

JUN 21 2023

**MEMORANDUM**

**FOR** : The Regional Executive Director  
DENR MIMAROPA Region  
1515 DENR By the Bay Building, Roxas Boulevard,  
Barangay 668, Ermita, Manila

**THRU** : The ARD for Technical Services

**FROM** : The OIC, PENR Officer

**SUBJECT** : **PROGRESS REPORT OF THE DRY SEASON  
BIODIVERSITY ASSESSMENT AND MONITORING  
SYSTEM (BAMS) FOR CY 2023**

Forwarded is the memorandum dated June 13, 2023 of PASu of Mounts Iglit-Baco Natural Park (MIBNP) which was received on June 19, 2023 regarding progress report of the Dry Season Biodiversity Assessment and Monitoring System (BAMS) for CY 2023. The general objective of the study is to provide technical assessment report of physical, flora and faunal components of MIBNP which is fundamental in creating a sustainable management and conservation plan and in addressing many critical conservation issues within the PA.

The PAMO of Mounts Iglit-Baco Natural Park (MIBNP) has conducted the four major components of Biodiversity Assessment Monitoring System (BAMS) for terrestrial ecosystem from April 29 to May 8, 2023 with the following activities:

- Soil Assessment-the PAMO conducted soil assessment in which samples are brought to the Regional soil laboratory of Department of Agriculture in Oriental Mindoro. Information of soil are gathered to know how biodiversity influences the quality of physical environment and vice-versa.
- Flora assessment was also conducted through the help of MBCFI. The assessment covers the ecosystem and species levels.
- The PAMO has also conducted faunal assessment covering anthropods, herpetofauna, birds and mammals (Volant and non-volant mammals).
- Data gathered from physical, flora and fauna assessment are encoded and analyzed in an integrated manner.

Results of data gathered during the conduct of Biodiversity Assessment Monitoring System is still under process thus, once completed final resport will be submitted by the PAMO of Mounts Iglit-Baco Natural Park (MINBP).

Fof information and record.

**ERNESTO E. TAÑADA**

TSD-CDS6/19/2023

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June 13, 2023

**MEMORANDUM**

**FOR :** The Regional Executive Director  
DENR MIMAROPA Region  
1525 L & S Bldg., Roxas Blvd., Ermita, Manila

**THRU :** The OIC-PENR Officer  
Mamburao, Occidental Mindoro

**FROM :** The Protected Area Superintendent  
Mts. Iglit-Baco Natural Park

**SUBJECT :** **PROGRESS REPORT OF THE DRY SEASON  
BIODIVERSITY ASSESSMENT AND MONITORING  
SYSTEM (BAMS) FOR CY 2023**

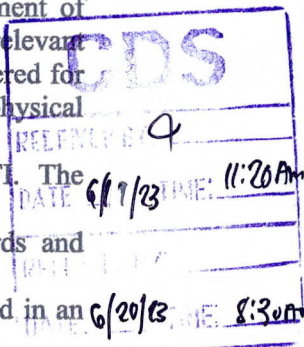


In line with the service and the commitment of the Mts. Iglit-Baco Natural Park-Protected Area Management Office (MIBNP-PAMO) to provide field implementers a standardized method of assessing and monitoring terrestrial ecosystems, respectfully submits herewith the progress report of the Biodiversity Assessment and Monitoring System (BAMS) conducted during dry season for CY 2023. In addition, the conduct of the BAMS intends to establish a baseline for long-term monitoring and management, and will be used in implementing science-based management interventions and in the formulation or updating of the respective Protected Area Management Plans and other Conservation Plans.

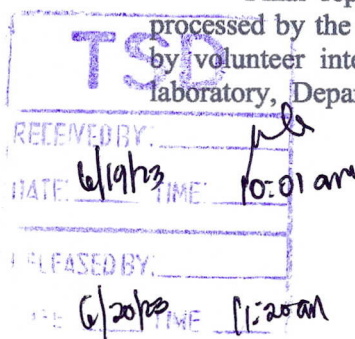
The MIBNP-PAMO conducted the four major components of BAMS for terrestrial ecosystem from April 29 - May 8, 2023.

The following are the activities conducted and participated by the MIBNP-PAMO:

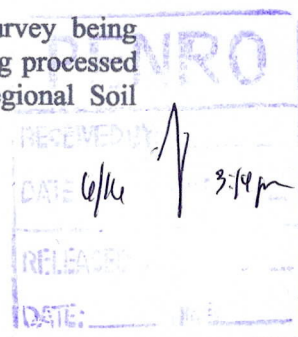
- The MIBNP-PAMO conducted soil assessment in which composite soil sample is composed of five samples systematically taken within the plot at a depth of 0-30 cm using a soil auger. Soil samples were brought to the Regional Soils Laboratory, Department of Agriculture, Naujan Oriental Mindoro. The MIBNP has also prepared various relevant maps (land use, land cover, soil, elevation, and slope). Information on soil are gathered for the purpose of understanding how biodiversity influences the quality of physical environment and vice-versa.
- Conducted flora assessment with the help of the consultant hired by MBCFI. The assessment covers ecosystem and species levels.
- The MIBNP conducted fauna assessment covering arthropods, herpetofauna, birds and mammals (volant and non-volant mammals).
- Data gathered from physical, floral, and fauna assessment are encoded and analyzed in an integrated manner.



Final report shall be submitted upon completion of the Results of Flora Survey being processed by the consultants hired by MBCFI, species list of Arthropods observed being processed by volunteer intern of BD Corridor and results of soil analysis brought to the Regional Soil laboratory, Department of Agriculture, Naujan Oriental Mindoro.



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Republic of the Philippines  
Department of Environment and Natural Resources  
MIMAROPA Region  
Provincial Environment and Natural Resources Office  
**MOUNTS IGLIT-BACO NATURAL PARK**  
**PROTECTED AREA MANAGEMENT OFFICE**



Attached herewith is the draft BAMS Report for dry season of CY 2023.

For information and record.

  
HECTOR S. ARAGONES JR.





MOUNTS  
ILOGIT-BAGO  
NATURAL  
PARK



# BIODIVERSITY ASSESSMENT AND MONITORING SYSTEM DRY SEASON REPORT CY 2023





# **DRAFT REPORT**

## **Biodiversity Assessment and Monitoring System in Mts. Iglit-Baco Natural Park**

**CY 2023**

**Province of Occidental Mindoro, Philippines**

**Prepared by**

**Mts. Iglit Baco Natural Park-Protected Area Management Office**





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## EXECUTIVE SUMMARY

Mts. Iglit-Baco Natural Park (MIBNP) was proclaimed by virtue of Republic Act. 6148 in 1970. It covers large areas of the central part of the island of Mindoro, the smallest among the five major endemicity in the country. MIBNP has the biggest remaining population of the critically endangered Tamaraw (*Bubalus mindorensis*) - the primary reason for the establishment of the park as a game refuge and bird sanctuary as well as the declaration of the park as an ASEAN Heritage site.

To properly provide field implementers a standardized method of assessing and monitoring terrestrial ecosystems, the MIBNP-PAMO survey team adopted the most recent standardized method in conducting biodiversity assessment and monitoring of terrestrial ecosystems including both flora and fauna.

The general objective of this study is to provide a technical assessment report of physical, floral and faunal components of MIBNP which is fundamental in creating a sustainable management and conservation plan, and in addressing many critical conservation issues.

The assessment was focused in the most vegetated portion of MIBNP. Soil characterization was done in three ways; through visual observation during field activities, using secondary data and through the collection of soil samples and subsequent analysis. For the characterization of chemical properties, a composite soil sample was collected in each of the five selected plots for vegetation survey. A composite soil sample is composed of five samples systematically taken within the plot at a depth of 0-30 cm using a soil auger.

For the floral survey, the team used a modified belt transect method wherein quadrats (20 m x 20 m) were laid out along a 2-km transect at every 250m interval. Nested quadrat sampling was used to assess and characterize the structure and species composition. For large woody plants with diameter less than 10 cm; diameter at breast height (DBH), merchantable height (MH), and total height (TH) were measured inside the 20 m x 20 m quadrat. Number of individuals of shrubs, poles, and saplings inside the 5m x 5m quadrat was counted to account the frequency of intermediate species, while percentage cover of understory species inside the 1m x 1m quadrat was determined,

For amphibians and reptiles, strip transect sampling and opportunistic catching was done. For bird species, transect walk method and netting was done. Bird survey was carried out along the 2-km transect routes, following the transect established for vegetation survey. These routes were traversed at the time when birds are mostly active. On the other hand, netting was done by setting mist nets along possible flyways within open and forested areas. For volant mammals, the same mistnets used for birds were also used to capture fruit bats and insect bats. For non-volant mammals such as murids, rodents and shrews, age traps baited with roasted coconut meat covered with peanut butter were set along possible runways.



Collection survey for arthropod was conducted at the sampling plots along the established 2-km transect which was used also for flora survey. A total of 9 sampling plots were sampled for arthropod within the 2-km transect, similar to the plots established during the flora survey.

Species Diversity parameters such as total Diversity abundance, species richness, species heterogeneity using Shannon-Weiner diversity index, species evenness using Pielou's evenness index of established plots were calculated using Microsoft Excel 2017. Importance value was also computed.

Based on the computed diversity values, for faunal diversity, a total of 68 terrestrial wildlife species consisting of five species of frogs, two species of reptiles, 53 species of birds and eight mammals were recorded. Of these, species (55%) are native or resident species while 19 species (34%) are endemic. Of the 19 endemic species, 14 are found throughout most of the Philippines while five species are only found in Mindoro Island.

For the amphibians, 8 species of frogs and toads, 1 species of snake and 1 species of lizard. Out of them, *Leptobrachium mangyanorum* is mindoro endemic and is found to be vulnerable species according to IUCN. *Limnonectes acanthi* is also listed as vulnerable frog and the rest of the species are Least Concern (LC). *Naja philippinensis* or known to be Philippine Cobra is a near threatened snake. With regards to avifauna, a total of 53 bird species were recorded in the study area under 31 families. Out of the total recorded of avian species, 41% were residents, 47% were Philippine endemic, 8% were dry season visitors and 4% were Mindoro endemic. Majority (88%) of the bird species recorded in the area are not listed under the IUCN Red List of Threatened Species, DAO 2004-15 of the Philippine Wildlife Act or CITES Appendices. These species are considered as widespread and abundant. There were, however, five species that are of conservation concern. The Mindoro endemic hornbill (*Penelopides mindorensis*) is listed as endangered and Mindoro endemic coucal (*Centropus steeri*) is critically endangered under IUCN. Colasisi (*Loriculus philippensis*) is considered as Endangered under the list of DAO 2004-15. For mammals, was a total of 11 species recorded consisting of 6 species of fruit bats, one species of insectivorous bats, 3 small non-volant mammals and 2 large-sized mammal. Seven species are endemic with four that are found throughout most of the Philippine islands and three only found in Mindoro.

The results of the assessment showed that MIBNP holds a very significant faunal diversity. In terms of floral composition, MIBNP, characterized as forest over limestone, has a low to moderate species diversity and stocking density. Other wildlife species also provides sufficient information on the importance of MIBNP as habitat. Noteworthy among the list are the 5 endemic terrestrial species of Mindoro (Mindoro Hornbill, Mindoro Litter Frog, Mindoro stripe faced fruit bat, Black hooded Coucal and Tamaraw) which are all listed under IUCN RedList. This indicates the importance of MIBNP for the in-situ conservation of these species specifically the critically endangered tamaraw.



# 1 INTRODUCTION

Mounts Iglit-Baco Natural Park (MIBNP) is a protected area in the island of Mindoro in the Philippines. First declared as a national park in 1970 by virtue of Republic Act No. 6148, MIBNP initially covers 75,445 hectares. The enactment of Republic Act No. 11038 or the Expanded National Integrated Protected Areas System Act of 2018 provided MIBNP with an expanded total area of 106,655.62 hectares under the protected area category of "Natural Park" and land classification of "National Park" consistent with Article XII, Section 3 of the 1987 Philippine Constitution.

The Park features a rugged terrain composed of river gorges, slopes, mountains and plateaus, and encompasses at least ten (10) river systems. Mount Baco at its peak is around 2,488 meters above sea level, while Mount Iglit reaches 2,364 meters above sea level. It is one of the nine ASEAN Heritage Parks in the Philippines. Several communities of indigenous peoples, such as the Tau-buid and Buhid - Bangon, live within the premises of the park.

MIBNP is home to at least 328 species of animals. It is where the largest population of the critically endangered, Mindoro endemic Tamaraw (*Bubalus mindorensis*) is located. Other endemic faunal species located in the park include the Mindoro Warty Pig (*Sus oliveri*), Philippine Deer (*Rusa marianna*) Mindoro Stripe-faced Fruit Bat (*Styloctenium mindorensis*), Mindoro Scops Owl (*Orus mindorensis*), and Mindoro Hornbill (*Penelopides mindorensis*) among others.

In compliance to the Biodiversity Management Bureau (BMB) Technical Bulletin No. 2016-05, MIBNP has undergone floral assessment for the establishment of Biodiversity Assessment and Monitoring System (BAMS). BAMS is the most recent standardized method in conducting biodiversity assessment and monitoring of terrestrial ecosystems including both flora and fauna in the country. It is required in all Protected Areas (PAs) by the Biodiversity Management Bureau (BMB) to properly guide its environmental managers for appropriate management and conservation of natural resources.

## 2 OBJECTIVES

Generally, this study aims to provide a technical assessment report of physical, floral and faunal components of MIBNP which is fundamental in creating a comprehensive guide on national biodiversity assessment and monitoring system, contribute to the management planning, profile updating and in addressing many critical conservation issues. Specifically, this study aims to:

- a) Conduct Biodiversity Assessment and Monitoring System (BAMS);
- b) Characterize soil, water flow, forest types, dominant species, importance value of each species, and diversity of an area;
- c) Provide a comprehensive analysis of vegetation structure, floral and faunal diversity of MIBNP;



- d) Provide a list of identified floral and faunal species found in the project site, including their endemism and conservation status

### 3 METHODOLOGY

#### 3.1 Physical Characterization and Mapping of MIBNP

Physical assessment was done using thematic and metric information. This study utilized both information providing descriptive data about the study area's surface such as soil, vegetation, land cover, location, slope, and elevation. These data were obtained through the DENR database and available online sources ([www.philgis.org](http://www.philgis.org) and [www.gadm.org](http://www.gadm.org)). The information was interpreted using ArcMap as the primary platform to analyze and extract useful data for MIBNP.

##### 3.1.1 Soil Characterization

For characterization of soil chemical properties, one composite soil sample was collected in each of the five selected plots for vegetation survey. A composite soil sample is composed of five samples systematically taken within the plot at a depth of 0-30 cm using a soil auger (Figure 1). Soil samples for the laboratory analysis were prepared by crushing the soil clods into smaller particles, spread in properly labeled paper and air-dried for about a month. Soil samples were brought to the Department of Agriculture-Agriculture Training Institute, Naujan Roxas Oriental Mindoro.



Figure 1. Soil sample taken at the MIBNP using a soil auger.





**Figure 2.** Soil sample taken at MIBNP placed in a resealable plastic container.

## 3.2 Biodiversity Survey

### 3.2.1 Flora Survey

The floral survey, which focused on the remaining forest patches of MIBNP, was conducted on 5 to 8 May 2023. The survey team used the improved Biodiversity Assessment and Monitoring System (BAMS) methodology prescribed by the Biodiversity Management Bureau for all the Protected Areas in the country. It employs a modified belt transect method wherein 9 quadrats (20m x 20m) were laid out along a 2-km transect at every 250m interval (Figure 3). There were two levels of assessment conducted. Ecosystem level assessment was done at every 50-m interval (section), while nested quadrat (at every 250 m interval) was used for the species level assessment (Figure 4). For ecosystem level assessment, each of the section was classified following the 12 forest formations developed by Fernando et al. (2008). In addition, the forest structure was characterized based on the maturity of the stand i.e. early second growth, advanced second growth, and old growth. Observed disturbance (i.e. clearing, cutting, kaingin, presence of invasive species) from each section were also noted.



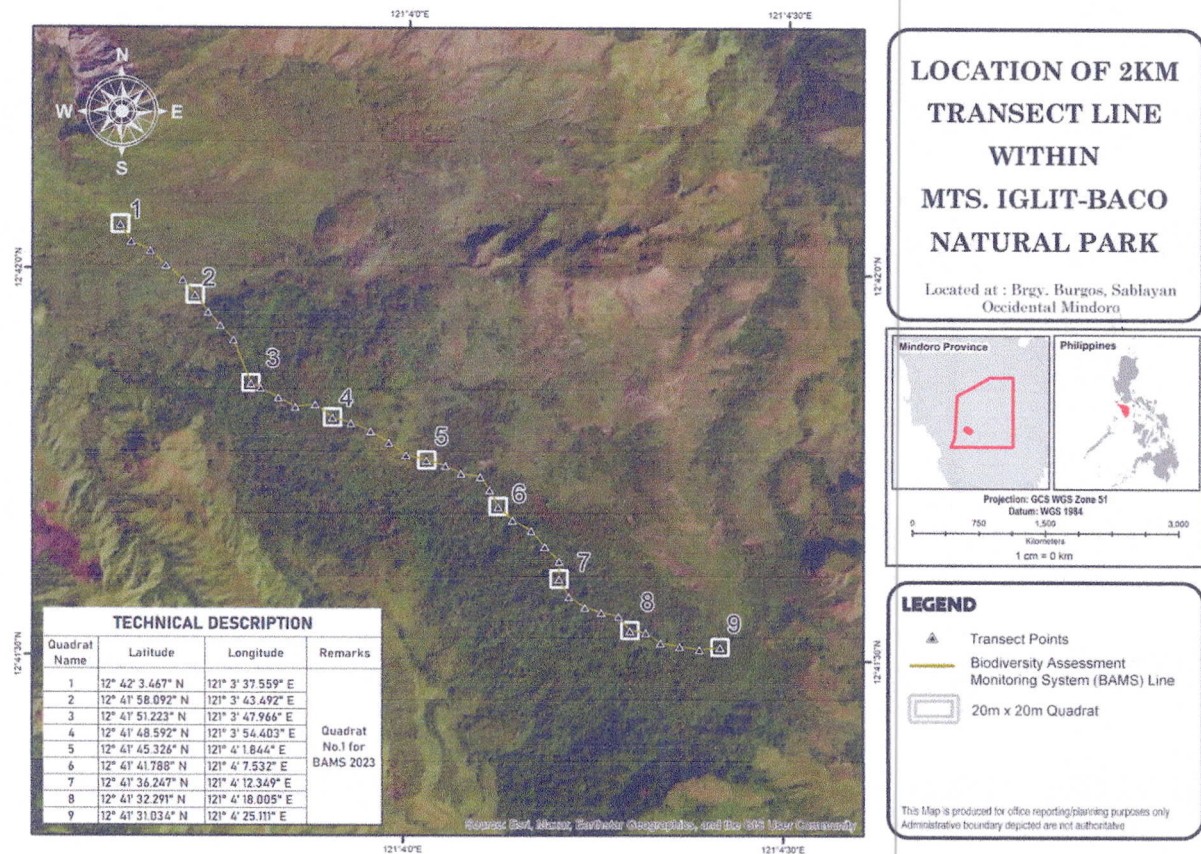


Figure 3. Location of different sampling quadrats and stations of the floral assessment in MIBNP

For species level assessment, nested quadrat sampling technique was used to assess and characterize the structure and species composition of the different plant communities (Figure 5). For large woody plants with diameter equal or greater than 10 centimeters, measurements of diameter at breast-height (DBH), merchantable height (MH), and total height (TH) were done inside the 20m x 20m quadrat. Diameter of trees was measured at 1.3m above ground or 10 cm above the tallest buttress if taller than 1.3m (Figure 6). In case a tree forks below 1.3 m from the ground, all stems with  $\geq 5$  cm DBH were counted and measured. Number of individuals of shrubs, poles and saplings inside the 5m x 5m quadrat was counted to account for the abundance and frequency of intermediate species, while percentage cover of understory species (grasses and other plants below 1m in height) inside the 1m x 1m quadrat was determined.

Additionally, an opportunistic flora survey involving free walk on different vegetation types and listing and photo documentation of the different species (inside and outside the quadrats) encountered was also carried out to account the maximum possible species in MIBNP. This survey also documented and somehow estimated the extent of the different land-use and vegetation types in the project site.



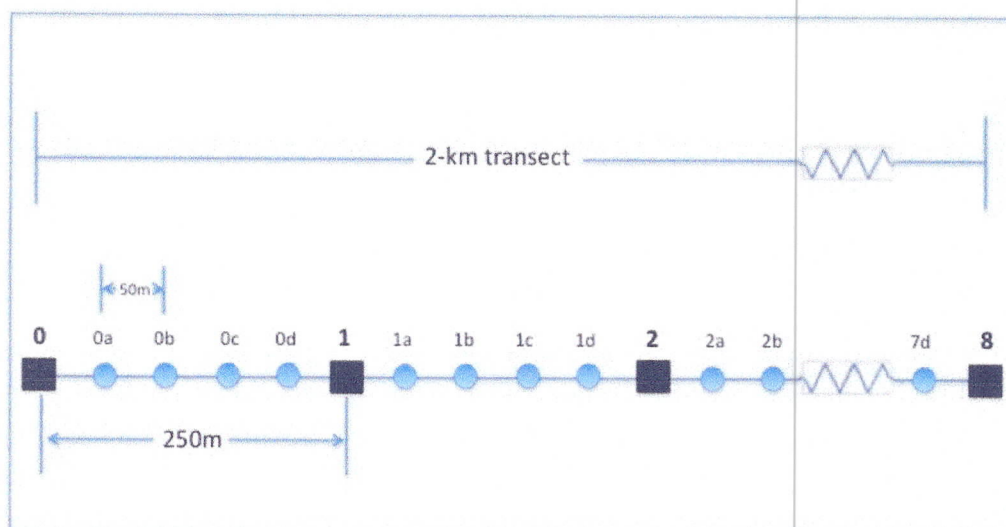


Figure 4. Modified belt transect employed for the floral assessment in MIBNP

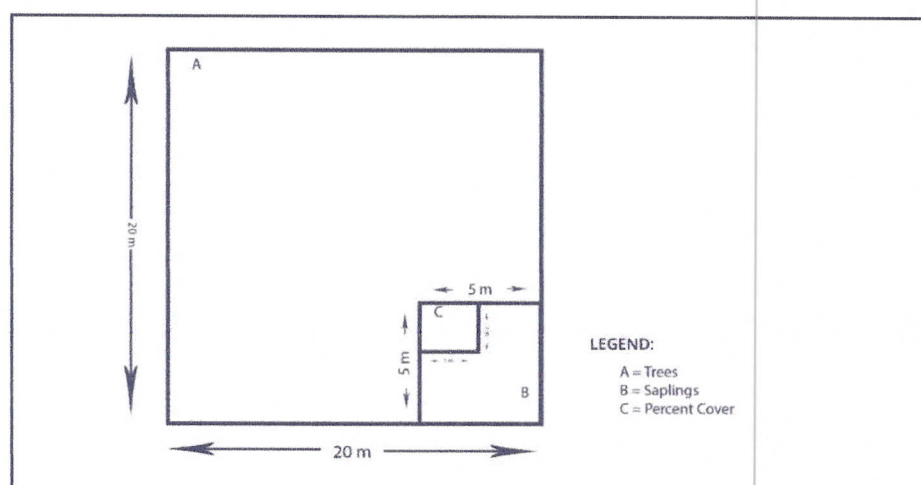


Figure 5. The nested quadrat used in the biodiversity assessment, established at every 250m distance along the transect.

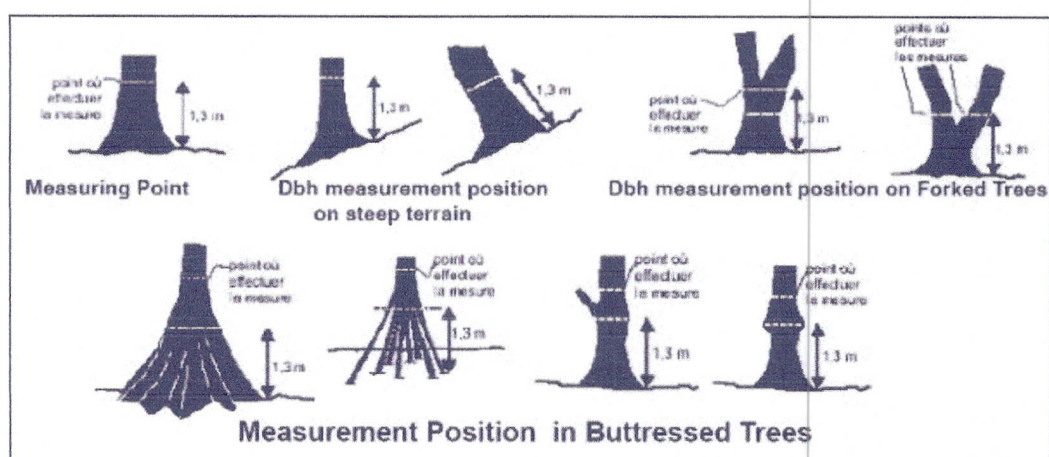


Figure 6. Appropriate position for taking DBH of trees

### 3.2.1.1 Collection of Herbarium Specimens

Sample specimens of each species that are difficult to identify in the field were collected. These were processed at the end of the survey in order to preserve the specimens prior to identification. The Schweinfurth's method (commonly known as "wet collection" method), a standard plant collection technique was employed. This technique involves soaking of properly labelled specimens in ethyl alcohol to avoid rapid wilting and crumpled drying. Important information such as the habitat, physiognomy, slope and aspect, characteristics of the plants that will later become unobservable after drying, DBH and TH were noted. Each specimen was tagged using proper coding prior to storage (Figure 7). The specimens were then sealed in polyethylene bags for further analysis.



Figure 7. Sample herbarium specimens with proper tagging.

### 3.2.1.2 Data analysis

#### 3.2.1.2.1 Diversity Indices

Species Diversity parameters such as total Diversity abundance, species richness, species heterogeneity using Shannon-Weiner diversity index, species evenness using Pielou's evenness index of established plots were calculated using Microsoft Excel 2017.

#### 3.2.1.2.2 Importance Value

The relative density, relative dominance and relative frequency values for each tree species were determined to obtain their Importance Value (IV) - a standard measurement in forest ecology to determine the rank relationships of species. The relative values indicate different aspects of species importance in a community. Importance values were computed using the following formula:

$$\text{a. Density} = \frac{\text{number of individuals}}{\text{area}}$$



- area sampled
- b. Relative Density =  $\frac{\text{density for a species}}{\text{total density for all species}} \times 100$
- c. Frequency =  $\frac{\text{number of plots in which species occur}}{\text{total number of plots sampled}}$
- d. Relative Frequency =  $\frac{\text{frequency value for a species}}{\text{total frequency for all species}} \times 100$
- e. Dominance =  $\frac{\text{basal area or volume for a species}}{\text{area sampled}}$
- f. Relative Dominance =  $\frac{\text{dominance for a species}}{\text{total dominance for all species}} \times 100$
- g. Importance Value = Relative Density + Relative Frequency + Relative Dominance

**Table 1:** Categories of diversity values

Relative Values	H' values	
Very High	> 3.500	
High	3.000-3.4999	
Moderate	2.500-2.9999	
Low	2.000-2.4999	
Very Low	<1.9999	

### 3.2.2 Vertebrate Fauna

Terrestrial wildlife assessment was conducted during April 29, 2023- May 04, 2023 with the sampling period coinciding with the dry season. The prevailing weather conditions ranged from sunny to partly cloudy.

#### 3.2.2.1 Herpetofauna

The survey was carried out from 29 April 2023–4 May 2023 with a total of 6 field days (8 hrs /day). Surveys were conducted during both day and night through strip transect sampling (Table 1) and opportunistic catching. Ten strip transects measuring 10 x 10 m



quadrats covered an area equivalent to 1000 m<sup>2</sup>. Five field staff walked along transect at regular intervals (7:00–10:00 h in the morning and 16.00–19.00 h in the evening), systematically searching for reptiles, frogs and toads. Each transect was repeated only two times, morning and evening. Searches were done, especially for cryptic species, in potential microhabitats along the stream and forest floor (e.g. pools, springs, seepage areas, tree holes, burrows, underneath fallen logs, on leaf litters and tree foliage).

All captured specimens were examined carefully and identified with relevant data recorded prior to being released at their original point of capture. Species identification were based on Alcala (1986) and Alcala and Brown (1998). After morphometrics are taken, specimens are photographed and then released.

**Table 2. Sampling site location and date of sampling**

Site	Date of sampling	Northing	Easting	Elevation (masl)
Site A	April 28-May 4, 2023	N 12° 41' 44.7"	E 121° 04' 07.5"	862-715
		N 12° 42' 04.1"	E 121° 03' 39.0"	
Site B	April 28-May 4, 2023	N 12° 42' 03.2"	E 121° 03' 47.1"	746-879
		N 12° 41' 40.9"	E 121° 04' 12.1"	

### 3.2.2.2 Avifauna

#### 3.2.2.2.1 Transect Walk Method

Avifauna survey was conducted along 2-km transect routes covering forested areas. . The survey was conducted at a steady pace (30min) between 7:00am and 9:00 am in the morning and 4:30pm to 6:00pm in the late afternoon when most birds are active. Line transects were surveyed in each sampling site and pooled the data for analysis. The transect line was walked at a constant pace for approximately 30min. To minimize disturbance during the count, a waiting period of 3 to 5min before counting was applied. Species observation mostly took place through vision by using 8×17 binoculars and eyes, but also through sound. Identification was visual except in some rare cases when the voice will be used if the bird cannot be seen. Identification and categorization of birds to their respective taxonomic groups' done following field guide books.





**Figure 8.** Bird transect route

#### 3.2.2.2.2 Netting

Birds were captured using mist nets with four shelves; each net was 12 m in length and 4 m in width. Twelve mist nets were installed inside the 20m x 20m subplot inside the 2 hectare permanent plot and three were installed at the borders of the permanent plots. Mist nets were monitored from 0500-17 hours at 1-2 hours interval and checked again in the early morning. The entire sampling had a total of days where net days were accomplished. Standard external measurements (total length, tail length) were taken. Identifies species were tagged, measured, and released at the site of capture, Guide to Philippines birds by Kennedy et. Al was used for the identification. Netting was done to record cryptic species as well as nocturnal bird species that are difficult to observe during transect counts.





Figure 9. Netting area

### 3.2.2.3 Mammals

#### 3.2.2.3.1 Bats

Fruit bats and insect bat were captured using the same mistnets used for birds which were left open at night. Mist nets were tended continuously during the activity peak from early dusk (about 1730h, net watching) until about 2200 h, whenever possible and were left open thereafter. Bats were removed at dawn, during net watching and until 2000h. Identification was based on Ingle and Heaney (1992). Representatives of species caught were photographed and then released.

#### 3.2.2.3.2 Non-volant Mammals

For small non-volant mammals (murid rodents and shrews), traps were set in the evening and retrieve captures early in the morning and replace bait in the late afternoon. Cage traps baited with roasted coconut meat covered with peanut butter were set in the late afternoon along possible runways (i.e. along fallen logs, tree buttresses, tree holes, etc).

### 3.2.2.4 Data Analysis

Bird community diversity indices were calculated from a mathematical formula that takes into account both species richness and the relative abundance of each species in the community. Relative abundance refers to the number of individuals of a given species divided by the total number of all species encountered. The community diversity was mathematically calculated using the Shannon-Weiner Index. The value of the Shannon-Weiner index ( $H'$ ) was calculated using the formula:

$$H' = -\sum [n_i/N \ln n_i/N]$$



The following diversity indices (parameters) were also used to determine the degree of species diversity in the sampling site:

- Species Richness Index ( $S$ ) – refers to the number of species for a given site
- Dominance Index ( $D$ ) will be mathematically computed using the formula:

$$D = (H_{\max} - H),$$

where:  $H$  = Diversity;

$$H_{\max} = \text{Maximum diversity} = \ln(S)$$

- Shannon's Evenness Index ( $e$ ) =  $H' / H_{\max}$ ,  
where:  $H_{\max} = \ln(S)$

### 3.2.3 Invertebrate Fauna

#### 3.2.3.1 Data Analysis

Species diversity can be quantified in different ways. The two main factors taken into account when measuring diversity are richness and evenness (Magurran 2004). Richness is a measure of the number of different kinds of organisms present in a particular area. For example, species richness is the number of different species present. However, diversity depends not only on richness, but also on evenness. Evenness compares the similarity of the population size of each of the species present or simply the equitability of the populations of the different species in an ecological unit.

The indices obtained include Margalef Index, Shannon-Wiener Diversity Index, Simpson's Index of Dominance, Simpson's Index of Diversity and Pielou's Equitability Index. Margalef Index is a measure to quantify species richness while the rest quantifies species diversity which consider species richness and evenness of the populations.

### 3.3 Important Plant Areas (IPA)

Important Plant Areas (IPAs) are areas of great botanical importance for threatened species, habitats and plant diversity (Anderson, 2002). The identification IPAs is a program initiated by Plant Life International, which aims to identify and protect a network of best sites for plant conservation throughout Europe and the rest of the world. This also aims to provide a site-based approach to conservation.

The identification of IPAs in MIBNP was based from the selection criteria set by Anderson (2002) with the following description below:

- Criterion A – The site holds significant population of one or more species that are of global or European conservation concern.
- Criterion B – The site has an exceptionally rich flora in relation to its biogeographic zones.
- Criterion C – The site is an outstanding example of a habitat type of global plant conservation and botanical importance.

## 4 RESULTS AND DISCUSSIONS

### 4.1 Physical Assessment

#### 4.1.1 Elevation

The information on elevation was derived from a digital elevation model (DEM). The elevation of MIBNP was divided into five classes, and the highest elevation was observed on the upper portion of the protected area which has a total area of 943.41 hectares. On the other hand, the lower part of the protected area was considered to be having an elevation of about 1000m to 1500 masl.

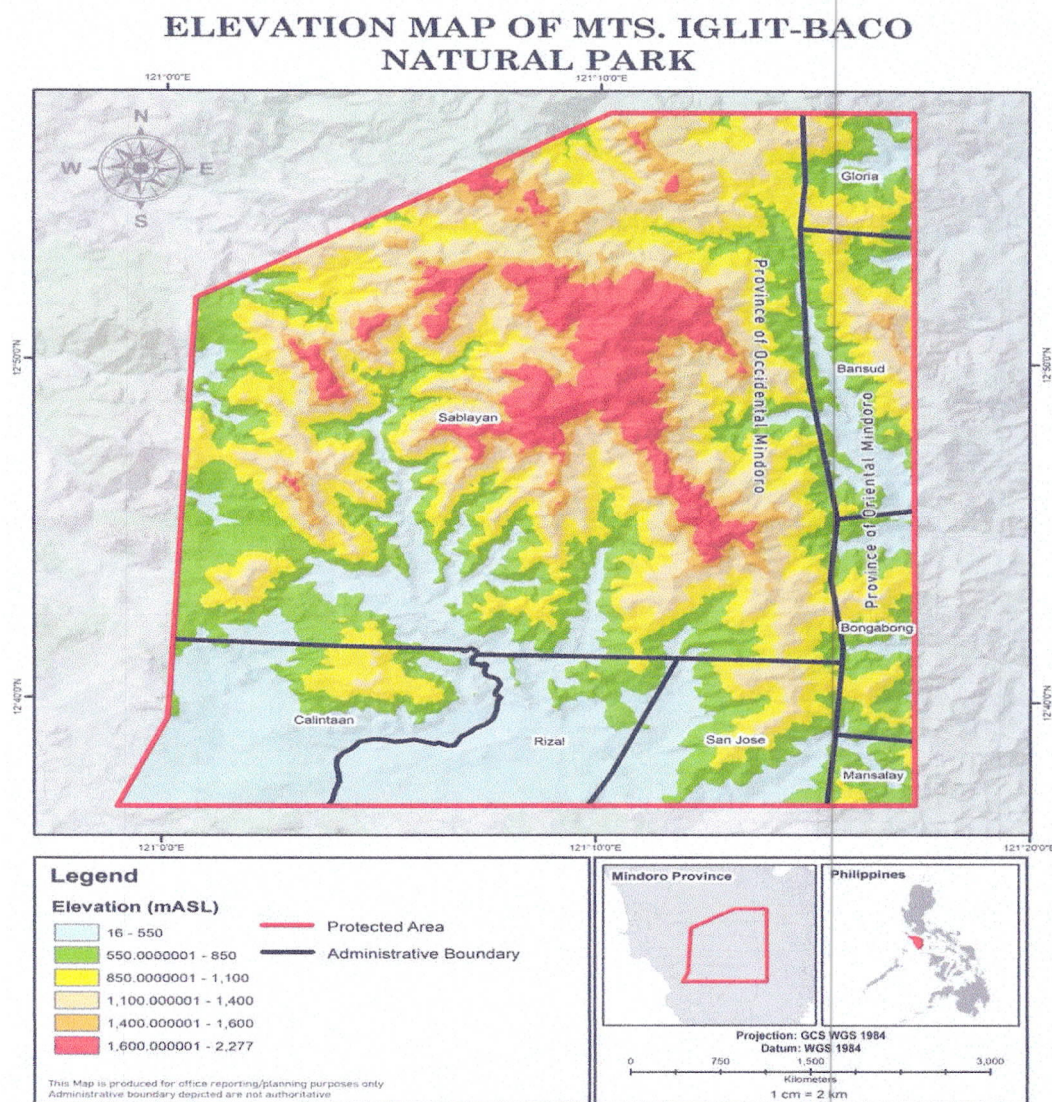
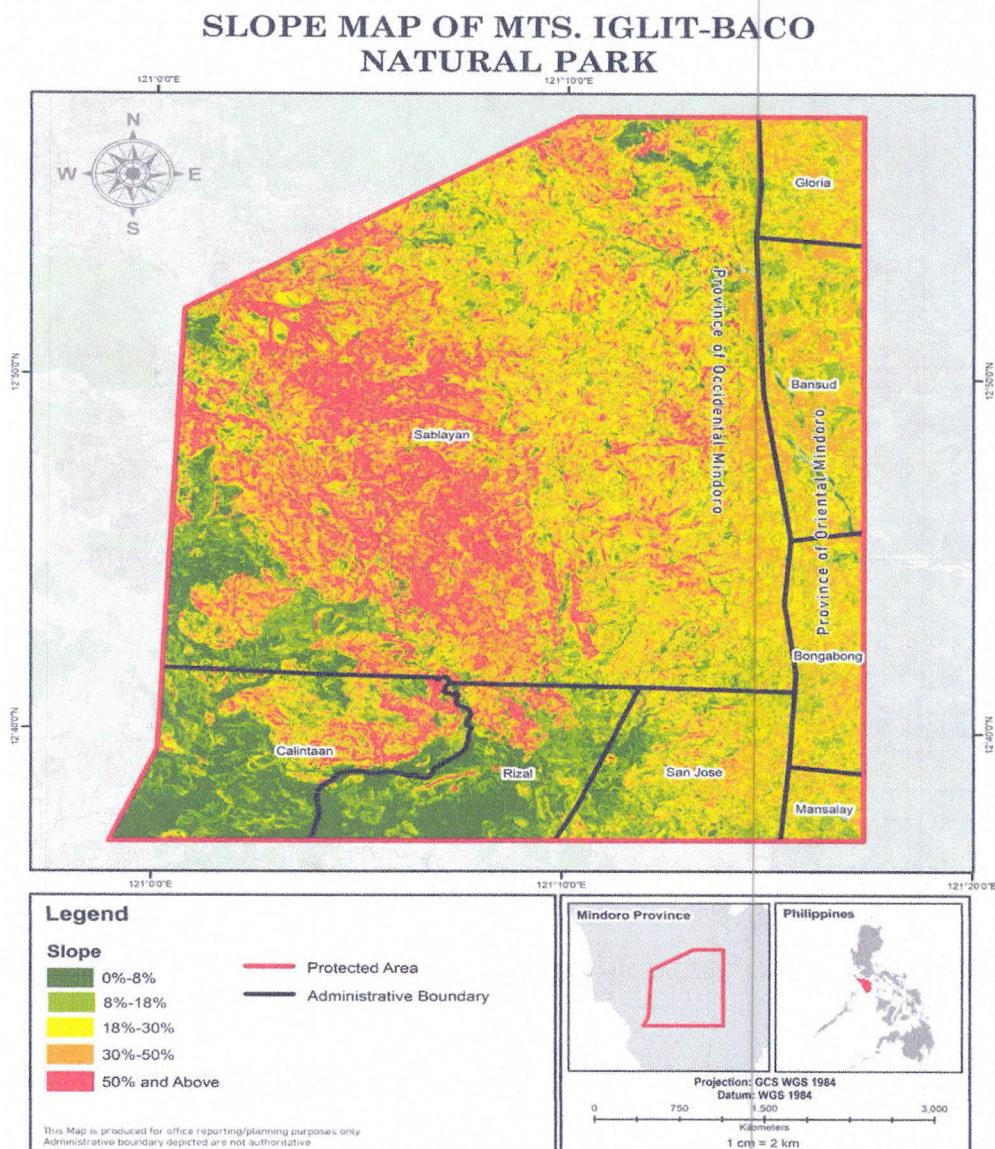


Figure 10. Elevation map of MIBNP





**Figure 11. Slope map of MIBNP**

#### 4.1.2 Slope

Majority of the protected area was considered to be having more than 50% slope which covers a total area 40, 859.88 hectares, while the minority of MIBNP was considered to be at 0 to 8% slope only, that is 3,627.88 hectares.

#### 4.1.3 Land Cover

There are eight identified land cover classes in MIBNP. These are listed as follows: annual crop, brush/shrubs, closed forest, grassland, inland water, open forest, open/barren, and perennial crop. Majority of the land cover of MIBNP is classified as grassland areas (43,322.86), followed by open forest with 31, 777.17 ha, brush/shrubs with 28, 861.96 ha, annual crop with 1373 ha, inland water with 841.89, closed forest with 284.25 hectare, perennial crop with 129.90 ha and lastly the open/barren land with 48.33 hectares.



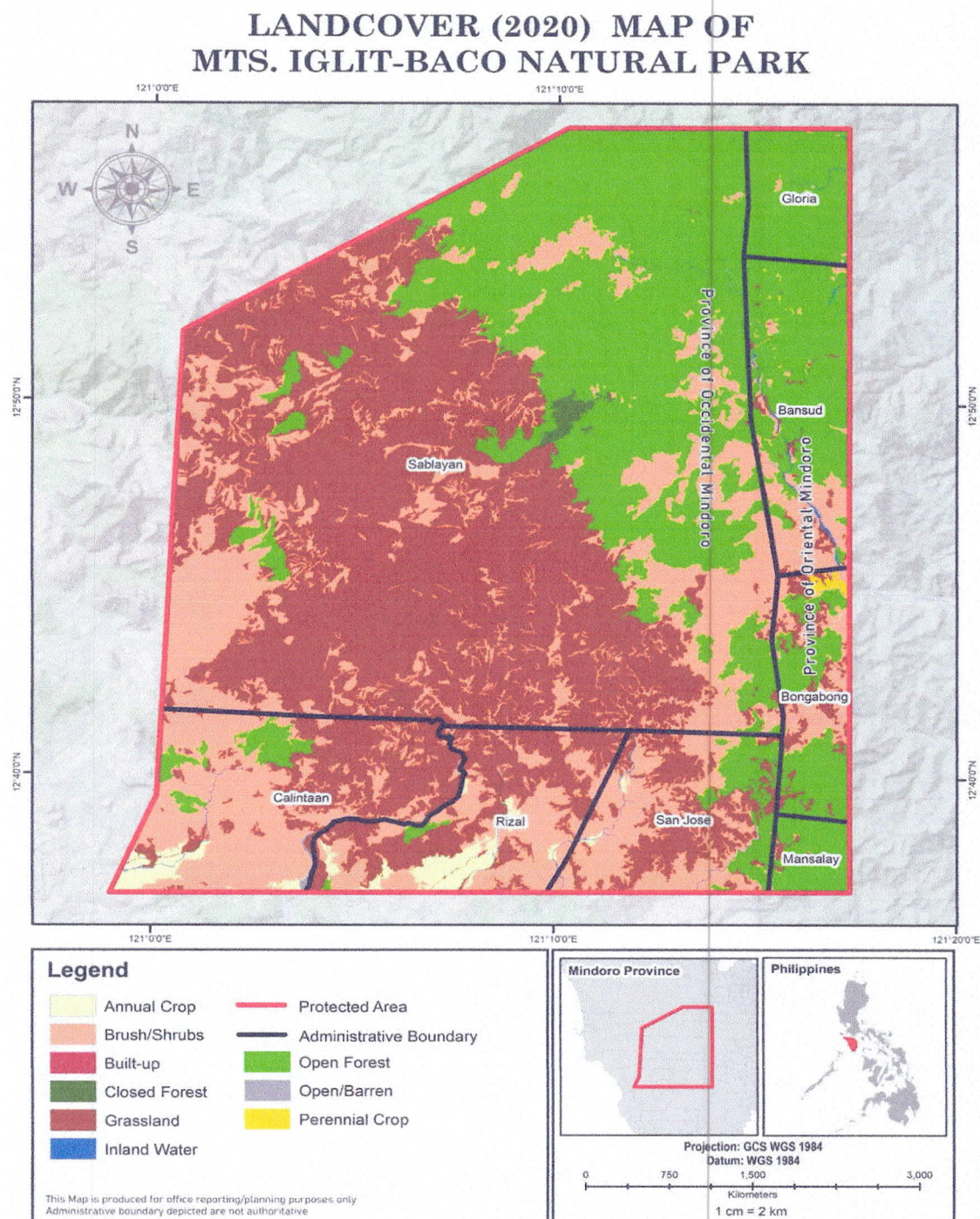


Figure 12. Land cover map of MIBNP



#### 4.1.2.1 Transect Walk Observation

Soils observed during the 2-km transect walk is brown in color. This color indicates to a certain degree the nature of the parent material of soils in the area. Likewise, the relatively light coloration of the soil is indicative of low organic matter content, which has implications to its aggregate stability and percent porosity. This type of soil normally has unstable aggregates, which can lead to compaction, and poor infiltration and aeration.



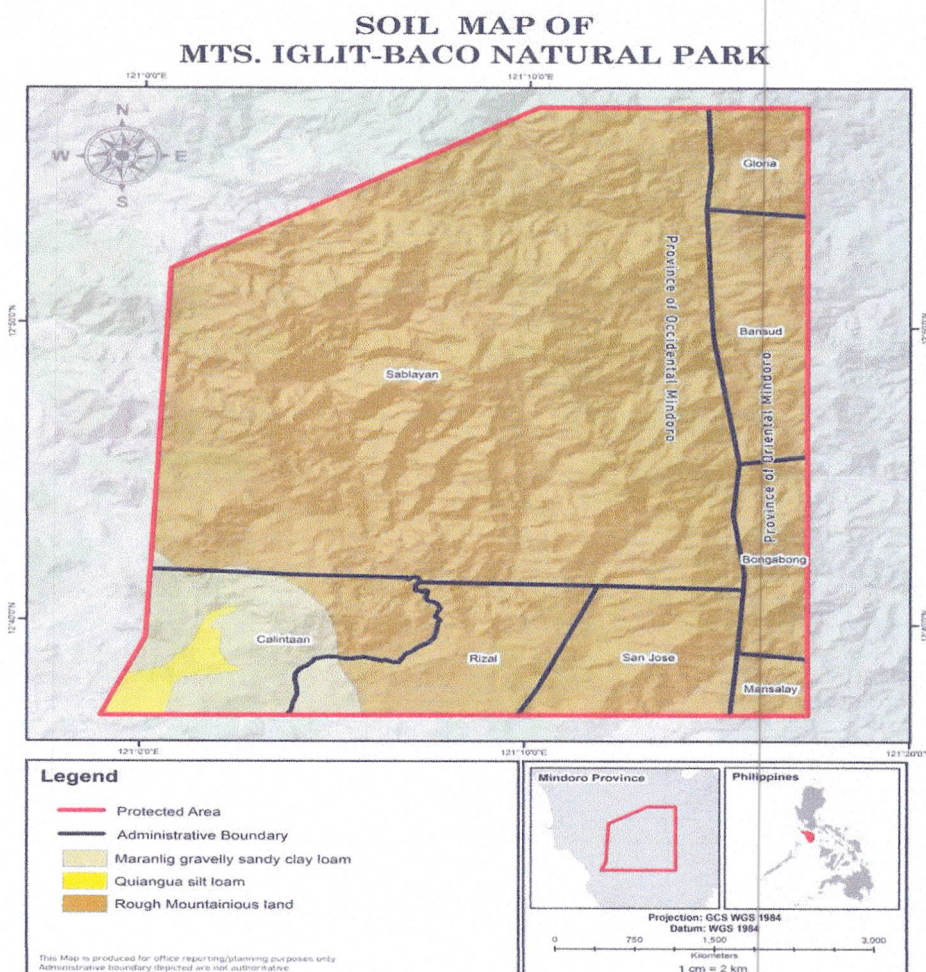
Figure 13. Typical color of soils observed in MIBNP.

Evidences of soil erosion were also observed during the field activities. Eroded soil materials are found along trails, indicative of constant human disturbance. Aside from anthropological impact, hints of naturally induced erosion are also observable. Furthermore, wallows of mud with traces of Tamaraw hoof marks were spotted in some areas indicating disturbance of soil by animal traffic.

#### 4.1.2.2 Soil Description from Available Secondary Information

Review of available data shows that two different soil types cover Mt. Iglit-Baco National Park. These are the Maranlig gravelly, sandy clay loam, and Quingua silt loam. However, majority of the site (95%) falls or is mapped as rough mountainous land





**Figure 14. Soils map of MIBNP**

“Maranlig soil series is a primary soil derived from basalt and andesite, and is classified as fine, isohyperthermic Typic Hapludults. The drainage is good to excessive externally and fair internally” (Carating et al., 2014). Maranlig soil is a highly weathered soil that is relatively infertile and acidic as it belongs to the order Ultisols. However, it could be productive with proper soil management. Quiangua soil series is a “member of fine clayey, mixed, isohyperthermic family of Typic Tropudalfs. The soil is very well drained” (Carating et al., 2014). As this soil belongs to the order Alfisols, this soil is relatively fertile with good amount of bases. Both soils are typically associated with forest vegetation. As such, it is important that it remains forested for protection and continuous productivity.

## 4.2 Vertebrate Fauna

A total of 68 terrestrial wildlife species consisting of five species of frogs, two species of reptiles, 53 species of birds and eight mammals were recorded. Of these, species (55%) are native or resident species while 19 species (~34%) are endemic. Of the 19 endemic species, 14 are found throughout most of the Philippines while five species are only found in Mindoro Island.



### 4.2.1 Herpetofauna

Our survey yielded 51 individual species of herpetofauna, 8 species of frogs and toads, 1 species of snake and 1 species of lizard. Out of them, *Leptobrachium mangyanorum* is mindoro endemic and is found to be vulnerable species according to IUCN. *Limnonectes acanthi* is also listed as vulnerable frog and the rest of the species are Least Concern (LC). *Naja philippinensis* or known to be Philippine Cobra is a near threatened snake.

Among the species of amphibians, only one species is Mindoro endemic, *Leptobrachium mangyanorum*. Among the frogs and toads recorded during our survey, families Rhacophoridae display the highest number of individuals and the highest abundance. Polypedates leucomystax (Rhacophoridae) is the most abundant tree frog species, while Fejervarya species (Dicroglossidae), Kaloula conjuncta (Microhylidae), were found to be the least abundant. The highest species richness as well as abundance of frogs and toads was recorded in moist forests. This reflects the fact that the moist forests in MIBNP provide ideal habitat for tree frogs and narrow-mouthed frogs. More importantly, all the narrow-mouthed frog species (Microhylidae) were found only in moist forests, highlighting the importance of protecting the few surviving moist forest habitats in MIBNP.

Only two species of reptiles which are commonly found in forested to open areas were recorded in the area. These are the two-striped mabouya and the green crested lizard.

The wildlife assessment thus recorded a total of only eight herpetofauna species within the area (Appendix I). This consists of 4 Philippine endemic and only one Mindoro endemic. Thus, the area is especially important to two locally endemic and Threatened frogs. Appendix II shows some of the herpetofauna species recorded within the area.

### 4.2.2 Avifauna

A total of 53 species of birds represented by 31 Families were recorded during the sampling period. The Line transect method recorded a total of 51 species while 6 species were recorded only through netting. Overall, the birds recorded within the area were common resident bird species associated with forested as well as open areas.

#### 4.2.2.1 Species Composition

A total of 53 bird species were recorded in the study area under 31 families. Out of the total recorded of avian species, 41% (n=21) were residents, 47% (n=24) were Philippine endemic, 8% (n=4) were dry season visitors and 4%(n=2) were Mindoro endemic.

Most of the birds recorded were Philippine endemic species. These birds are found throughout the Philippines. Endemic birds are usually associated with forested areas. There was also one Near Endemic species, birds only found in the Philippines and in some nearby islands. Resident species or birds which naturally distributed in the Philippines and in other countries comprised 41% of the total number of recorded species in MIBNP. They breed or are suspected of breeding in the Philippines and normally live here throughout the year. Endemic birds are usually associated with forested areas. The sampling coincided with the

migratory season of birds and there were five species (8% recorded) while the remaining 4% occur only in Mindoro Island. Figure 15 shows a chart representation of the residency status of all recorded bird species.

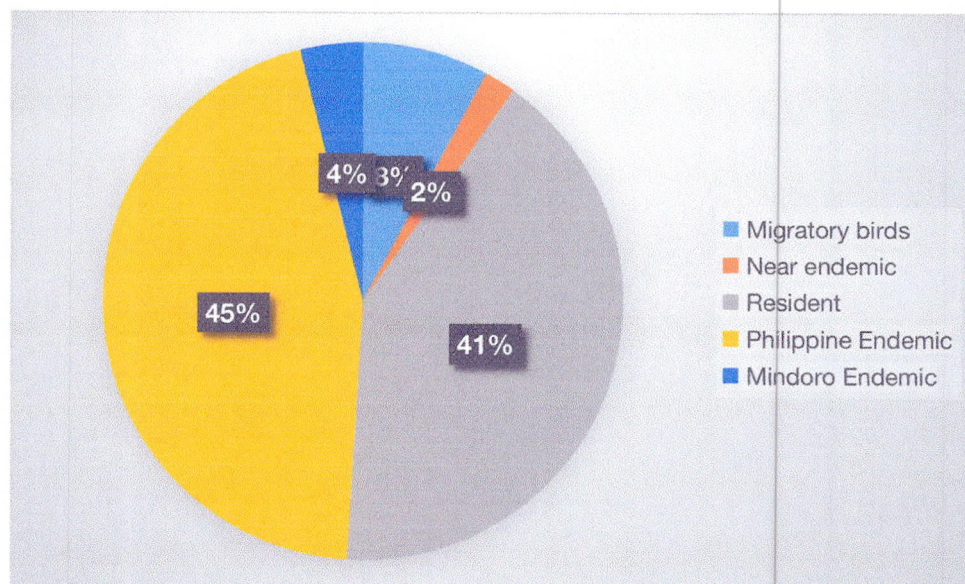


Figure 15. Residency status of all recorded bird species

The sampling area generally consisted of open scrubland and grassland with patches of secondary growth forests. Habitat association of bird species recorded concurs with the available habitat types.



Majority (88%) of the bird species recorded in the area are not listed under the IUCN Red List of Threatened Species, DAO 2004-15 of the Philippine Wildlife Act or CITES Appendices. These species are considered as widespread and abundant. There were, however, five species that are of conservation concern. The Mindoro endemic hornbill (*Penelopides mindorensis*) is listed as endangered and Mindoro endemic coucal (*Centropus steeri*) is critically endangered under IUCN. Colasisi (*Loriculus philippensis*) is considered as Endangered under the list of DAO 2004-15. Figure 16 shows a chart representation of the conservation status of recorded bird species.

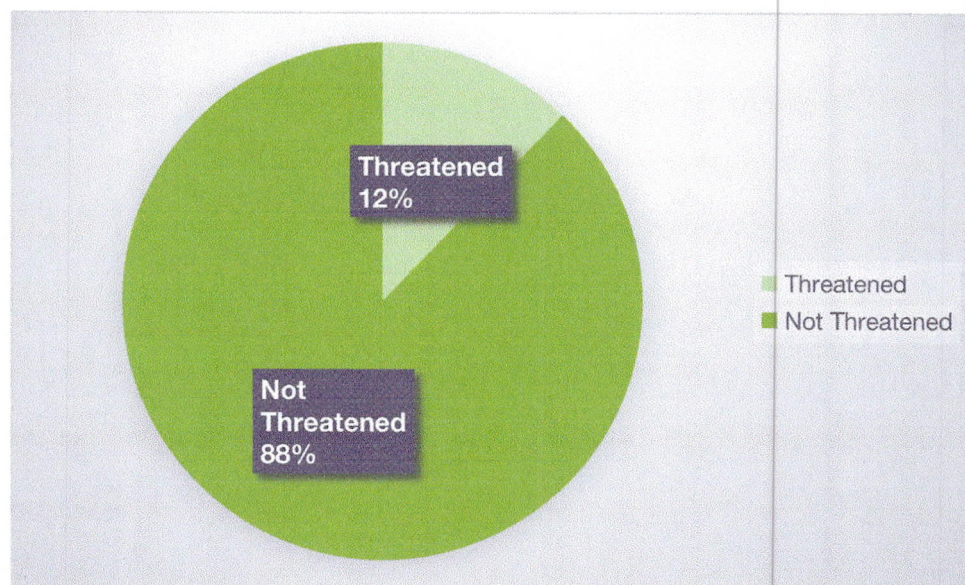


Figure 16. Conservation status of recorded bird species

#### 4.2.2.2 Biodiversity Parameters: Species Richness, Abundance and Diversity Indices

The Line Transect Method resulted to a total of 51 bird species consisting of 496 individuals. The Species Diversity Index ( $H'$ ) value obtained was high (3.27). This suggests that only a few species dominated in terms of number of individuals recorded relative to bird species richness. The most dominant were Philippine Bulbul (*Hypsipetes philippinus*) and Pygmy swiftlet (*Colocalia troglodytes*) which are naturally gregarious birds easily seen flying while catching insects. Together, they comprised 15% and 8% respectively of the total number of individuals observed.

#### 4.2.3 Mammals

There was a total of 11 species recorded consisting of 6 species of fruit bats, one species of insectivorous bats, 3 small non-volant mammals and 2 large-sized mammal (Appendix VII). Seven species are endemic with four that are found throughout most of the Philippine islands and three only found in Mindoro.

A total of 58 individuals of bats were captured resulting to a netting success of bat/net night. The native *Cynopterus brachyotis* accounted for 43% of total captures while the native *Rousettus amplexicaudatus* accounted for 35%. For the small non-volant mammals, only three species was captured for trapping.



The presence of the Critically Endangered Tamaraw (*Bubalus mindorensis*) and Mindoro Pallid Flying Fox (*Desmalopex leucopterus*) highlights the importance of the area and the need to further protect it against various environmental disturbances.

## 5 CONCLUSION

The results of the assessment showed that MIBNP holds a very significant faunal diversity. In terms of floral composition, MIBNP, characterized as forest over limestone, has a low to moderate species diversity and stocking density. This is expected and understandable as MIBNP is composed of brushland, young secondary forest and a large portion of grassland area with approximately 62% of its total land area. On the other hand, the terrestrial wildlife of MIBNP provides sufficient information of high biodiversity parameters (species diversity, richness and abundance). Noteworthy among the list are the 5 endemic terrestrial species of Mindoro (Mindoro Hornbill, Mindoro Litter Frog, Mindoro stripe faced fruit bat, Black hooded Coucal and Tamaraw) which are all listed under IUCN RedList. This indicates the importance of MIBNP for the in-situ conservation of these species specifically the critically endangered tamaraw.

## 6 RECOMMENDATIONS

The recommendations root on the area-based disparities of the current BAMS sites in relation to the total demarcated area of 106,655.62 hectares. This drives the recommendation for the establishment of additional sampling sites for the assessment of all the forest formations present in the protected area from Lowland Evergreen Forest to Upper Montane Forest to cover the current deficient in data or information. The PAMB has also recommend the addition of sampling sites within the Multiple Use Zone. Hence, establishment of BAMS sites within these ecosystems can also provide some insights on the composition and diversity of the biota. However, there is a limitation of the PAs to cover larger assessment and monitoring area, this drives to the recommendation to establish a network to facilitate exchange of information. A user-friendly database should be developed to maximize the use of the information collected from the different assessment and monitoring sites.

The current capabilities of personnel conducting the BAMS needs refinement and enrichment. This provides the assurance that species observed underwent accurate and proper identification. The BAMS should also be enhanced through the addition of new methodologies such as ecosystem specific techniques within the target capacitation to increase likelihood of identifying new species or monitoring species of interest.

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## 7 APPENDICES

Appendix I. Checklist of amphibians and reptiles recorded within MIBNP.

No.	Taxa	Common name	Residency status	Habitat association	Conservation status			
					IUCN	CITES	DAO 2004-15	
	Class Amphibia							
	Order Anura							
	RANIDAE							
	DICROGLOSSIDAE							
1	<i>Limnonectes acanthi</i>	Busuanga wart frog	Philippine endemic	forested areas; amphibious	Vulnerable	Not listed	Not listed	
2	<i>Fejervarya vittigera</i>	Luzon Wart Frog	Philippine endemic	forested areas; terrestrial	Least Concern	Not listed	Not listed	
	MEGOPHRIDAE							
3	<i>Leptobrachium mangyanorum</i>	Mindoro litter frog	Mindoro endemic	forested areas; terrestrial	Vulnerable	Not listed	Not listed	
	RHACOPHORIDAE							
4	<i>Polypedates leucomystax</i>	Common tree frog	native	open areas	Least Concern	Not listed	Not listed	
	CERATOBATRACHIDAE							
5	<i>Platymantis corrugatus</i>	Rough-backed Forest Frog	Philippine Endemic		Least Concern	Not listed	Not listed	

No.	Taxa	Common name	Residency status	Habitat association	Conservation status		
					IUCN	CITES	DAO 2004-15
	<b>MICROHYLIDAE</b>						
6	<i>Kaloula conjuncta</i>	Truncate-Toed Chorus Frog	Philippine Endemic		Least Concern	Not listed	Not listed
	<b>Class Reptilia</b>						
	<b>Order Squamata</b>						
	<b>SCINCIDAE</b>						
7	<i>Eutropis multicarinata</i>	Two-striped mabouya	native	forested to open areas	Least Concern	Not listed	Not listed
	<b>ELAPIDAE</b>						
8	<i>Naja philippinensis</i>	Philippine Cobra	Philippine endemic	forested to open areas	Near threatened	Not listed	Not listed



Appendix II. Transect results and computed biodiversity indices

No.	Scientific Name	Common Name	No. of individuals (n <sub>i</sub> )	Relative Frequency (n <sub>i</sub> /N)	Proportional Dominance Index (n <sub>i</sub> /N) <sup>2</sup>	ln(n <sub>i</sub> /N)	Proportional Species Diversity Index (n <sub>i</sub> /N) ln(n <sub>i</sub> /N)
1	<i>Fejervarya vittigera</i>	Luzon Wart Frog	4	0.066666667	-0.18053668	-2.708050201	0.004444444
2	<i>Kaloula conjuncta</i>	Philippine Narrow-mouthed Frog	3	0.05	-0.149786614	-2.995732274	0.0025
3	<i>Leptobrachium mangyanorum</i>	Mindoro Litter Frog	2	0.033333333	-0.113373246	-3.401197382	0.001111111
4	<i>Limnectes acanthi</i>	Busuanga wart frog	3	0.05	-0.149786614	-2.995732274	0.0025
5	<i>Naja philippinensis</i>	Philippine Cobra	1	0.016666667	-0.068239076	-4.094344562	0.000277778
6	<i>Platymantis corrugatus</i>	Rough-backed Forest Frog	2	0.033333333	-0.113373246	-3.401197382	0.001111111
7	<i>Polypedates leucomystax</i>	Four-lined Tree Frog	49	0.816666667	-0.165394816	-0.202524264	0.666944444
8	<i>Eutropis multicarinata</i>	Two-striped mabouya	1	0.016666667	-0.068239076	-4.094344562	0.000277778

Species richness =8

Abundance = 65

Species diversity index (H') = 1.01

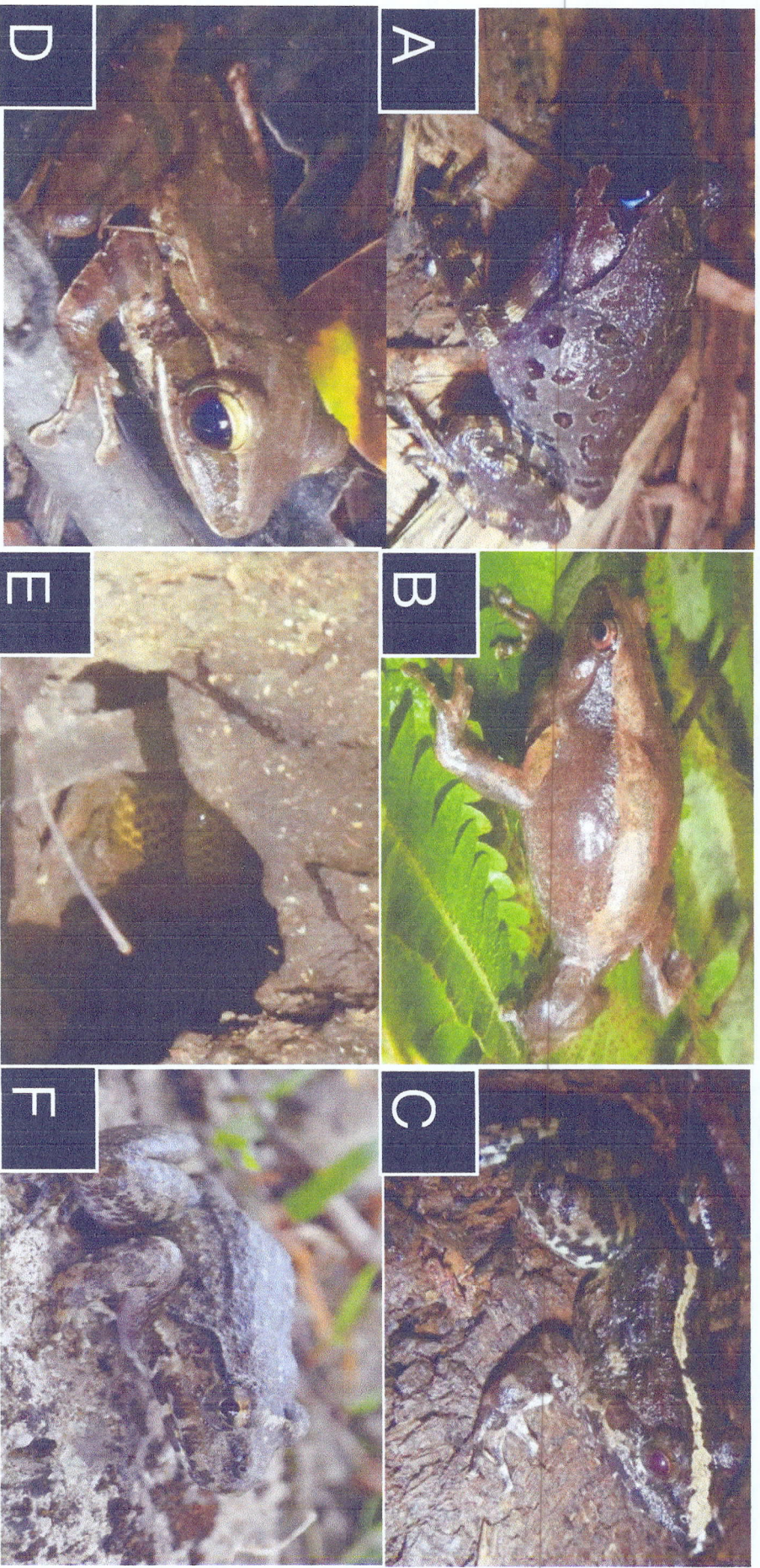
Dominance Index = 0.13

Evenness Index = 0.578

Total Mindoro endemic =2



### Appendix III. Photos of amphibians and reptiles recorded within MIBNP



(A) *Leptobrachium mangyanorum*, (B) *Kaloula conjuncta*, (C) *Fejervarya vittigera*, (D) *Polypedates leucomystax*, (E) *Naja philippensis*  
(F) *Limnonectes acanthi*



## Appendix IV. Checklist of birds recorded within MIBNP

No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
	COLUMBIDAE							
	<i>Macropygia phasianella</i>	Reddish cuckoo-dove	Resident	forested areas	transect	Least Concern	Not Listed	Not Listed
1		White-eared brown-dove	Philippine endemic	forested areas	transect	Least Concern	Not Listed	Not Listed
2	<i>Phapitreon leucotis</i>	Pompadour Green-Pigeon	resident	forested areas	transect	Least Concern	Not Listed	Not Listed
3	<i>Treron pompadora</i>							
	PSITTACIDAE							
4	<i>Loriculus philippensis</i>	Colasisi	Philippine endemic	forested & open areas	transect, netting	Least Concern	II	Endangered
	CUCULIDAE							
5	<i>Centropus viridis</i>	Philippine coucal	Philippine endemic	forested & open areas	transect	Least Concern	Not Listed	Not Listed
6	<i>Centropus bengalensis</i>	Lesser coucal	resident	forested areas	transect	Least Concern	Not Listed	Not Listed
7	<i>Cuculus fugax</i>	Hodgson's Hawk-Cuckoo	Resident	Forested areas	transect	Least Concern	Not listed	Not listed
8	<i>Centropus steerii</i>	Black hooded Coucal	Mindoro endemic	Forested areas	transect	Critically Endangered	Not listed	Not listed
9	<i>Eudynamys scolopacea</i>	Common koel	Philippine Endemic	Open areas	transect	Least Concern	Not listed	Not listed
	ALCEDINIDAE							
10	<i>Halcyon smyrnensis</i>	White-throated	resident	forested &	transect	Least Concern	Not Listed	Not Listed



No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
		kingfisher		open areas				
	<b>MEROPIDAE</b>							
11	<i>Merops viridis</i>	Blue-throated Bee-eater	resident	open areas	transect	Least Concern	Not Listed	Not Listed
12	<i>Merops philippinus</i>	Blue-tailed Bee-eater	Resident	Forested and open areas	transect	Least Concern	Not listed	Not listed
	<b>PYCNONOTIDAE</b>							
13	<i>Hypsipetes philippinus</i>	Philippine bulbul	Philippine endemic	forested areas	transect, netting	Least Concern	Not Listed	Not Listed
14	<i>Pycnonotus goiavier</i>	Yellow-vented Bulbul	resident	forested & open areas	transect	Least Concern	Not Listed	Not Listed
	<b>DICRURIDAE</b>							
15	<i>Dicrurus balicassius</i>	Balicassiao	Philippine endemic	forested areas	transect, netting	Least Concern	Not Listed	Not Listed
	<b>ORIOLIDAE</b>							
16	<i>Oriolus chinensis</i>	Black-naped oriole	resident	forested & open areas	transect	Least Concern	Not Listed	Not Listed
	<b>CORVIDAE</b>							
17	<i>Corvus macrorhynchos</i>	Large-billed Crow	resident	forested & open areas	transect	Least Concern	Not Listed	Not Listed
18	<i>Corvus enca</i>	Slender-billed Crow	resident	open areas	transect	Least Concern	Not Listed	Not Listed
	<b>PARIDAE</b>							
19	<i>Pardaliparus elegans</i> ( <i>Parus elegans</i> )	Elegant tit	Philippine endemic	forested areas	netting	Least Concern	Not Listed	Not Listed



No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
	<b>LOCUSTELLIDAE</b>							
20	<i>Megalurus palustris</i>	Striated Grassbird	resident	open areas	transect	Least Concern	Not Listed	Not Listed
	<b>MUSCICAPIDAE</b>							
			Migrant	Forested areas	transect			
21	<i>Ficedula narcissina</i>	Narcissus Flycatcher				Least Concern	Not Listed	Not Listed
22	<i>Saxicola caprata</i>	Pied Bushchat	Resident	Open areas	transect	Least Concern	Not listed	Not Listed
23	<i>Ficedula westermanni</i>	Little Pied Flycatcher	Resident	Forested areas	transect	Least Concern	Not listed	Not listed
24	<i>Brachypteryx montana</i>	White-browed shortwing	Philippine endemic	Forested areas	transect	Least concern	Not listed	Not listed
	<b>LANIIDAE</b>							
25	<i>Lanius cristatus</i>	Brown shrike	migrant	forested & open areas	transect	Least Concern	Not Listed	Not Listed
26	<i>Lanius schach</i>	Long-tailed Shrike	resident	open areas	transect	Least Concern	Not Listed	Not Listed
27	<i>Lanius validirostris</i>	Mountain shrike	Philippine Endemic	Forested areas	transect	Least Concern	Not listed	Not listed
	<b>STURNIDAE</b>							
			Philippine endemic	forested areas	transect			
28	<i>Sarcops calvus</i>	Coletto				Least Concern	Not Listed	Not Listed
	<b>RALLIDAE</b>							
29	<i>Amaurornis olivaceus</i>	Plain Bush Hen	Resident	Open areas	transect	Least Concern	Not listed	Not listed



No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
30	<i>Porzana fusca</i>	Ruddy-breasted Crane	Migrant	Open areas	transect	Least Concern	Not listed	Not listed
31	<i>Amaurornis phaeicurus</i>	White-breasted Waterhen	Resident	Open areas	transect	Least Concern	Not listed	Not listed
32	<i>Dryolimnas mirificus</i>	Brown Banded Rail	Philippine Endemic	Forested and open areas	transect	Data Deficient	Not listed	Not listed
	<b>TURCINIDAE</b>							
33	<i>Turnix susciator</i>	Barred Butongquail	Philippine Endemic	Forested areas	transect	<b>Vulnerable</b>	Not listed	Not listed
34	<i>Turnix sylvatica</i>	Small Butongquail	Philippine Endemic	Open areas	transect	Least Concern	Not listed	Not listed
	<b>DICAEDAE</b>							
35	<i>Dicaeum pygmaeum</i>	Pygmy flowerpecker	Philippine endemic	forested areas	transect	Least Concern	Not Listed	Not Listed
	<b>FALCONIDAE</b>							
36	<i>Microhierax erythrogenys</i>	Philippine Falconet	Philippine Endemic	Open areas	transect	Least Concern	Not listed	Not listed
37	<i>Falco peregrinus</i>	Peregrine Falcon	Philippine Endemic	Forested and open areas	transect	Least Concern	Not listed	Not listed
	<b>PICIDAE</b>							



No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
38	<i>Dryocopus javensis</i>	White-bellied Woodpecker	Resident	Forested and open areas	transect	Least Concern	Not listed	Not listed
39	<i>Yungipicus maculatus</i>	Philippine Pygmy Woodpecker	Philippine Endemic	Open areas	transect	Least Concern	Not listed	Not listed
<b>PHASIANDAE</b>								
40	<i>Gallus gallus</i>	Red Jungle Fowl	Resident	Forested areas	transect	Least Concern	Not listed	Not listed
<b>PSSITACIDAE</b>								
41	<i>Tanygnathus lucionensis</i>	Blue naped Parrot	Philippine Endemic	Forested areas	transect	<b>Near Threatened</b>	Not listed	Not listed
42	<i>Loriculus philippensis</i>	Colasisi	Philippine Endemic	Forested and open areas	transect	Least Concern	Not listed	Not listed
<b>PITTIDAE</b>								
43	<i>Pitta sordida</i>	Hooded Pitta	Philippine Endemic	Forested and open areas	transect	Least Concern	Not listed	Not listed
<b>MEGALAIMIDAE</b>								
44	<i>Megalaima haemacephala</i>	Coppersmith Barbet	Resident	Open areas	transect	Least Concern	Not listed	Not listed
<b>PSSITACULIDAE</b>								
45	<i>Prioniturus verticalis</i>	Blue-winged Racket tail	Philippine Endemic	Forested and open areas	transect	<b>Critically Endangered</b>	Not listed	Not listed



No.	Taxa	Common name	Residency status	Habitat association	Method	Conservation status		
						IUCN	CITES	DAO 2004-15
	<b>CISTICOLIDAE</b>							
46	<i>Cisticola juncidis</i>	Zitting Cisticola	Resident	Open areas	transect	Least Concern	Not listed	Not listed
	<b>BUCEROTIDAE</b>							
47	<i>Penelopied mindorensis</i>	Mindoro Hornbill	Mindoro endemic	Forested areas	transect	Endangered	Not listed	Not listed
	<b>TURDIDAE</b>							
48	<i>Zoothera cinerea</i>	Ashy Ground Thrush	Philippine Endemic	Forested areas	transect	Vulnerable	Not listed	Not listed
49	<i>Turdus chrysolaus</i>	Brown-headed Thrush	Philippine Endemic	Forested areas	transect	Least concern	Not listed	Not listed
	<b>ESTRILIDAE</b>							
50	<i>Lonchura atricapilla</i>	Chestnut munia	Resident	Open areas	transect	Least Concern	Not listed	Not listed
	<b>ACCIPITRIDAE</b>							
51	<i>Haliastur indus</i>	Brahminy kite	Resident	Open areas	transect	Least Concern	Not listed	Not listed
52	<i>Spizaetus philippensis</i>	Changeable Hawk Eagle	Philippine Endemic	Forested areas	transect	Least Concern	Not listed	Not listed
	<b>APODDAE</b>							
53	<i>Collocalia troglodytes</i>	Pygmy swiftlet	Philippine Endemic	Open areas	transect	Least Concern	Not listed	Not listed



Appendix V. Photos of some birds recorded within MIBNP



(A) *Loriculus philippensis*, (B) *Dryolaimus mirificus*, (C) *Centropus steerii*, (D) *Penelopides mindorensis*, (E) *Zoothera cinerea*,  
(F) *Hypsipetes philippinus*



## Appendix VI. Transect results and computed biodiversity indices

No.	Scientific Name	Common Name	No. of individuals (n)	Relative Frequency (n/N)	Proportional Dominance Index (n/N) <sup>2</sup>	$\ln(n/N)$	Proportional Species Diversity Index (n/N) $\ln(n/N)$
1	<i>Centropus bengalensis</i>	Lesser Coucal	4	0.007936508	0.0000629882	-4.836281907	-0.03838319
2	<i>Peneloped mindorensis</i>	Mindoro Hornbill	8	0.015873016	0.000251953	-4.143134726	-0.065764043
3	<i>Zoothera cinerea</i>	Ashy Ground Thrush	1	0.001984127	0.000003936	-6.222576268	-0.012346381
4	<i>Dicrurus balicassius</i>	Balicassiao	29	0.057539683	0.003310815	-2.855280438	-0.16429193
5	<i>Tamix susciator</i>	Barred Buttonquail	1	0.001984127	0.000003936	-6.222576268	-0.012346381
6	<i>Centropus steerii</i>	Black Hooded Coucal	3	0.005952381	0.000035430	-5.123963979	-0.030499786
7	<i>Oriolus chinensis</i>	Black Naped Oriole	12	0.023809524	0.000566893	-3.737669618	-0.088992134
8	<i>Tamynathus lucionensis</i>	Blue naped Parrot	19	0.037698413	0.00142117	-3.278137289	-0.123580572
9	<i>Merops philippinus</i>	Blue-tailed Bee-eater	9	0.017857143	0.00031887	-4.025351691	-0.07188128
10	<i>Merops viridis</i>	Blue-throated Bee-eater	26	0.051587302	0.000003936	-2.96447973	-0.15292951
11	<i>Prioniturus verticalis</i>	Blue-winged Raquet-tail	1	0.001984127	0.000003936	-6.222576268	-0.012346381
12	<i>Haliastur indus</i>	Brahmany kite	1	0.001984127	0.000003936	-6.222576268	-0.012346381
13	<i>Dryolimnas virificus</i>	Brown-banded Rail	1	0.001984127	0.000003936	-6.222576268	-0.012346381
14	<i>Lanius cristatus</i>	Brown Shrike	2	0.003968254	0.000015747	-5.529429088	-0.021942179
15	<i>Spizaetus cirrhatus</i>	Changeable-Hawk Eagle	1	0.001984127	0.000003936	-6.222576268	-0.012346381



No.	Scientific Name	Common Name	No. of individuals (ni)	Relative Frequency (ni/N)	Proportional Dominance Index (ni/N) <sup>2</sup>	ln(ni/N)	Proportional Species Diversity Index (ni/N) ln(ni/N)
16	<i>Lonchura atricapilla</i>	Chestnut Munia	12	0.023809524	0.000566893	-3.737669618	-0.088992134
17	<i>Loriculus philippensis</i>	Colasisi	14	0.027777778	0.000771605	-3.583518938	-0.099542193
18	<i>Sarcops calvus</i>	Coletto	17	0.033730159	0.001137724	-3.389362924	-0.114323749
19	<i>Eudynamys scolopacea</i>	Common koel	11	0.021825397	0.000476348	-3.824680995	-0.08347518
20	<i>Megalaima haemacephala</i>	Coppersmith barbet	6	0.011904762	0.000141723	-4.430816799	-0.052747819
21	<i>Parus elegans</i>	Elegant tit	2	0.003968254	0.00001574	-5.529429088	-0.021942179
22	<i>Cuculus fugax</i>	Hodgson's Hawk-cuckoo	10	0.01984127	0.000393676	-3.919991175	-0.077777603
23	<i>Pitta sordida</i>	Hooded pitta	2	0.003968254	0.000015747	-5.529429088	-0.021942179
24	<i>Corvus macrorhynchos</i>	Large-billed crow	23	0.045634921	0.002082546	-3.087082052	-0.140878744
25	<i>Ficedula westermanni</i>	Little Pied Flycatcher	7	0.013888889	0.000192901	-4.276666119	-0.059398141
26	<i>Lanius schach</i>	Long-tailed shrike	1	0.001984127	0.000003936	-6.222576268	-0.012346381
27	<i>Lanius validirostris</i>	Mountain shrike	3	0.005952381	0.000035430	-5.123963979	-0.030499786
28	<i>Ficedula narsissina</i>	Narcissus flycatcher	1	0.001984127	0.000003936	-6.222576268	-0.012346381
29	<i>Falco peregrinus</i>	Peregrine falcon	1	0.001984127	0.000003936	-6.222576268	-0.012346381
30	<i>Hypsipetes philippinus</i>	Philippine bulbul	80	0.158730159	0.025195263	-1.840549633	-0.292150735
31	<i>Centropus viridis</i>	Philippine coucal	28	0.055555556	0.00308642	-2.890371758	-0.160576209



No.	Scientific Name	Common Name	No. of individuals (ni)	Relative Frequency (ni/N)	Proportional Dominance Index (ni/N) <sup>2</sup>	ln(ni/N)	Proportional Species Diversity Index (ni/N) ln(ni/N)
32	<i>Microhierax erythrogenys</i>	Philippine Falconet	2	0.003968254	0.00001574	-5.529429088	-0.021942179
	<i>Yungipicus maculatus</i>	Philippine Pygmy Woodpecker	5	0.009920635	0.000098419	-4.613138356	-0.045765261
33							
34	<i>Saxicola caprata</i>	Pied bushchat	2	0.003968254	0.00001574	-5.529429088	-0.021942179
35	<i>Amaurornis olivaceus</i>	Plain Bush Hen	1	0.001984127	0.000003936	-6.222576268	-0.012346381
36	<i>Treron pompadora</i>	Pompadour Green Pigeon	6	0.011904762	0.000141723	-4.430816799	-0.052747819
37	<i>Dicaeum pygmaeum</i>	Pygmy Flowerpecker	4	0.007936508	0.0000629882	-4.836281907	-0.03838319
38	<i>Colocalia troglodytes</i>	Pygmy swiftlet	42	0.0833333333	0.006944444	-2.48490665	-0.207075554
39	<i>Gallus gallus</i>	Red Jungle Fowl	17	0.033730159	0.001137724	-3.389362924	-0.114323749
40	<i>Macropygia phasianella</i>	Reddish Cuckoo Dove	19	0.037698413	0.00142117	-3.278137289	-0.123580572
41	<i>Porzana fusca</i>	Ruddy-breasted crake	1	0.001984127	0.000003936	-6.222576268	-0.012346381
42	<i>Corvus enca</i>	Slender-billed crow	1	0.001984127	0.000003936	-6.222576268	-0.012346381
43	<i>Turnix sylvatica</i>	Small button quail	1	0.001984127	0.000003936	-6.222576268	-0.012346381
44	<i>Megalurus palustris</i>	Striated Grassbird	5	0.009920635	0.000098419	-4.613138356	-0.045765261
45	<i>Dryocopus javensis</i>	White-bellied Woodpecker	7	0.013888889	0.000192901	-4.276666119	-0.059398141



No.	Scientific Name	Common Name	No. of individuals (n)	Relative Frequency (n/N)	Proportional Dominance Index (n/N) <sup>2</sup>	ln(n/N)	Proportional Species Diversity Index (n/N) ln(n/N)
46	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	1	0.001984127	0.000003936	-6.222576268	-0.012346381
47	<i>Halcyon chloris</i>	White-collared kingfisher	1	0.001984127	0.000003936	-6.222576268	-0.012346381
48	<i>Phapitreron leucotis</i>	White-eared Brown-dove	32	0.063492063	0.004031242	-2.756840365	-0.175037484
49	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	2	0.003968254	0.000015747	-5.529429088	-0.021942179
	<i>Pycnonotus goiaver</i>	Yellow-vented Bulbul	10	0.01984127	0.000393676	-3.919991175	-0.077777603
50	<i>Cisticola Juncidis</i>	Zitting Cistecola	11	0.021825397	0.000476348	-3.824680995	-0.08347518
51	<i>Turdus chrysolaus</i>	Brown headed Thrush	1	0.001984127	0.000003936	-6.222576268	-0.012346381
52	<i>Brachypteryx montana</i>	White-browed shortwing	1	0.001984127	0.000003936	-6.222576268	-0.012346381
53							

Species richness =53

Abundance = 506

Species diversity index (H') = 3.27

Dominance Index = 0.06

Evenness Index = 0.56



Appendix VII. Checklist of mammals recorded within MIBNP.

No.	Species	Common name	Residency status	Habitat association	Conservation status			Method used
					IUCN	CITES	DAO 2004-15	
ORDER CHIROPTERA								
PTEROPODIDAE								
				Common in secondary forest, often present in cropland and urban parks and residential areas	Least Concern	Not Listed	Not Listed	Netting
1	<i>Ptenochirus jagori</i>	Musky fruit bat	Philippine endemic					
2	<i>Cynopterus brachyotis</i>	Common short-nosed fruit bat	Native	Agricultural areas; Disturbed Forests	Least Concern	Not Listed	Not Listed	Netting
3	<i>Haplonycteris fischeri</i>	Philippine pygmy fruit bat	Philippine endemic	Common in primary forests	Least Concern	Not Listed	Not Listed	Netting
4	<i>Eonycteris spelaea</i>	Common nectar bat	Native	Agricultural areas; roosts in caves	Least Concern	Not Listed	Not Listed	Netting
5	<i>Rousettus amplexicaudatus</i>	Common roussette	Native	Agricultural areas; roosts in caves	Least Concern	Not Listed	Not Listed	Netting
6	<i>Desmalopex leucopterus</i>	Mindoro Pallid Flying Fox	Philippine endemic	Forest/Artificial/Terrestrial	Least Concern	Not Listed	Not Listed	Netting
	<i>Syloctenium mindorensis</i>	Mindoro stripe faced fruit bat	Mindoro endemic	Forest/Artificial/Terrestrial				
7					Endangered	Not Listed	Not Listed	Netting
ORDER RODENTIA								
MURIDAE								



No.	Species	Common name	Residency status	Habitat association	Conservation status			Method used
					IUCN	CITES	DAO 2004-15	
7	<i>Apomys musculus</i>	Least Philippine forest mouse	Philippine endemic	Forested areas	Least Concern	Not Listed	Not Listed	Trapping
8	<i>Rattus mindorensis</i>	Mindoro soft-furred rat	Mindoro endemic	Forested areas	Vulnerable	Listed	Not Listed	Trapping
9	<i>Crocidura grayi</i>	Luzon shrew	Philippine endemic	Forested areas	Least Concern	Not Listed	Not Listed	Trapping
	<b>ORDER ARTIODACTYLA</b>							
	<b>BOVIDAE</b>							
10	<i>Bubalus mindorensis</i>	Tamaraw	Mindoro endemic	Mixed forest/ grassland	<b>Critically Endangered</b>	I	<b>Critically Endangered</b>	Index of presence/ Incidental observation
	<b>ORDER PRIMATES</b>							
	<b>CERCOPITHECIDAE</b>							
11	<i>Long Tailed-Macaque</i>	Macaca fascicularis	Resident	Mixed forest/ grassland	<b>Nearly Threatened</b>	Not Listed	Not Listed	Index of presence/ Incidental observation



# Appendix VIII. Photos of some of the recorded mammals within MIBNP



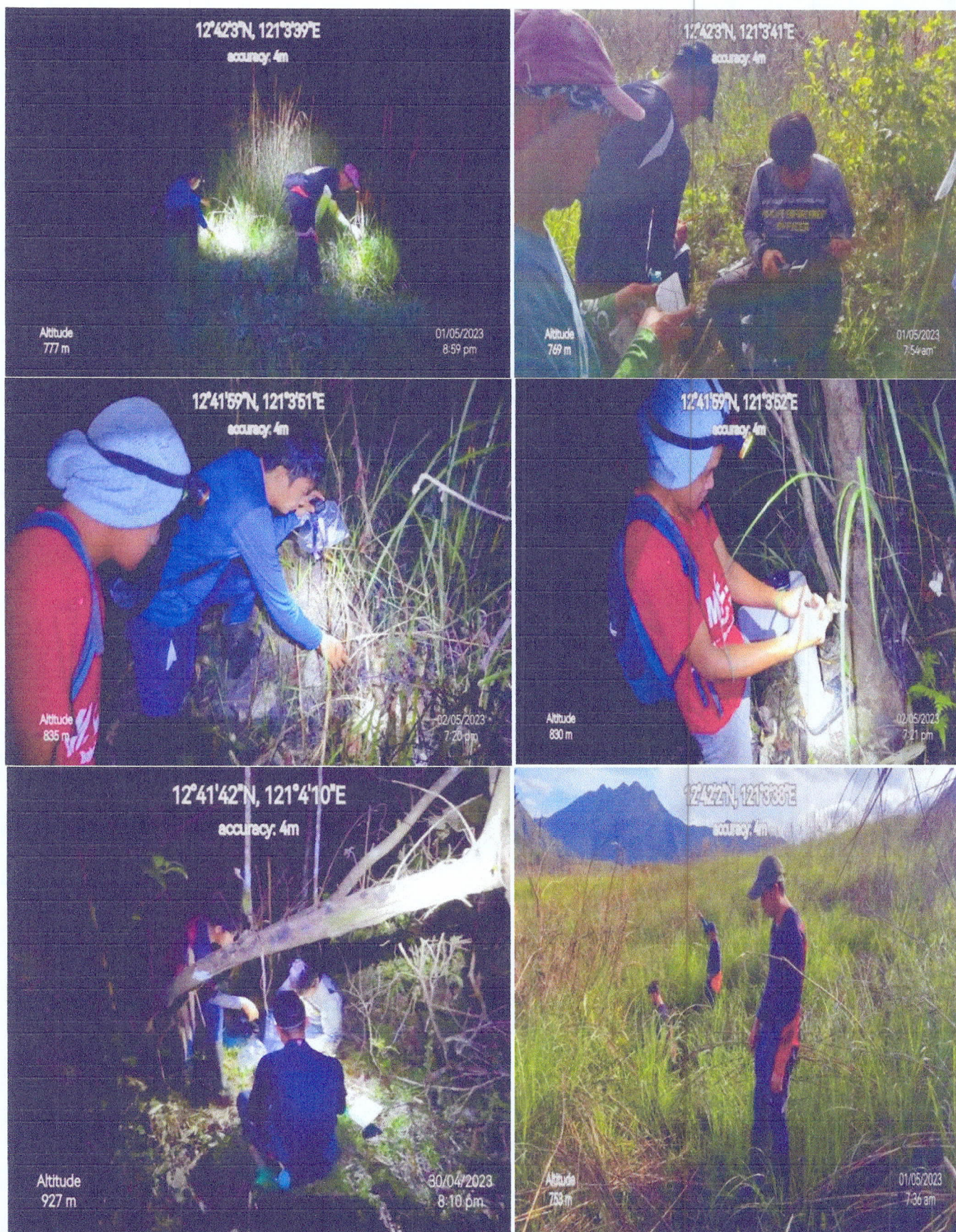
(A) *Ptenochirus jagori*, (B) *Cynopterus brachyotis*, (C) *Styloctenium mindorensis* (D) *Eonycteris spelaea*, (E) *Apomys musculus*, (F) *Bubalus mindorensis*, (G) *Macaca fascicularis*



## Appendix IX. Photo Documentation during the conduct of Avifauna Assessment





**Appendix X. Photo Documentation during the conduct of Herpetofauna Assessment**



**Appendix XI. Photo Documentation during the conduct of Flora Assessment**



Appendix XII. Photo Documentation during the conduct of Soil Assessment





### Appendix XIII. Photo Documentation during the assessment of volant mammals





Collection survey for arthropod was conducted at the sampling plots along the established 2-km transect which was used also for flora survey. A total of 9 sampling plots were sampled for arthropod within the 2-km transect, similar to the plots established during the flora survey.

Species Diversity parameters such as total Diversity abundance, species richness, species heterogeneity using Shannon-Weiner diversity index, species evenness using Pielou's evenness index of established plots were calculated using Microsoft Excel 2017. Importance value was also computed.

Based on the computed diversity values, for faunal diversity, a total of 68 terrestrial wildlife species consisting of five species of frogs, two species of reptiles, 53 species of birds and eight mammals were recorded. Of these, species (55%) are native or resident species while 19 species (34%) are endemic. Of the 19 endemic species, 14 are found throughout most of the Philippines while five species are only found in Mindoro Island.

For the amphibians, 8 species of frogs and toads, 1 species of snake and 1 species of lizard. Out of them, *Leptobrachium mangyanorum* is mindoro endemic and is found to be vulnerable species according to IUCN. *Limnonectes acanthi* is also listed as vulnerable frog and the rest of the species are Least Concern (LC). *Naja philippinensis* or known to be Philippine Cobra is a near threatened snake. With regards to avifauna, a total of 53 bird species were recorded in the study area under 31 families. Out of the total recorded of avian species, 41% were residents, 47% were Philippine endemic, 8% were dry season visitors and 4% were Mindoro endemic. Majority (88%) of the bird species recorded in the area are not listed under the IUCN Red List of Threatened Species, DAO 2004-15 of the Philippine Wildlife Act or CITES Appendices. These species are considered as widespread and abundant. There were, however, five species that are of conservation concern. The Mindoro endemic hornbill (*Penelopides mindorensis*) is listed as endangered and Mindoro endemic coucal (*Centropus steeri*) is critically endangered under IUCN. Colasisi (*Loriculus philippensis*) is considered as Endangered under the list of DAO 2004-15. For mammals, was a total of 11 species recorded consisting of 6 species of fruit bats, one species of insectivorous bats, 3 small non-volant mammals and 2 large-sized mammal. Seven species are endemic with four that are found throughout most of the Philippine islands and three only found in Mindoro.

The results of the assessment showed that MIBNP holds a very significant faunal diversity. In terms of floral composition, MIBNP, characterized as forest over limestone, has a low to moderate species diversity and stocking density. Other wildlife species also provides sufficient information on the importance of MIBNP as habitat. Noteworthy among the list are the 5 endemic terrestrial species of Mindoro (Mindoro Hornbill, Mindoro Litter Frog, Mindoro stripe faced fruit bat, Black hooded Coucal and Tamaraw) which are all listed under IUCN RedList. This indicates the importance of MIBNP for the in-situ conservation of these species specifically the critically endangered tamaraw.