Long-winged Antwren	?
Conopophagidae	<i>Conopophaga aurita</i>	Chestnut-belted Gnatcatcher **	1
Tyrannidae	<i>Pitangus sulphuratus</i>	Great Kiskadee	1
Tyrannidae	<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher	1
Tyrannidae	<i>Mionectes macconnelli</i>	McConnell's Flycatcher **	1

Tyrannidae	<i>Mionectes oleagineus</i>	Ochre-bellied Flycatcher	1
Tyrannidae	<i>Myiobius barbatus</i>	Whiskered Flycatcher **	1
Tyrannidae	<i>Rhytipterna simplex</i>	Grayish Mourner	1
Cotingidae	<i>Lipaugus vociferans</i>	Screaming Piha	1
Dendrocolaptidae	<i>Glyphorhynchus spirurus</i>	Wedge-billed Woodcreeper	1
Dendrocolaptidae	<i>Xiphorhynchus pardalotus</i>	Chestnut-rumped Woodcreeper	1
Thraupidae	<i>Ramphocelus carbo</i>	Silver-beaked Tanager	1
Euphonidae	<i>Euphonia violacea</i>	Violaceous Euphonia	1
Cardinalidae	<i>Cyanocompsa cyanoides</i>	Blue-Black Grosbeak **	2
<b>Number of Individuals</b>			<b>23</b>
<b>Species Richness</b>			<b>20</b>

Note: species with \*\* was recorded exclusively via mist-netting

### 4.3. Mammals

#### 4.3.1. Non-volant Mammals:

The Sophia Point rapid biodiversity survey recorded a total of 15 non-volant mammal species representing eleven families and eight (8) Orders (see Table 8). Mammal species of international conservation concern recorded at Sophia Point included *Panthera onca* (IUCN listed as Near Threatened), *Puma concolor* (IUCN listed as Near Threatened), *Puma yagouaroundi* (IUCN listed as Near Threatened), *Tapirus terrestris* (IUCN listed as Vulnerable), *Ateles paniscus* (IUCN listed as Vulnerable) and *Aloutta seniculus* (IUCN listed as Least Concern).

The most abundant families recorded during this survey, were Cebidae and Felidae which were represented by three (3) species each. The remaining families, Didelphidae, Tapiridae, Agoutidae, Cervidae, Tayassuidae, Procyonidae, Dasypodidae, Dasyproctidae and Myrmecophagidae with each being represented by a single species.

Eleven species was recorded via camera traps, of which six species including the Felidae (cats), Myrmecophagidae (tamandua, anteaters), Procyonidae (coati mundi, raccoons) and Didelphidae (opossums) were recorded exclusively by this method.

No critically endangered non-volant mammal species were recorded in this survey.

**Table 9 – Non-volant Mammals survey data:**

TAXA				Sophia Point RBA		
ORDER	Family Name	Scientific Names	Common Name	SP - Trns	SP - Cam	Total
PRIMATES	Cebidae	<i>Cebus olivaceus</i>	Wedge-capped Capuchin	x		
PRIMATES	Cebidae	<i>Aloutta seniculus</i>	Red Howler Monkey	x		
PRIMATES	Cebidae	<i>Ateles paniscus</i>	Black Spider Monkey	x		
DIDELPHIMORPHIA	Didelphidae	<i>Philander sp.</i>	Opossum		P	1
CINGULATA	Dasypodidae	<i>Dasypus novemcinctus</i>	Nine-banded Armadillo	x	P	1
RODENTIA	Dasyproctidae	<i>Dasyprocta leporina</i>	Red-rumped Agouti	x	P	2

RODENTIA	Agoutidae	<i>Agouti paca</i>	Paca (Labba)	x	P	2
ARTIODACTYLA	Cervidae	<i>Mazama americana</i>	Red Brocket Deer	x	P	1
ARTIODACTYLA	Tayassuidae	<i>Tayassu sp.</i>	Peccary	x		
CARNIVORA	Procyonidae	<i>Nasua nasua</i>	Coatimundi		P	1
CARNIVORA	Felidae	<i>Puma yagouaroundi</i>	Jaguarundi		P	1
CARNIVORA	Felidae	<i>Puma concolor</i>	Puma		P	1
CARNIVORA	Felidae	<i>Panthera onca</i>	Jaguar		P	1
PILOSA	Myrmecophagidae	<i>Tamandua tetradactyla</i>	Southern Tamandua		P	1
PERISSODACTYLA	Tapiridae	<i>Tapirus terrestris</i>	Tapir	x	P	1

Note: P means photographed by the camera-traps.

#### 4.3.2. Bats

The Sophia Point rapid biodiversity survey recorded a total of 12 individuals representing eight genera and 2 families; Emballonuridae and Phyllostomidae, with the later having individuals from 4 of its sub-families (see Table 9). Eight of the species recorded was identified to species level. The genera recorded included the Carollia, Artibeus, Anoura, Sturnira, Glossophaga, Rhynchonycteris, Micronycteris and Saccopteryx, with 2 species of Emballonuridae and 9 species of Phyllostomines (Leaf-nosed bats). The conservation status of the bats recorded during the surveys was assessed via the IUCN Red List. All of the bat species identified during the surveys were assessed as least concern by the IUCN.

**Table 10 – Bats survey data:**

TAXA			Sophia Point RBA			
Family Name	Scientific Name	Common Name	Night 1	Night 2	Night 3	Total
Emballonuridae	<i>Saccoteryx bilineata</i>	Greater Sac-winged Bat	1			1
Stenodermatinae (SF)	<i>Artibeus sp1.</i>	fruit Bat	1			1
Stenodermatinae (SF)	<i>Artibeus obscurus</i>	Dark fruit-eating Bat		1	1	2
Stenodermatinae (SF)	<i>Artibeus concolor</i>	Brown fruit-eating Bat			1	1
Stenodermatinae (SF)	<i>Artibeus planirostris</i>	Flat-faced fruit-eating Bat			1	1
Emballonuridae	<i>Rhynchonycteris naso</i>	Long-nosed River Bat		1		1
Phyllostomidae	<i>Micronycteris daviesi</i>	Davie's Big-eared Bat		1		1
Glossophaginae (SF)	<i>Anoura sp.</i>	Nectar-feeding' Bat			1	1
Carollinae (SF)	<i>Carollia sp.</i>	Short-tailed' Bat			1	1
Stenodermatinae (SF)	<i>Sturnira lilium</i>	Little Yellow-shouldered Bat			1	1
Glossophaginae (SF)	<i>Glossophaga soricina</i>	Pallas's Long-tongued Bat			1	1
<b>Number of Individuals</b>			<b>2</b>	<b>3</b>	<b>7</b>	<b>12</b>
<b>Species Richness</b>			<b>2</b>	<b>3</b>	<b>7</b>	<b>11</b>

Note: SF means sub-family

#### 4.4. Terrestrial Macro-invertebrates:

The terrestrial macro-invertebrates were not formally surveyed, and thus there was no methodology for the group.

The team approach towards recording the macro-invertebrates, was to take note of any Visual observation of this faunal group. Hence, observations along the main transects and around the yard was done during the day and night for any ground dwelling, flying and perching macro-invertebrates.

Terrestrial-macro invertebrates recorded during the survey were classified to the Order taxa, due to the difficulty of identifying and classifying invertebrates to the species level.

This survey recorded 16 orders of terrestrial macro-invertebrates. The most abundant terrestrial macro-invertebrates encountered Lepidoptera and Diptera, Isoptera, Araneae, Odonata, and Hymenoptera. Orders such as Mantodea, Scorpiones and Lithobiomorpha were the least abundant observed. Insects are very abundant within the study area and the abundance of insects may be related to the number of plants that were either fruiting or flowering during the survey.

**Table 11 - macro-invertebrates Orders' observed during the survey:**

Vernacular Name	Macro-invertebrate Order
Mites and Ticks	Acari
Spiders	Araneae
Cockroaches	Blattidea
Centipedes	Lithobiomorpha
Beetles	Coleoptera
Millipedes	Callipodida
True Flies	Diptera
True Bugs	Hemiptera
Bees, Wasp and Ants	Hymenoptera
Termites	Isoptera
Butterflies, moths and skippers	Lepidoptera
Praying Mantis	Mantodea
Dragon and Damselflies	Odonata
Grasshoppers, locusts, crickets and katydids	Orthoptera
Scorpions	Scorpiones
Earth-worms	Haplotaxida

## 5. Species of International Conservation Concern

Four (4) of the mammal species recorded are listed in the IUCN Red List. Two species are CITES Appendix I listed while 10 species are CITES Appendix II listed, including two primate species that occurs within the study area, but was not recorded during this survey. Table 9 provides a



summary of the mammal species of international concern recorded by the surveys within this concession.

**Table 12: Mammal Species of International Concern recorded during this survey**

<b>SPECIES</b>	<b>COMMON NAMES</b>	<b>IUCN Classification</b>	<b>CITES CLASSIFICATION</b>
<i>Puma yagouaroundi</i>	Jaguarundi	Least Concern	I: Species in danger of extinction that are, or that can be affected by trade
<i>Panthera onca</i>	Jaguar	Near Threatened	I: Species in danger of extinction that are, or that can be affected by trade
<i>Puma concolor</i>	Puma	Least Concern	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Mazama Americana</i>	Red Brocket	Data Deficient	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Tayassu pecari</i>	White-lipped Peccary	Vulnerable	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Tamandua tetradactyla</i>	Southern Tamandua	Least Concern	II: Species in danger of extinction that are, or that can be affected by trade
<i>Tapirus terrestris</i>	Brazilian Tapir	Vulnerable	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Alouatta macconnelli</i>	Guianan Red Howler Monkey	Least Concern	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Ateles paniscus</i>	Black Spider Monkey	Vulnerable	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Cebus olivaceus</i>	Weeper Capuchin	Least Concern	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Pithecia pithecia</i>	Guianan Saki Monkey *	Least Concern	II: species that are not currently in danger of extinction, but may become so in the future.
<i>Saimiri sciureus</i>	Common Squirrel Monkey *	Least Concern	II: species that are not currently in danger of extinction, but may become so in the future.

**Note:** Species \*; Guianan Saki Monkey and Common Squirrel Monkey are both found with the study area (Desmond pers.comm)

No critically endangered mammals are known to occur in Guyana. The only endangered mammal listed by the IUCN for Guyana is the Giant Otter (*Pteronura brasiliensis*), which was not recorded in this survey, but is known from the Essequibo River and its upper tributaries.

## 6. Aquatic Diversity

### 6.1. Habitat description

### 6.1.1. Aquatic Sampling Site 1

This aquatic sampling site is located in close proximity to the Main house. During the low tide this site is an independent pond, however, while the water is high, it is connected to the main channel. The depth of the water body was 0.2m at its shallowest point and 1m at its deepest point. Surrounding the pond is primarily grass while the channel was composed of leaf litter and clay. In general, this sample site was noted to natural. During the period of sampling the weather was mostly sunny with a light rain.

### 6.1.2. Aquatic Sampling Site 2

This aquatic sampling site is on the Essequibo river with a sampling length of 200m. This water body type was considered a brackish stream. Canopy cover above the edges of the stream. During this sampling time, it was primarily overcast with heavy rain fall.

## 6.2. Method

The aquatic survey was undertaken around the clock to ensure both diurnal and nocturnal fish species were captured. Also, sampling methods were executed to ensure that both large and small species were captured and recorded, including:

- Hook and line- Hook and line was used with worm baits, flour bait.
- Gillnet- gillnets were set overnight. These nets were set in a conspicuous area with low water flow. The gillnets were set during the low tide, the nets remained overnight during the high tide and was checked again in the morning during the low tide.
- Eye Shine- a bright torch was used in order to record fish species in clear, shallow water, such as fish that browse on algae growing at stream edges.

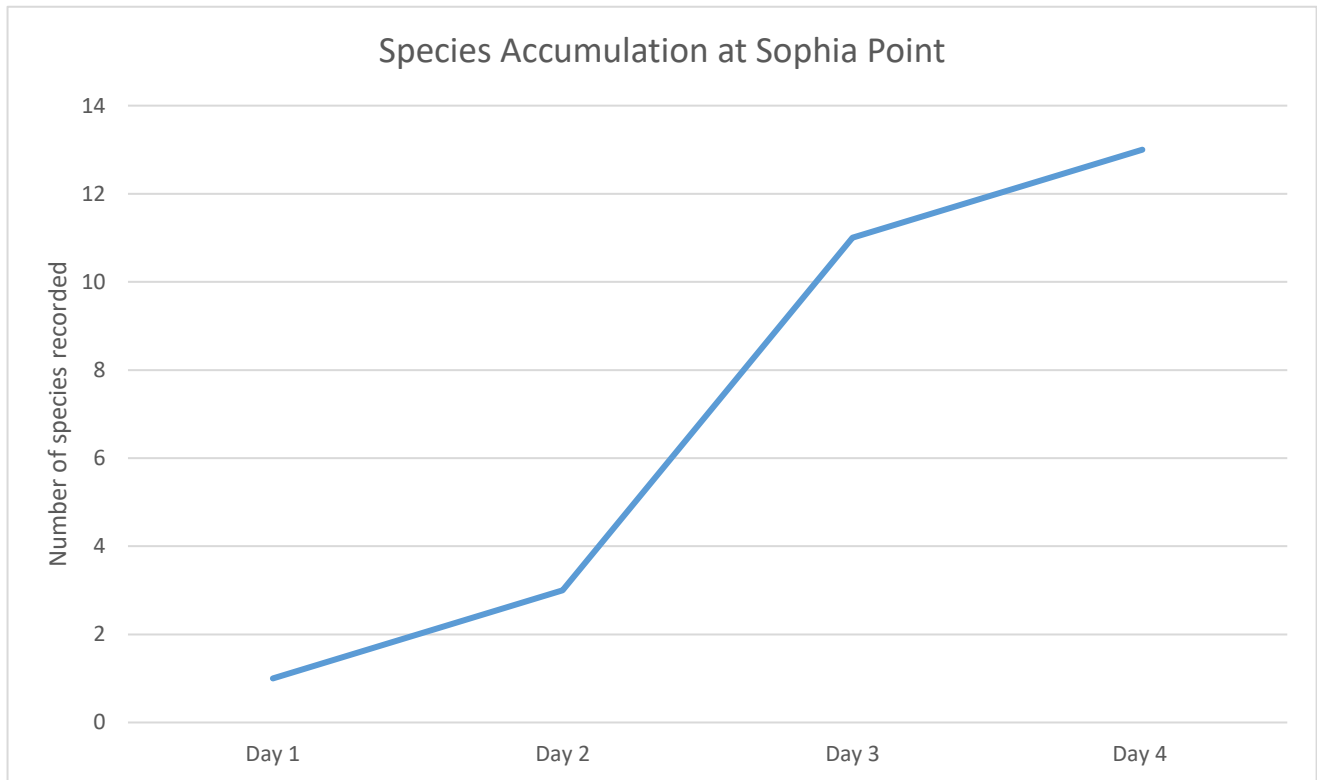
## 6.3. Fish Species Recorded

**Table 1: Species capture from the two fishing points**

Common Name	Family	Genes	Species	Sampling Points	
				Sampling Point 1	Sampling Point 2
-	Aplochilidae	<i>Rivulus</i>	<i>spp</i>	√	-
Larima	Pimelodidae	<i>Pimelodus</i>	<i>spp</i>	√	√
Silver fish	Characidae	<i>Moenkhausia</i>	<i>oligolepis</i>	√	-
Huri	Erythrinidae	<i>Hoplias</i>	<i>malabaricus</i>	√	-
Daray	Anostomidae	<i>Leporinus</i>	<i>friderici</i>	-	√
Cassie	Pimelodidae	<i>Rhamdia</i>	<i>quelen</i>	-	√
Yakatu	Bryconinae	<i>Brycon</i>	<i>pesu</i>	-	√
Catfish	Ariinae	<i>Sciades</i>	<i>spp</i>	-	√
Pirai	Serrasalmidae	<i>Serrasalmus</i>	<i>rhombeus</i>	-	√
Yakatu	Bryconinae	<i>Brycon</i>	<i>falcatus</i>	√	√
Basha	Sciaenidae	<i>Plagioscion</i>	<i>squamosissimus</i>	-	√

Tiger fish	Pimelodidae	<i>Pseudoplatystomas</i>	<i>fasiatum</i>	-	√
-	Prochilodontidae	<i>Prochilodus</i>	<i>rubrotaeniatus</i>	-	√

**Figure 1: Species Accumulating Curve**



Day 1	<i>Rivulus spp</i>
Day 2	<i>Pimelodus spp, Plagioscion squamosissimus</i>
Day 3	<i>Moenkhausia oligolepis, Hoplias malabaricus Pimelodus spp, Leporinus friderici, Rhamdia quelen, Brycon pesu, Sciades spp., Serrasalmus rhombeus, brycon falcatus</i>
Day 4	<i>Plagioscion squamosissimus, Pseudoplatystomas fasiatum, Prochilodus rubrotaeniatus, Brycon pesu, Brycon falcatus</i>

**Table 2: Species accumulating table**

#### 6.4. Aquatic diversity discussion

During the survey, a total of thirteen (13) species were collected, the collection was very diverse with species ranging from Characiformes and Siluriformes. Both of these families were expected since the water type was noted to be muddy but yet flowed as black water.

Characiformes is a large and diverse groups of fishes. The diversification ranges from small aquarium fishes to larger species that are consumed on a daily basis by local (New world

Encyclopedia, 2013). Characiformes inhabit a wide range of freshwater ecosystem. This is inclusive of stagnant ponds and rushing streams which is in line with the sampling points mentioned earlier. Siluriformes on the other hand, are known as catfishes. They possess one to four pair of barbels which aid in coordination since they are benthic organisms. The barbels functions are the eyes for catfishes since closer to the channel bottom would be dark. This helps with finding food and escaping predators (Encyclopedia, 2004).

It should be noted that the sampling points were affected by tidal season. During the high tide the water body expanded and the stagnant pond was connected to the Essequibo river. This created an environment for fishes in the pond to move to the main channel and vice versa. However, it was noted based on the data collected, large fishes utilize the pond for breeding of their young since both *Brycon falcatus* and *Hoplias malabaricus* juveniles were captured.

Moreover, data collected for the four-day period was noted to increase as the number of day increases, graph 1 illustrates that as time go by the diversity of fishes also increases. Additionally, sampling should be done until the diversity of fishes remain constant. This data would then have a better representation of the fish species diversity present at Sophia point.

## 7. Discussion

This report represents a short duration (4 day) rapid biodiversity assessment on the Sophia Point site. Based on the limited time available and less than ideal weather conditions, the number and diversity of species identified in the study exceeded expectation.

By way of example, to identify 15 non-volant mammal species representing 11 families and 8 orders, including two large apex predator *Felidae* in the form of the Jaguar (*Panthera onca*) and Puma (*Puma concolor*) is an indicator of a high level of ecological integrity and complexity. Moreover a number of species of international conservation concern were identified including *Puma yagouaroundi* (IUCN listed as Near Threatened), *Tapirus terrestris* (IUCN listed as Vulnerable), *Ateles paniscus* (IUCN listed as Vulnerable) and *Aloutta seniculus* (IUCN listed as Least Concern).

From just this return of non-volant mammal species it is evident that Sophia Point is not only a site with access to a complex and rich level of biodiversity but also that there are vulnerable or near threatened species which could benefit from the conservation status conferred by the Sophia Point Rainforest Research Centre.

Whilst further detailed, cross-seasonal and extended monitoring is required to make definitive judgement as to the value and complexity of species of both flora and fauna present at Sophia Point, this rapid assessment clearly identified the potential at the site and provides justification for further study in the surrounding area.

## 8. Reference List:

- Bovolo, I. *et al*, 2018. *The Guiana Shield rainforests—overlooked guardians of South American climate*. Environmental Research Letters.
- Braun, M.J., D.W. Finch, M.B. Robbins, and B.K. Schmidt. 2000. *A Field Checklist of the Birds of Guyana*. Biological Diversity of the Guianas Program Publication 41. Smithsonian Institution, Washington, DC.
- Clarke, F *et al*, (ed) 2012. *Biodiversity Assessment of Simon & Shock International Logging Inc. Forest Concession in the Upper Essequibo-Corentyne-North Rupununi District, GUYANA*
- Donnelly, M *et al*, 1998. *Field Checklist of reptiles and amphibians of Iwokrama Forest*. Iwokrama International Centre. Georgetown. Guyana.
- Donnelly, M *et al*, 2005. *Sampling amphibians and reptiles in the Iwokrama Forest ecosystem*. Proceedings of the Academy of Natural Sciences of Philadelphia **154**, 55-69.
- Emmons, L.H. and Feer, F. (1990). *Neotropical Rainforest Mammals: a Field Guide*. University of Chicago Press, Chicago.
- Maureen A. Donnelly, Ross D. MacCulloch, Cristina A. Ugarte, David Kizirian, and M. J. Lannoo. 2006. *A New Riparian Gymnophthalmid (Squamata) from Guyana*. *Copeia*: September 2006, Vol. **2006**, 396-403.
- De Avila Pires, Teresa. C. S., 2005. *Reptiles, in Checklist of the Terrestrial Vertebrates of the Guiana Shield*, Hollowell, T., and R. P. Reynolds, eds. Bulletin of the Biological Society of Washington, no. 13.
- Erize, F., Rumboll, M., Mata, J. 2006. *Birds of South America: Non-Passerines: Rheas to Woodpeckers*. Princeton University Press Princeton
- Finch, D.W., Hinds, W., Sanderson, J., and Missa, O. 2001. Avifauna of the Eastern Edge of the Eastern Kanuku Mountains, Lower Kwitaro River, Guyana. In: *A biodiversity assessment of the Eastern Kanuku Mountains, Lower Kwitaro River, Guyana* (Eds. Jensen R. Montambault and Olivier Missa). RAP Bulletin of Biological Assessment 26. Conservation International, Washington, DC
- Hilty, S.L. 2003. *Birds of Venezuela*. 2<sup>nd</sup> edition. Princeton University Press Princeton
- Hollowell, T and R. P. Reynolds, 2005. *Mammals, in Checklist of the Terrestrial Vertebrates of the Guiana Shield*, Hollowell, T and R. P. Reynolds eds. Bulletin of the Biological Society of Washington, no. 13.
- Install, Robin., Rodner, C., and M. Lentino., M. 2006. *Birds of Northern South America: An Identification Guide, Volume 1: Species Account*.
- Install, Robin., Rodner, C., and M. Lentino., M. 2006. *Birds of Northern South America: An Identification Guide, Volume 2: Plates and Maps*.
- Kok, P.R.K., and Kalamandeen, M. 2008. *Introduction to the taxonomy of amphibians of Kaieteur National park, Guyana*. ABC Taxa.
- Lim, Burton K., Mark D. Engstrom, and Jose Ochoa G. 2005. *Mammals, in Checklist of the Terrestrial Vertebrates of the Guiana Shield*, Hollowell, T., and R. P. Reynolds, eds. Bulletin of the Biological Society of Washington, no. 13.
- Lim, Burton K., Engstrom, Mark D., and Reid, Fiona A., 1999. *Guide to the Mammals of the Iwokrama Forest*. Iwokrama International Centre for Rainforest Conservation.
- New World Encyclopedia, 2013, "Characidae", <https://www.newworldencyclopedia.org/entry/Characidae>
- Parker, T.A., III, R.B Foster, L.H. Emmons, P. Freed, A.B. Forsyth, B. Hoffman, and B.D Gill (eds.).1993. *A biological assessment of the Kanuku Mountain region of southwestern Guyana*. RAP Working Papers 5. Conservation International, Washington DC.

Ridgley, R.S. and Agro, D.O. 1998. The Vertebrate fauna of Iwokrama Forest – Birds. *Iwokrama faunal surveys: final report from work carried out in the Iwokrama forest by the Academy of Natural Sciences of Philadelphia 1996-1998*. ANSP, Philadelphia.

Steege, H. ter., 2003. *Plant Ecology, in Conservation Priorities of the Guayana Shield, 2002 Consensus*. Conservation International, Centre for Applied Biodiversity Science.







Steege, Hans. Ter and Zondervan, Gerold. 2000. *A preliminary analysis of large-scale forest inventory data of the Guiana Shield in: Plant Diversity in Guyana, with recommendations for a National Protected Area Strategy*. The Tropenbos Foundation. (Tropenbos Series; 18).

Steege, H (2001); *Biomass estimates for forests in Guyana and their use in carbon offsets*; Iwokrama Research Report 2001-01.

Senaris, J.C. and MacCulloch, R. 2005. Amphibians. In: *Checklist of the Terrestrial Vertebrates of the Guiana Shield* (Eds. Hollowell, T, and Reynolds, R.P) *Bulletin of the Biological Society of Washington* **13**, 9-24.

Senaris *et al.*, 2008. *Amphibians and reptiles of the Acarai Mountains, and Sipu, Kamo and Essequibo rivers in the Konashen COCA, Guyana*. RAP Bulletin of Biological Assessment 51. Conservation International, Arlington, VA, USA.

## 9. Photo Appendix

	
Dark Fruit-eating Bat ( <i>Artibeus obscurus</i> )	Davie's Big-eared Bat ( <i>Micronycteris daviesi</i> )
	
Long-nosed River Bat ( <i>Rhynchonycteris naso</i> )	Little Yellow-shouldered Bat ( <i>Sturnira lilium</i> )
	
'Nectar-feeding' Bat ( <i>Anoura sp.</i> )	Pallas's Long-tongued Bat ( <i>Glossophaga soricina</i> )





Setting up mist-net for understory birds



Setting up a camera-trap



Jaguar poop containing Peccary hair and small bones



Inspecting the Jaguar poop



Setting up mist-net for Bats



Setting up mist-net for Bats near micro-habitat of pond





Silver-beaked Tanager (*Ramphocelus carbo*)



rare Chestnut-belted Gnateater (*Conopophaga aurita*)



Grayish Mourner (*Lipaugus vociferans*)



Screaming Piha (*Lipaugus vociferans*)



Wedge-billed Woodcreeper (*Glyphorynchus spirurus*)



Gray-breasted Sabrewing (*Campylopterus largipennis*)





American Pygmy Kingfisher (*Chloroceryle aenea*)



Long-winged Antwren (*Myrmotherula longipennis*)



Blue-black Grosbeak (*Cyanocompsa cyanoides*)



Rusty-margined Flycatcher (*Myiozetetes cayanensis*)



Heliconids butterfly - Lepidoptera



Moth - Lepidoptera



Nocturnal Wasps - Hymenoptera



Dragonfly - Odonata



Map Tree-frog (*Boana geographica*)



Cane Toad (*Rhinella murinus*)







Blue-grey Tanager (*Thraupis episcopus*)



Fork-tailed Flycatcher (*Tyrannus savanna*)



Possibly a Giant Armadillo burrow or Paca - active



Nine-banded Armadillo (*Dasyus novemcinctus*) burrow



Nocturnal survey for frogs



Biodiversity assessment team taking a lunch break





Butterfly - Lepidoptera



Moth - Lepidoptera



Swampy section of transect 2



Hill section of Transect 2



Section of the Boundary Line transect



Swampy section of Boundary Line transect





Equipment for rapid assessment: set 1



Equipment for rapid assessment: set 2



*Brycon falcatus* (Juvenile)



*Serrasalmus rhombeus*



*Leporinus friderici*



*Pimelodus* spp



*Rhamdia quelen* (Juvenile)



*Plagioscion squamosissimus*