



# Biodiversity and Soil Characterization of Ancestral Domain of the Tagbanua Tribe in Aborlan, Palawan, Philippines

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## ABSTRACT

This study was conducted to determine strategies to enhance the sustainable forest management practices of the Tagbanua tribe. Specifically to describe the biodiversity and soil characteristics of the ancestral domain. The modified belt-transect method for biodiversity assessment developed by B+WISER (2014), further modified by the Department of Environment and Natural Resources (DENR) in the assessment, was used in this study. Results of soil chemical analysis showed significant variations among various land uses. The ancestral domain had at least 73 plant species belonging to 34 families and 59 genera. Four (4) taxa whose SN/families were still undetermined and another three (3) genera under families Annonaceae, Meliaceae, and Sapindaceae were unidentified. It had 12 plant species that are threatened with one critically endangered based on the list of threatened Philippine plants of the DENR. On the other hand, a total of 372 birds representing 61 species from 29 families were recorded. The high Shannon-Weiner Diversity Index ( $H' = 3.69$ ) and Shannon's Evenness ( $HE = 0.90$ ) values indicate high avifaunal diversity and equitable distribution among the detected species. Most of the conservation priority species recorded in the area are Palawan endemic species. The survival of these birds is threatened by extinction due to habitat loss. This observation emphasized the importance of the ancestral domain as a refuge for these endemic species and conservation priority areas.

## INTRODUCTION

In the Philippines, the annual forest cover loss is placed at 49,954 ha or 1.4 percent annually from 1990 to 2000, making it one of the notoriety in SE Asia and the second country with the thinnest forest cover (Aquino et al. 2014). The forest cover of the Philippines declined from 70 percent of the country's total land area of 30 million hectares (ha) in 1900 to about 18.3 percent, or just over 5 million ha of residual and old-growth natural forests, in 1999 (ESSC 1999). Official records showed that in 2010, the forest cover was 23% or about 6.8 million hectares (FMB 2019).

At present, the few remaining areas in the country with intact forests are mostly those in which indigenous forest management persists (Guiang et al. 2001). The top 3 regions that had the highest forest cover based on 2010 satellite images released by the NAMRIA are Regions 2 with 1.04 million hectares, Region 4-B, MIMAROPA with 915,664 and CAR with 773,191 (DENR 2015). The fact is, these regions are home to various indigenous peoples.

Indigenous Peoples have always played an important role in the conservation and preservation of the country's forest

areas. Among them are Tagbanua tribe in the province of Palawan who relied on the forests for their survival. They are fully dependent on forests for rice production through Kaingin farming. They also generate income from extracting forest products such as bamboo, Almaciga resins, rattan, and honey gathering.

In 2009, an ancestral domain with a total land area of 12,874.74 hectares was awarded to this tribal group. It is important to document what are the plant resources found therein for sustainable management of resources in the ancestral domain. The inventory and documentation of the indigenous plant species further aid in biodiversity conservation; the study site, being an ancestral domain, is prone to exploitation. Keeping these species protected and conserved for biodiversity may also serve as a natural gene bank of plant species in the province.

## Objectives/Statement of the Problem

The general objective of this study was to determine strategies to enhance the forest management practices of the Tagbanua in Aborlan, Palawan, Philippines. Specifically,

this was conducted in order to describe the biodiversity and soil characteristics of the ancestral domain.

## MATERIALS AND METHODS

### Location of the Study Site

The study was conducted in the ancestral domain area of the Tagbanua tribe in Barangay Cabigaan, in the municipality of Aborlan, Palawan (Fig. 1). The Certificate of Ancestral Domain Title (CADT) was awarded on July 24, 2009, with a total land area of 12,874.74 hectares covering Brgys Cabigaan, Aborlan and portion in Sitio Manaili, Brgy Dumanguena of Narra, Palawan. There are 600 IP rights holders of this ancestral domain. The area is recognizably having a portion of intact forest, particularly in the watershed area and on the highest elevation of the ancestral domain. The watershed is the primary source of irrigation water systems providing potable water in seven (7) barangays within which the majority of the tribal communities reside.

### Floral Survey

#### Establishment of woody flora diversity plots and transects:

The modified belt-transect method for biodiversity assessment developed by B+WISER (2014), further modified by DENR in the assessment of forestlands, was used in this study. As stipulated in the guidebook on Biodiversity Assessment and Monitoring System (BAMS) in September 2017, a 2 km transect was used; two (2) line transects were established in 2 sites with a measurement of 2 km per transect. Eight plots with a measurement of 20m x 20m in each two-kilometer transect were established, with a total of 16 plots in all sampling areas. The distance per plot is 250 meters.

**Plant identification:** Plant species identification was verified through herbarium records and flora (Hooker 1872-1887, Hooker 1890, Pradhan & Lachungpa 1990, Kholia 2010). The unidentified species in the field were photographed and later identified by taxonomy experts. Identification of

floral species was up to the species level. Dubious identified species, morphotype system and/or use of higher taxa (genus, family) were used to facilitate distinction.

Endemism and ecological status of the different species were assessed to determine the ecological importance of the vegetation in the area. Nomenclature of the species followed the latest Angiosperm Phylogeny Group classification (Stevens 2001).

### Avifauna Survey

The avifaunal survey was conducted using a standard transect count method described by the Biodiversity Management Bureau (BMB) of the DENR and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (BMB-DENR & GIZ, 2017). The study used a standard two-kilometer transect line that was established between the coordinates 9.44688 N 118.44363 E and 9.45959 N 118.43153 E. The survey was carried out by identifying, counting, and recording all the birds detected using visual and auditory cues while walking along the transect route. The counting of birds was repeated six times based on the species discovery curve. All bird counts were done early in the morning (6:00 am) and late in the afternoon (3:00 pm) as the bird activities peak at these periods.

### Prior Informed Consent

Before entering the community, the researcher had complied with the guidelines and important requirements such as secure Free Prior and Informed Consent (FPIC) in compliance with NCIP Administrative Order Nos. 1, Series of 2012, otherwise known as The Indigenous Knowledge System and Practices (IKSP's) and Customary laws (CLs) Research and Documentation Guidelines of 2012. Among others, the guidelines stated that the FPIC of the ICCs/IPs permission should be secured before the commencement of any undertakings, i.e., research activity that affects them.

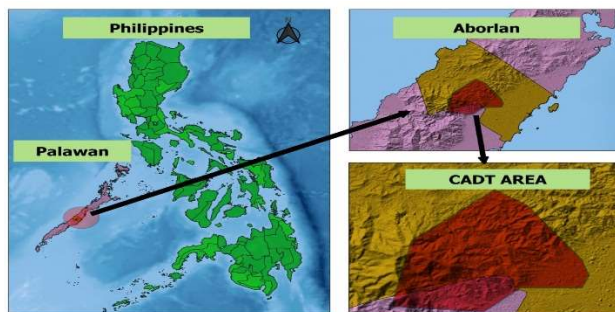
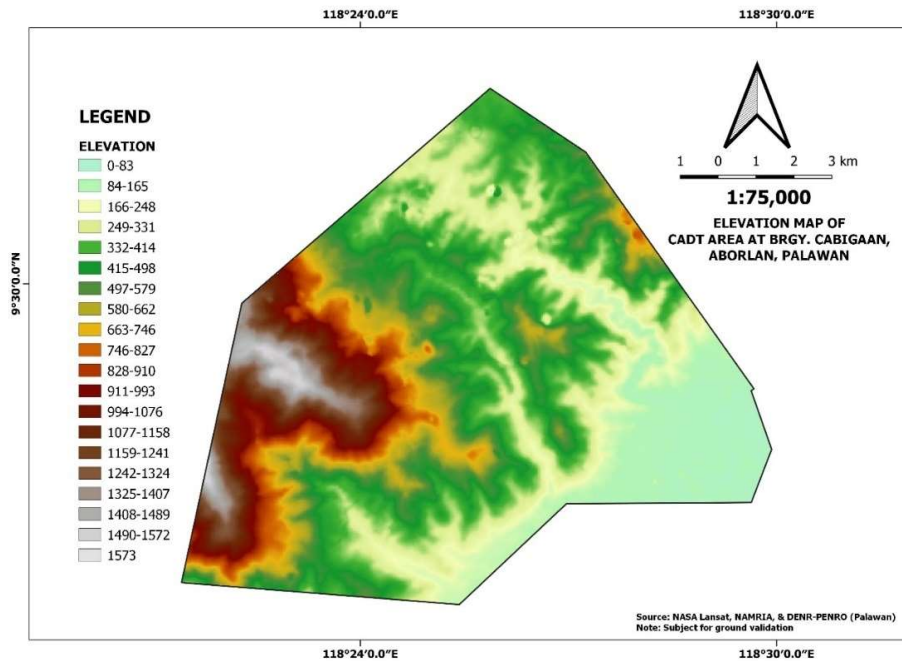
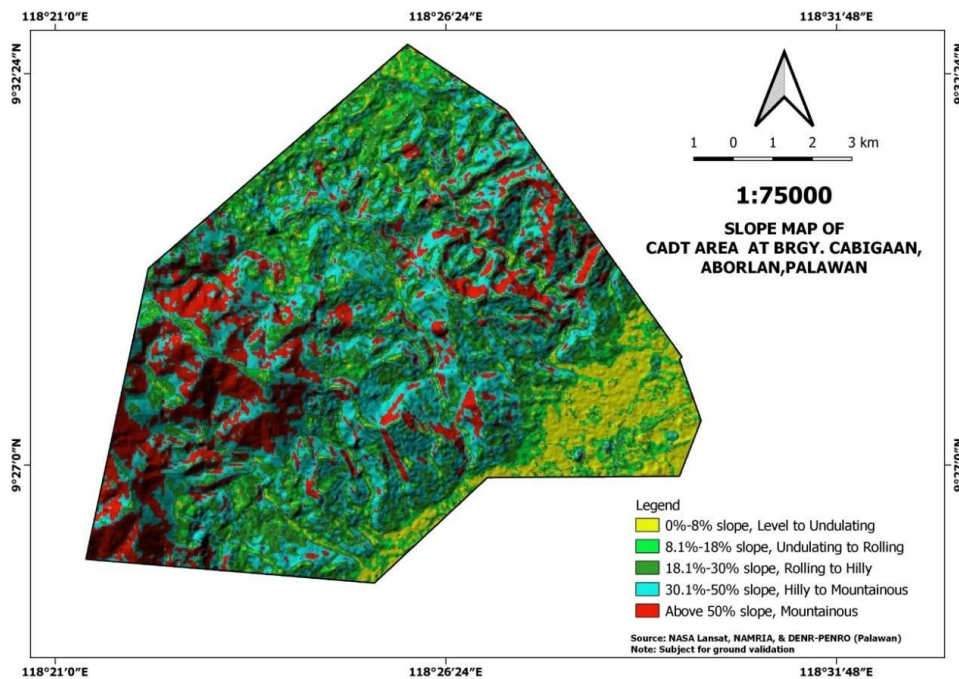


Fig. 1: Location map of the study site.



(Source: DENR-CENRO Puerto Princesa, 2020)

Fig. 2: Elevation map of the ancestral domain.



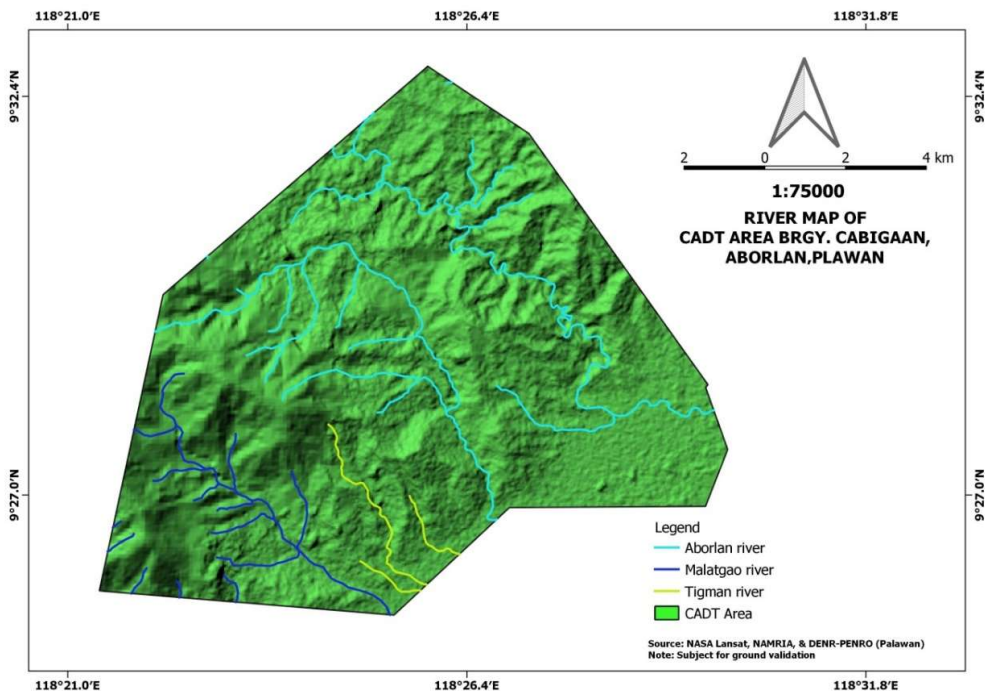
(Source: DENR-CENRO Puerto Princesa, 2020)

Fig. 3: Slope map of the ancestral domain.

## RESULTS AND DISCUSSION

### Biophysical Characteristics

**Morphology and drainage:** The topography is characterized by a flat to hilly to mountainous slope. The highest elevation is at 1,505 – 1,573 meters above sea level (masl) in the



(Source: DENR-CENRO Puerto Princesa)

Fig. 4: River system of the ancestral domain.

Culandanum area in the western portion of the municipality of Aborlan, while the lowest is at 16- 70 meters above sea level (Fig. 2), which is in Brgy. Cabigaan proper, including the portion of the Talakaigan watershed.

The ancestral domain is a part of the Victoria–Anepahan Mountain Range (VAMR), which is considered one of the 11 important bird areas in Palawan (Mallari et al. 2001). Slopes vary from 0% level to very steep (>50%) (Fig. 3). The slope 30.1% - 50% had the biggest total area of 4,340.22 hectares representing 33% of the total land area, followed by 18.1% -30% slope, (rolling to hilly) with an area of 2,932.08 hectares representing 22%. Generally, the latter is preferred by the IPs in conducting their farming activities for their convenience. On the other hand, areas above 50% cover 2,617.95 hectares, which represents 20%, a mountainous portion of the ancestral domain where the forest is relatively intact.

The 3 river systems include Aborlan, Malatgao, and Tigman. Aborlan River is considered a “lifeblood” due to its importance among the Tagbanua tribe and that of the 7 barangays (out of 19) who are the direct beneficiaries of the watershed in Talakaigan River. There is an existing dam structure that serves as a source of water for agriculture and households, mostly of Brgys Cabigaan, Iraan, Magbabadil, Barake, Apis, Sagpangan, and Mabini. (Fig. 4). The watershed is also a recreational area for residents.

In 2017, data from the Palawan Council and Sustainable

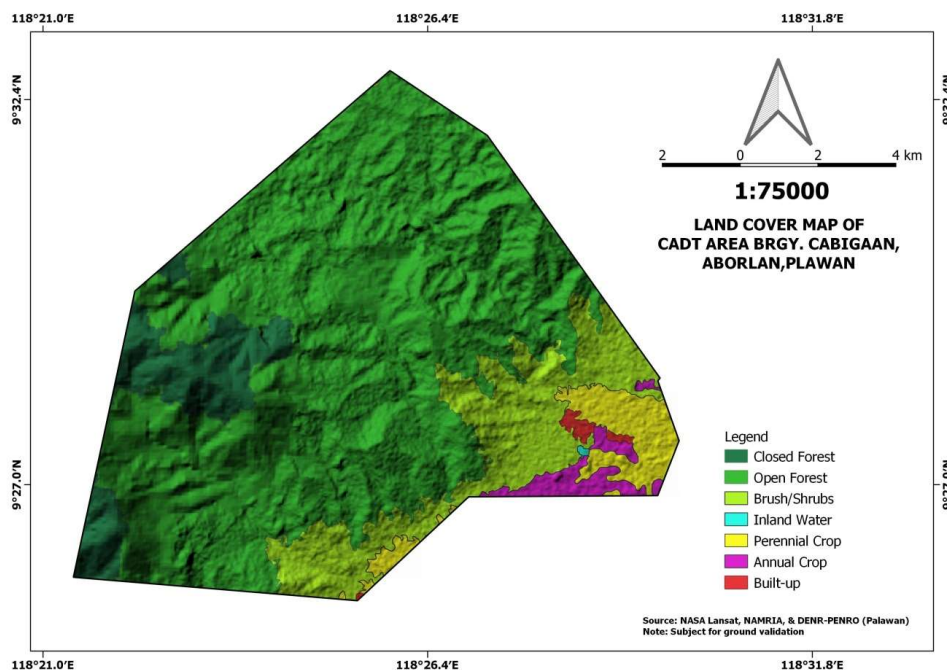
Development (PCSD) showed that the major land use of the area was as “open forests,” which comprise an area of 9,173.74 hectares or 71% of its total land area. Agricultural area for annual crops had limited coverage, with only 248.72 hectares (Table 1).

Generally, there is intact vegetation in the closed forest, which extends a portion of the Talakaigan watershed. Vegetation in the lower elevation and flat terrain is shrublands (1,795.86 has.), which serve as an ecotone between the forest and agricultural ecosystems. Other significant land uses were built-up areas (53.57 ha.) and inland waters (5.93 ha.), which cover a portion of the Talakaigan watershed forest situated in the rough terrain and higher elevations (Fig. 5).

Table 1: Land cover of the ancestral domain.

Land Cover (2014)	Area [has.]
Annual Crop	248.72
Built-up	53.57
Closed Forest	1,053.87
Inland Water	5.93
Open Forest	9,173.74
Perennial Crop	543.06
Brush/Shrubs	1,795.86
TOTAL	12,874.74

(Source: PCSD, 2017)



(Source: DENR-CENRO Puerto Princesa)

Fig. 5: Land cover map of the ancestral domain.

## Land Use

Using the Indigenous Peoples classification of land uses, below are the different land-use types in the area:

- Village (*sagpon-sagpon*). This is where clustered houses are built.
- Rivers (*danum*). Are sources of freshwater resources.
- Coconut plantation (*niogan*). Area planted to coconut.
- Swidden farm (*kaingin*). This refers to upland areas planted with rice, vegetables, root crops, and legumes.
- Pasture land (*kesgetan*). The area is designated as a communal pasture/grazing area.
- Natural Forest (*talun*). These are mountain ranges and ridges that serve as a source of community forest products such as wild fruits, mineral resources, and wild animals.

## Soil

The soil is classified as rough, mountainous, or undifferentiated (Fig. 6), which is characterized by an extensively developed slope (lateral) flow of soil moisture owing to the considerable steepness of the slopes and the high water permeability of the gravel-like rock masses. Soils are also highly diverse and can vary significantly within limited areas due to different exposures and steepness.

## Soil Chemical Characteristics of the Ancestral Domain of the Tagbanuas Soil pH

Comparison among the land uses revealed that lowland ricefield (*basakan*), vegetable production area (*gulayan*), and coconut plantation (*niyogan*) had a pH average value of 5.8, while forest soil (*talun*) and swidden (*kaingin*) had both average values of 5.4 (Table 2). Using FAO Staff (1976) as the standard range of some chemical and physical properties of soils, the area is considered acidic. Analysis of variance (Table 3) showed that pH levels were significantly different among the land-use systems.

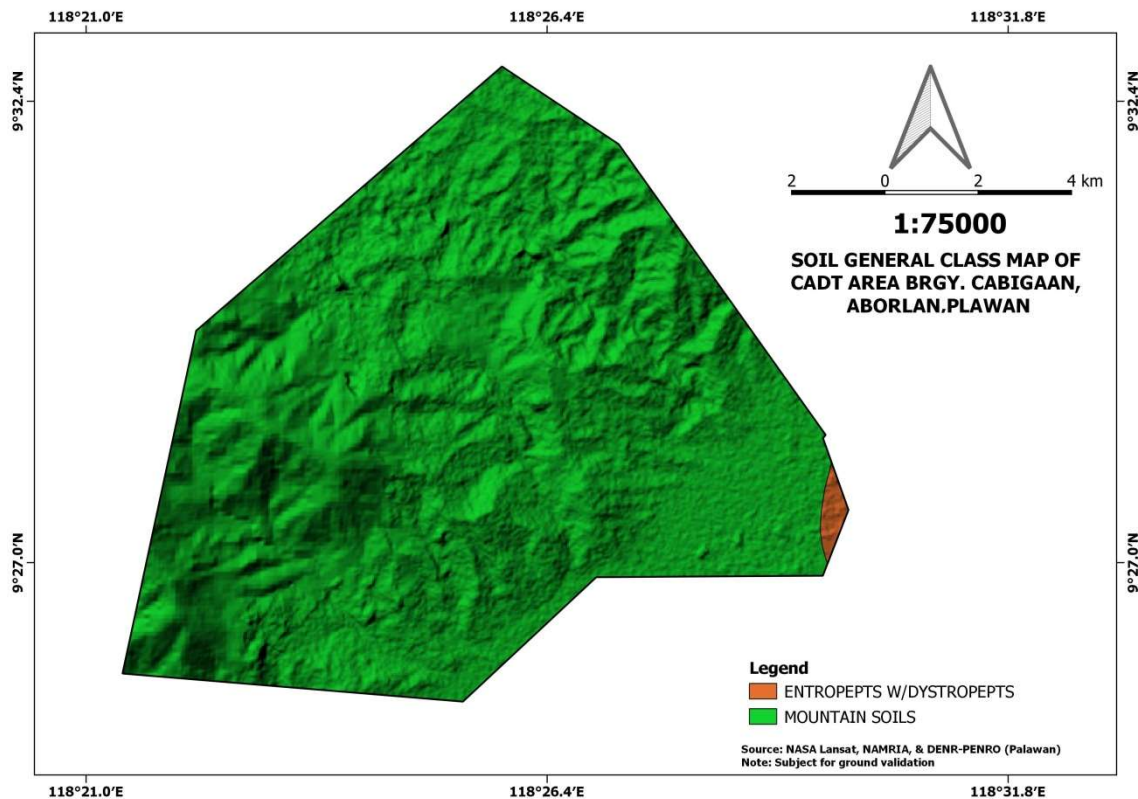
Treatments with the same subscript are not significantly different from each other at a 5% level of significance using Duncan's Multiple Response Test (DMRT)

## Total Nitrogen

The "forest soil" had the highest nitrogen level of 1.0, described as "high" using the FAO standard (FAO 1973). Analysis of variance (Table 4) showed differences in Nitrogen with *highly* significant differences in the forest soil compared to the other land uses attributed to the frequent cultivation for agricultural production purposes.

## Available Phosphorus

Analysis of variance revealed significant differences in the



(Source: DENR-CENRO, Puerto Princesa)

Fig. 6: Soil map of the ancestral domain.

Table 2: Chemical analysis of soils in the ancestral domain.

Soil Chemical Properties	Soil Samples				
	Lowland Ricefield ( <i>Basakan</i> )	Vegetable Production Area ( <i>Gulayan</i> )	Forest Soil ( <i>Talun</i> )	Coconut Farm ( <i>Niyogan</i> )	Swidden ( <i>Kaingin</i> )
pH	5.8 <sub>a</sub>	5.8 <sub>a</sub>	5.4 <sub>b</sub>	5.8 <sub>a</sub>	5.4 <sub>b</sub>
Nitrogen	0.5 <sub>b</sub>	0.5 <sub>b</sub>	1.0 <sub>a</sub>	0.5 <sub>b</sub>	0.5 <sub>b</sub>
Phosphorous (ppm)	88 <sub>b</sub>	108 <sub>a</sub>	38 <sub>e</sub>	46 <sub>d</sub>	48 <sub>c</sub>
Potassium (ppm)	44 <sub>c</sub>	60 <sub>d</sub>	122 <sub>b</sub>	248 <sub>a</sub>	80 <sub>c</sub>

Table 3: Analysis of variance for the pH value of soils.

Source of Variation	Df	Sum of Squares	Mean Square	F	p-Value	F-Crit
pH	4	0.576	0.144	14.400	0.000*	3.11
Error	10	0.100	0.010			
Total	14	0.676				

\*significant at 0.05 level of significance

phosphorus content among the indigenous forest management systems (Table 5). Phosphorus content of the IPs soil was found to be significantly different in vegetable production (*gulayan*) (108 ppm) as compared to those of the lowland rice farms (*basakan*) (88 ppm), swidden (*kaingin*) (48 ppm), coconut farm (*niyogan*) (46) and forest soil (*talun*) (38 ppm).

Based on FAO Staff (1976), the value of available P in all areas is high (25-45 ppm) to very high (> 45 ppm). The vegetable production area (*gulayan*) had the highest value due to the application of inorganic P by farmers. Using the FAO Staff standard, all other indicated uses have “high” levels of phosphorus.

Table 4: Analysis of variance for the Nitrogen value of soils.

Source of Variation	Df	Sum of Squares	Mean Square	F	p-Value	F-Crit
Nitrogen	4	0.600	0.150	15.000	0.000*	3.11
Error	10	0.100	0.010			
Total	14	0.700				

\*significant at 0.05 level of significance

Table 5: Analysis of variance for the Phosphorous value of soils.

Source of Variation	Df	Sum of Squares	Mean Square	F	p-Value	F-Crit
Phosphorus	4	11265.600	2816.400	2816.400	0.000*	3.11
Error	10	10.000	1.000			
Total	14	11275.600				

\*significant at 0.05 level of significance

Table 6: Analysis of variance for the Potassium value of soils.

Source of Variation	Df	Sum of Squares	Mean Square	F	p-Value	F-Crit
Potassium	4	80822.400	20205.600	20205.600	0.000*	3.11
Error	10	10.000	1.000			
Total	14	80832.400				

\*significant at 0.05 level of significance

### Available Potassium

The coconut farm (*niyogan*) had the highest soil potassium content (248 ppm) while “moderately low” in forest soil (*talun*) (122 ppm), “low” in swidden (*kaingin*) (80 ppm), vegetable farm (*gulayan*) (60 ppm) and lowland rice farm (*basakan*) (44 ppm). The frequent cultivation and harvest in their lowland rice farm (*basakan*) explains why it had the lowest potassium content. Based on Phosyn Chemicals Limited (1987), as cited by Palijon (1998), the guideline level for potassium is 200 ppm. In this study, only the coconut farm (*niyogan*) had the highest amount of potassium, while the rest of the land uses have low levels of K content. Analysis of variance for K revealed significant differences among the indigenous land-use management system (Table 6).

### Floral Description and Species Composition of the Ancestral Domain

Results showed that there were at least 73 plant species belonging to at least 33 families and 59 genera (Table 7). There were 4 taxa whose SN/families were still undetermined and genera under families Annonaceae (1), Meliaceae (3), and Sapindaceae (1). Voucher specimens were all kept in duplicate at the Herbarium of the Department of Forestry and Environmental Science (DFES) of the College of Agriculture, Forestry and Environmental Sciences (CAFES) at the Western Philippines University (WPU), main campus, Aborlan, Palawan, Philippines.

Most of the species are classified under families Meliaceae with 8, Moraceae represented by 6, Burseraceae (4), Euphorbiaceae (4), and Malvaceae (4). Using the diversity values for the Shannon-Weiner classification scale developed by Fernando (1998), the forest area of the ancestral domain is considered *high*, with a value of 3.42 (Table 8).

The big floral composition is due in part to its geographical location. The vegetation area is a typical tropical lowland evergreen rainforest, the most luxuriant of all plant communities (Whitmore 1984, 1990). The trees are tall, dense and with large numbers growing in groups. The vegetation had three strata or canopy layers. The top stratum is composed of emergent trees such as apitong (*Dipterocarpus grandiflorus*) and manggis (*Koompassia excelsa* (Becc.) Taub., and amugis (*Koordersiodendron pinnatum* (Blanco) Merr., growing either individually or in groups.

The main layer or the trees below the emergent trees are composed of species such as nato (*Palaquium bataanense* Merr.), bunog (*Garcinia benthami* Pierre), Kalingag/Himaraan (*Cinnamomum mercadoi*), and of Syzygium, Pometia (*Pometia pinnata* JR & G Forst.) and Symplocos (*Symplocos odoratissima* (Blume) Choisy ex Zoll).

Smaller trees such as species of *Aglaia* and *Elaeocarpus*, and saplings of the top canopy comprised the undergrowth stratum. The herbaceous vegetation on the ground is usually sparse, with few individuals of fern species. Rattan and woody lianas are also present. The ancestral domain is also a

Table 7: Checklist of identified plant species within the ancestral domain.

No.	Common/local name	Scientific name	Family name
1	Putian	<i>Alangium chinense</i> (Lour.) Rehder	Alangiaceae
2	Morangsang (Dao)	<i>Dracontamelon dao</i> (Blanco) Merr.& Rolfe	Anacardiaceae
3	Amugis	<i>Koordersiodendron pinnatum</i> (Blanco) Merr.	Anacardiaceae
4	Uway-uway (Kamiring)	<i>Semecarpus</i> sp.	Anacardiaceae
5	Samirig	----	Annonaceae
6	Lanutan	<i>Mitrephora lanotan</i> (Blanco) Merr.	Annonaceae
7	Kamanglit (dita)	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae
8	Palanguton	<i>Ervatamia</i> sp.	Apocynaceae
9	Malapapaya	<i>Polyscias nodosa</i>	Araliaceae
10	Banga	<i>Orania paraguayensis</i> Becc.	Arecaceae
11	Bugo	<i>Garuga floribunda</i>	Burseraceae
12	Saling	<i>Canarium</i> sp.	Burseraceae
13	Pagsahingin	<i>Canarium asperum</i> Benth.	Burseraceae
14	Magusalang/Manggusaleng	<i>Protium connarifolium</i> , cf.	Burseraceae
15	Repetek	<i>Kokoona ochracea</i> (Elmer) Merr.	Celastraceae
16	Bukbok	<i>Atuna racemosa</i> Raf.	Chrysobalanaceae
17	Bunog	<i>Garcinia benthami</i> Pierre	Clusiaceae
18	Garcinia	<i>Garcinia venulose</i>	Clusiaceae
19	Kandis	<i>Garcinia lateriflora</i> Blume	Clusiaceae
20	Binuang	<i>Octomeles sumatrana</i>	Datiaceae
21	Apitong	<i>Dipterocarpus grandiflorus</i> (Blanco)	Dipterocarpaceae
22	Kamagong	<i>Diospyros discolor</i> (Desr.) Gurke	Ebenaceae
23	Takip asin	<i>Macaranga grandifolia</i>	Euphorbiaceae
24	Bagonay	<i>Drypetes littoralis</i> (C Robinson) Merr.	Euphorbiaceae
25	Balakat gubat	<i>Sapium luzonicum</i> (Vid.) Merr.	Euphorbiaceae
26	Tangan	<i>Macaranga</i> sp.	Euphorbiaceae
27	Ipil	<i>Intsia bijuga</i> (Colebr.) Kuntze	Fabaceae
28	Manggis	<i>Koompassia excelsa</i> (Becc.) Taub.	Fabaceae
29	Pangi	<i>Pangium edule</i> Reinw. ex Blume	Flacourtiaceae
30	Bago	<i>Gnetum gnemon</i> L.	Gnetaceae
31	Lingo-lingo	<i>Viticipremna philippinensis</i> (Turcz.) H.J.Lam.	Lamiaceae
32	Bikayan (Malaikmo)	<i>Cinnamomum</i> sp.	Lauraceae
33	Himaraan (Kalingag)	<i>Cinnamomum mercadoi</i> S. Vidal	Lauraceae
34	Apalang (Palawan Putat)	<i>Barringtonia palawanensis</i> P. Chantaranothai	Lecythidaceae
35	Putat	<i>Barringtonia racemosa</i> (L.) Blume ex DC	Lecythidaceae
36	Datu	<i>Leea manillensis</i>	Leeaceae
37	Bayok	<i>Pterospermum diversifolium</i> Blume	Malvaceae
38	Durian	<i>Durio zibethinus</i>	Malvaceae
39	Taluto	<i>Pterocybium tinctorium</i> Merr.	Malvaceae
40	Grewia	<i>Astronia Grewia</i>	Malvaceae
41	Balukanag	<i>Chisocheton cumingianus</i> (C.DC.) Harms.	Meliaceae
42	Mararango	<i>Azadirachta excels</i> (Jack) Jacobs	Meliaceae

Table Cont....



No.	Common/local name	Scientific name	Family name
43	Lambunao	<i>Aglaia elliptica</i> Blume	Meliaceae
44	Bagingsado (Malasaging Elanan)	<i>Aglaia</i> sp.	Meliaceae
45	Bayuso (Malasaging Pula)	<i>Aglaia</i> sp.	Meliaceae
46	Alalandeg	<i>Dysoxylum</i> sp.	Meliaceae
47	Lipso	<i>Chisocheton</i> sp.	Meliaceae
48	Parina		Meliaceae
49	Antipolo/Malagda	<i>Artocarpus blancoi</i> (Elm.) Merr.	Moraceae
50	Kalios	<i>Streblus asper</i>	Moraceae
51	Kanapay	<i>Ficus magnoliifolia</i>	Moraceae
52	Katel/Katol	<i>Ficus glandulifera</i> (Wall. ex Miq.) King	Moraceae
53	Sisian (Tangisang bayawak)	<i>Ficus variegata</i> Blume	Moraceae
54	Kobi	<i>Artocarpus mitida</i>	Moraceae
55	Duguan/Palawan duguan	<i>Myristica guaterifolia</i> A DC	Myristicaceae
56	Tanghas	<i>Myristica elliptica</i>	Myristicaceae
57	Malabayabas/Palawan malabayabas	<i>Tristanopsis oblongifolia</i> (Merr.) Peter G. Wilson & Waterhouse	Myrtaceae
58	Indang/Undang	<i>Syzygium</i> sp.	Myrtaceae
59	Anuling	<i>Pisonia umbellifera</i> (Forst.) Seem.	Nyctaginaceae
60	Bananato	<i>Microdesmis casearifolia</i> Planch.	Pandaceae
61	Saog	<i>Ardisia</i> sp.	Primulaceae
62	Agtap	<i>Neonauclea</i> sp.	Rubiaceae
63	Rambutan	<i>Nephelium lappaceum</i> L.	Sapindaceae
64	Dipanga/malugai	<i>Pometia pinnata</i> JR & G Forst.	Sapindaceae
65	Balisangkad	-----	Sapindaceae
66	Benselagen	<i>Mimusops parvifolia</i>	Sapotaceae
67	Nato	<i>Palaquium bataanense</i> Merr.	Sapotaceae
68	Ulam	<i>Planchonella</i> sp.	Sapotaceae
69	Ragingding	<i>Symplocos odoratissima</i> (Blume) Choisy ex Zoll.	Symplocaceae
70	Maraapog	-----	
71	Panghasaan	-----	
72	Pupuan	-----	
73	Dampilingan	-----	

home of dipterocarp i.e., Apitong (*Dipterocarpus grandiflorus* (Blanco) Blanco). The largest and tallest tree measured was nato (*Palaquium bataanense* Merr.), with a diameter at breast height (dbh) of 118 and approximately 17 m tall.

Table 8: Diversity values for the Shannon-Weiner classification scale developed by Fernando (1998).

Relative values	H' Values
Very High	> 3.5000
High	3.0000 - 3.4999
Moderate	2.5000 - 2.9999
Low	2.0000 - 2.4999
Very Low	< 1.9999

The number of individuals by dbh group (Fig. 7) showed that a big percentage (40%) of trees had smaller diameters (dbh of 1-10 cm), which shows that the area is currently regenerating. The wide distribution of dbh ranging from 1-120 cm is indicative of an old-growth forest condition of the ancestral domain.

The most frequent species (Fig. 8) was Dipanga (*Pometia pinnata* JR & G Forst.) (41 individuals), with at least 2 individuals encountered in each of the 16 plots established, followed by Apalang (*Barringtonia palawanensis* P. Chantaranonthai) (39 individuals),

Ragingding (*Symplocos odoratissima* (Blume) Choisy ex Zoll. (29), Rambutan (*Nephelium lappaceum* L.) (28) and

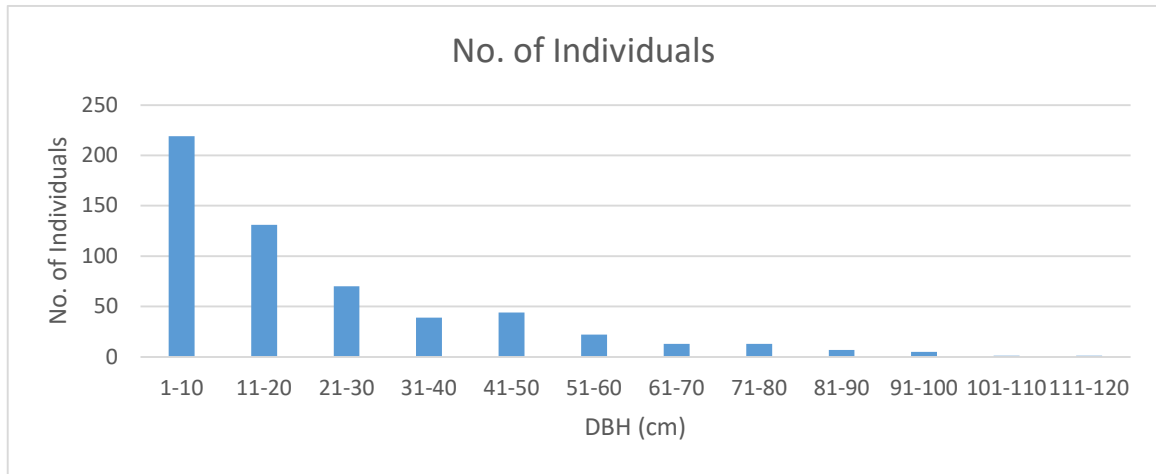


Fig. 7: Frequency histogram of 517 individuals in the ancestral domain.

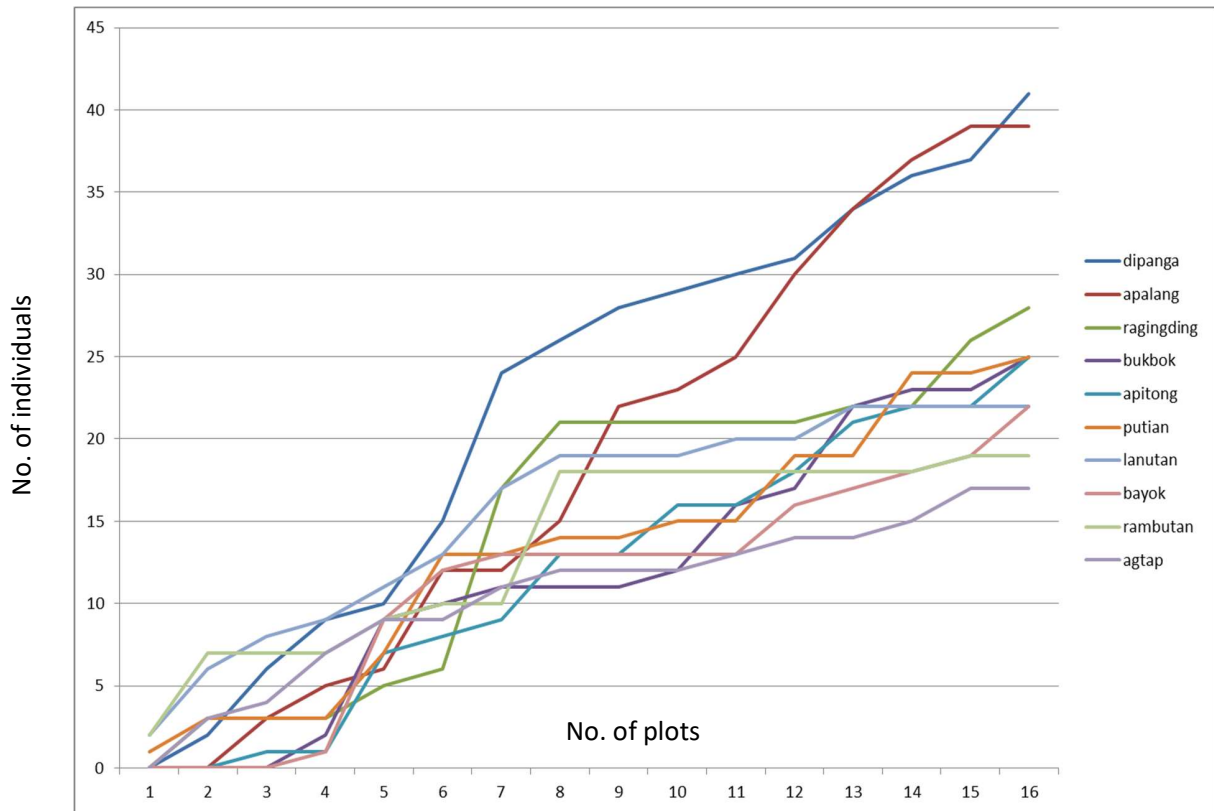


Fig. 8: Frequency Distribution of Species.

Apitong (*Dipterocarpus grandiflorus*) (Blanco) Blanco (25), Bukbuk (*Atuna racemosa* Raf.) (25) and Putian (*Alangium chinense* (Lour.) Rehder (25)). In this study, the most number of individuals, basal area, and volume belong to the families under Sapindaceae, Lecythidaceae, Malvaceae, Annonaceae, and Meliaceae (Figs. 8, 9, and 10).

**Conservation Status**

There were 12 plant species recorded that are categorized as either critically endangered, threatened and vulnerable, or other threatened species (Table 9) based on the updated national list of threatened Philippine plants of the Department

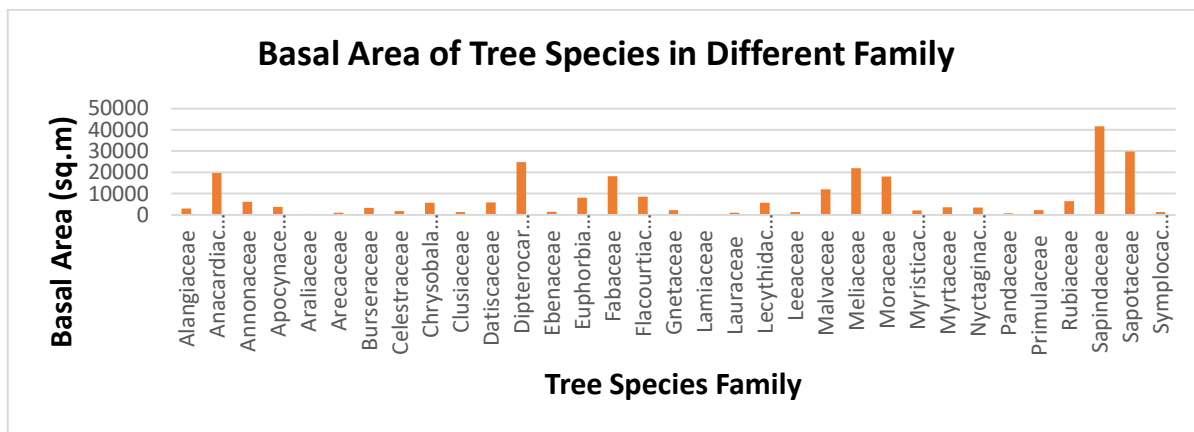


Fig. 9: Basal area.

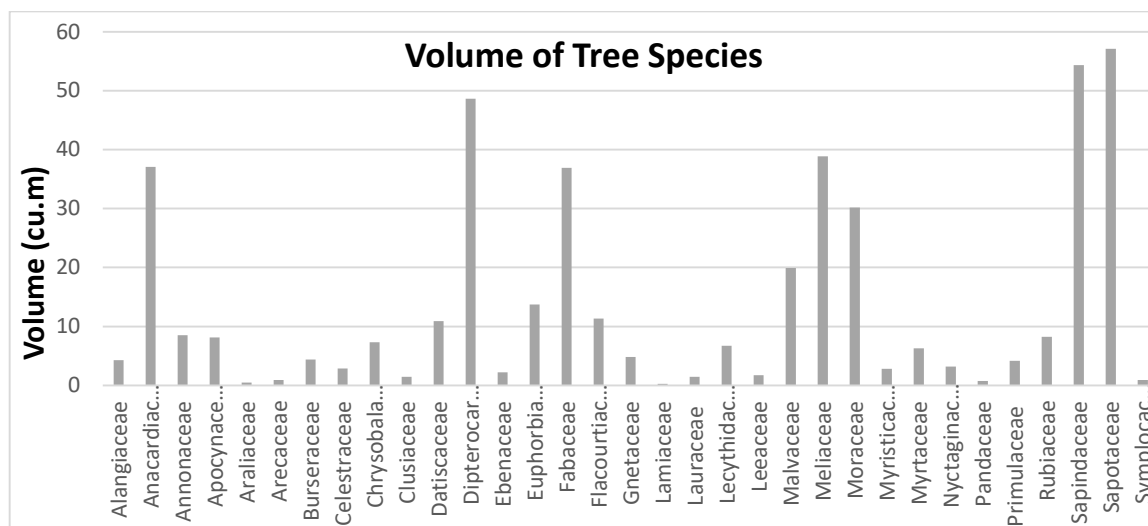


Fig. 10: Volume of tree species.

of the Environment and Natural Resources (DENR). Among these species, Banga (*Orania paraguayensis* Becc.), known locally among Tagbanua as “tangkaurin,” is a native of Palawan (Dransfield et al. 2008) and is considered a critically endangered palm species. The Tagbanua commonly use the leaves of this plant to build their houses (Fig. 11).

Meanwhile, Manggis (*Koompassia excelsa* (Becc.) Taub. is a threatened plant under the IUCN endangered category due to habitat degradation such as kaingin. This species is recorded as native to Palawan and is usually found in forests in its low altitudes. Ecologically, Manggis is a resting or nesting place for important native birds in Palawan, such as Blue-naped parrots, Mynah, and Philippine cockatoo (MODECERA 2018). Flowers of this plant also serve as food for wild bees that exist in the area. The Tagbanua called this tree “Ginuu” (i.e., a respectable one or

person in the community); hence, it is a sacred tree amongst IPs.

Most of the threatened plants are in the vulnerable category. About 6 plant species are under this category. These vulnerable species are not endangered or critically endangered but are under threat due to deforestation, habitat destruction, overcollection, poaching, and land conversion, and are most likely to move to the endangered category in the future. In terms of abundance, quite a number of individuals have been observed i.e., *apalang* with 39 individuals, rambutan (28), apitong (25), nato (14) himaraan (6), kamagong (5) ipil (5).

There are 4 species listed under the “other threatened species” (OTS) i.e., Amugis (*Koordersiodendron pinnatum*), Lanutan (*Mitrephora lanotan*), Kalingag/himaraan (*Cinnamomum mercadoi*), Nato (*Palaquium bataanense*).

Table 9: List of threatened plant species found in the ancestral domain.

Common Name/Local Name	Scientific Name	Family	Conservation Status
Banga	<i>Orania paraguensis</i>	Arecaceae	<i>Critically endangered</i>
Manggis	<i>Koompassia excelsa</i>	Fabaceae	<i>Endangered</i>
Dao	<i>Dracontomelon dao</i>	Anacardiaceae	<i>Vulnerable</i>
Apitong	<i>Dipterocarpus grandifloras</i>	Dipterocarpaceae	<i>Vulnerable</i>
Kamagong	<i>Diospyros discolor</i>	Ebenaceae	<i>Vulnerable</i>
Ipil	<i>Intsia bijuga</i>	Fabaceae	<i>Vulnerable</i>
Apalang	<i>Barringtonia palawanensis</i>	Lecythidaceae	<i>Vulnerable</i>
Rambutan	<i>Nephelium lappaceum</i>	Sapindaceae	<i>Vulnerable</i>
Amugis	<i>Koordersiodendron pinnatum</i>	Anacardiaceae	<i>Other threatened species</i>
Lanutan	<i>Mitrephora lanotan</i>	Annonaceae	<i>Other threatened species</i>
Kalingag/Himaraan	<i>Cinnamomum mercadoi</i>	Lauraceae	<i>Other threatened species</i>
Nato	<i>Palaquium bataanense</i>	Sapotaceae	<i>Other threatened species</i>

Fig. 11: Banga (*Orania paraguensis* Becc.) is a raw material used by Tagbanuas for making house.

A taxon is *another* threatened species when it has been evaluated against the criteria and does not qualify to be critically endangered, endangered, or vulnerable but is under threat from adverse factors, such as over-collection throughout its range, and is likely to move to the vulnerable category in the near future (DAO 2017-11).

#### Avifaunal Description of the Ancestral Domain of the Tagbanua Tribe

A total of 372 birds representing 61 species from 29 families were recorded during the survey (Table 10). The family Pycnonotidae had the highest number of individuals (14.5%), followed by the families Dicaeidae (12.6%) and Nectariniidae (9.1%). Meanwhile, the Columbidae family had the most number of species representations (7 species), followed by Cuculidae (6 species), Pycnonotidae (4 species), and Nectariniidae (4 species). Either one or two species mostly represented the other families.

Table 10: Families, common names, scientific names, frequency, relative abundance, conservation status, and level of endemism of birds found in the ancestral domain.

Family	Common Name	Scientific Name	Conservation Status	Level of Endemism	Frequency [n]	Relative Abundance [%]
Pycnonotidae	Palawan Bulbul	<i>Alophotix frater</i>	P3	PHES*	17	4.57
Pycnonotidae	Ashy-Fronted Bulbul	<i>Pycnonotus cinereifrons</i>	LC	PHES*	14	3.76
Pycnonotidae	Sulphur-Bellied Bulbul	<i>Hypsipetes palawanensis</i>	P3	PHES*	15	4.03
Pycnonotidae	Black-Headed Bulbul	<i>Pycnonotus atriceps</i>	LC	R	8	2.15
Timaliidae	Pin-Striped Tit-Babbler	<i>Macronous gularis woodi</i>	LC	R**	20	5.38
Pellorneidae	Ashy-Headed Babbler	<i>Malacocincla cinereiceps</i>	P3	PHES*	9	2.42
Pellorneidae	Melodious Babbler	<i>Malacopteron palawanense</i>	NT / P3	PHES*	1	0.27
Muscicapidae	White-Vented Shama	<i>Copsychus niger</i>	P3	PHES*	11	2.96
Muscicapidae	Palawan Blue Flycatcher	<i>Cyornis lemprieri</i>	NT / P3	PHES*	5	1.34
Irenidae	Asian Fairy-Bluebird	<i>Irena puella tweedallii</i>	LC	R**	16	4.30
Cisticolidae	Rufous-Tailed Tailorbird	<i>Orthotomus sericeus</i>	LC	R	19	5.11
Picidae	Red-Headed Flameback	<i>Chrysocolaptes erythrocephalus</i>	E/P2	PHES*	1	0.27
Picidae	Spot-Throated Flameback	<i>Dinopium everetti</i>	NT/P3	PHES*	2	0.54
Picidae	Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	V / P3	R	1	0.27
Pittidae	Hooded Pitta	<i>Pitta sordida</i>	LC	R	5	1.34
Pittidae	Red-Bellied Pitta	<i>Erythropitta erythrogaster</i>	LC	PHES	1	0.27
Monarchidae	Blue-Paradise Flycatcher	<i>Terpsiphone cyanescens</i>	NT / P3	PHES*	4	1.08
Monarchidae	Black-Naped Monarch	<i>Hypothymis azurea azurea</i>	LC	R	3	0.81
Dicaeidae	Pygmy Flowerpecker	<i>Dicaeum pygmaeum palawanorum</i>	LC	R**	26	6.99
Dicaeidae	Palawan Flowerpecker	<i>Prionochilus plateni</i>	P3	PHES*	21	5.65
Cuculidae	Chestnut-Breasted Malkoha	<i>Phaenicophaeus curvirostris</i>	LC	R	5	1.34
Cuculidae	Asian Koel	<i>Eudynamis scolopaceus</i>	LC	R	2	0.54
Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	LC	R	2	0.54
Cuculidae	Lesser Coucal	<i>Centropus bengalensis javanensis</i>	LC	R	1	0.27
Cuculidae	Square-Tailed Drongo-Cuckoo	<i>Surniculus lugubris brachyurus</i>	LC	R	2	0.54
Cuculidae	Plaintive Cuckoo	<i>Cacomantis merulinus</i>	LC	R	2	0.54
Corvidae	Slender-Billed Crow	<i>Corvus enca</i>	LC	R	8	2.15
Nectariniidae	Pale Spiderhunter	<i>Arachnothera diluitor</i>	P3	PHES*	18	4.84
Nectariniidae	Olive-Backed Sunbird	<i>Cinnyris jugularis</i>	LC	R	6	1.61
Nectariniidae	Brown-Throated Sunbird	<i>Anthreptes malacensis paraguae</i>	LC	R**	4	1.08
Nectariniidae	Lovely Sunbird	<i>Aethopyga shelleyi shelleyi</i>	P3	PHES	6	1.61
Dicruridae	Hair-Crested Drongo	<i>Dicrurus hottentottus palawanensis</i>	LC	R**	14	3.76
Dicruridae	Ashy Drongo	<i>Dicrurus leucophaeus leucophaeus</i>	LC	R	4	1.08
Paridae	Palawan Tit	<i>Periparus amabilis</i>	NT / P3	PHES*	17	4.57
Estrildidae	White-Bellied Munia	<i>Lonchura leucogastra palawana</i>	LC	R	2	0.54

Table Cont....

Family	Common Name	Scientific Name	Conservation Status	Level of Endemism	Frequency [n]	Relative Abundance [%]	
Estrildidae	Scaly-Breasted Munia	<i>Lonchura punctulata cabanisi</i>	LC	R	2	0.54	
Alcedinidae	Oriental Dwarf Kingfisher	<i>Ceryx erithaca</i>	LC	R	6	1.61	
Alcedinidae	Collared Kingfisher	<i>Todiramphus chloris collaris</i>	LC	R	2	0.54	
Accipitridae	Crested Serpent-Eagle	<i>Spilornis cheela palawanensis</i>	AII / P2	R**	2	0.54	
Accipitridae	Crested Goshawk	<i>Accipiter trivirgatus palawanus</i>	AII / P2	R**	1	0.27	
Bucerotidae	Palawan Hornbill	<i>Anthracoceros marchei</i>	V / AII / P2	PHES*	3	0.81	
Columbidae	Green Imperial Pigeon	<i>Ducula aenea</i>	LC	R	2	0.54	
Columbidae	Common Emerald-Dove	<i>Chalcophaps indica</i>	LC	R	5	1.34	
Columbidae	Pink-Necked Green Pigeon	<i>Treron vernans</i>	LC	R	4	1.08	
Columbidae	Spotted Dove	<i>Spilopelia chinensis tigrine</i>	LC	R	2	0.54	
Columbidae	Zebra Dove	<i>Geopelia striata</i>	LC	R	2	0.54	
Columbidae	Black-Chinned Fruit Dove	<i>Ptilinopus leclancheri gironieri</i>	P3	R**	5	1.34	
Columbidae	Reddish Cuckoo-Dove	<i>Macropygia tenuirostris</i>	LC	R	2	0.54	
Campephagidae	Bar-Bellied Cuckoo-Shrike	<i>Coracina striata difficilis</i>	LC	R**	3	0.81	
Campephagidae	Fiery Minivet	<i>Pericrocotus igneus igneus</i>	NT	R	2	0.54	
Sturnidae	Common Hill Myna	<i>Gracula religiosa palawanensis</i>	AII / P1	R**	4	1.08	
Sturnidae	Asian Glossy Starling	<i>Aplonis panayensis</i>	LC	R	8	2.15	
Chloropseidae	Yellow-Throated Leafbird	<i>Chloropsis palawanensis</i>	P3	PHES*	8	2.15	
Coraciidae	Oriental Dollar Bird	<i>Eurystomus orientalis orientalis</i>	LC	R	2	0.54	
Aegithinidae	Common Iora	<i>Aegithina tiphia</i>	LC	R	3	0.81	
Psittaculidae	Blue-Naped Parrot	<i>Tanygnathus lucionensis salvadorii</i>	NT / AII / P1	R	3	0.81	
Psittaculidae	Blue-Headed Racket-Tail	<i>Prioniturus platenae</i>	V / P2	PHES*	2	0.54	
Phasianidae	Red Junglefowl	<i>Gallus gallus</i>	LC	R	2	0.54	
Phasianidae	Palawan Peacock-Pheasant	<i>Polyplectron napoleonis</i>	V / AI / P1	PHES*	1	0.27	
Oriolidae	Black-Naped Oriole	<i>Oriolus chinensis chinensis</i>	LC	R	2	0.54	
Artamidae	White-Breasted Woodswallow	<i>Artamus leucorynchus leucorynchus</i>	LC	R	2	0.54	
					Total	372	100

## Legend:

**Conservation Status:**

LC – IUCN Status “Least concern”

NT – IUCN Status “Near-threatened”

V – IUCN Status “Vulnerable”

AI – CITES Status “Appendix I”

AII – CITES Status “Appendix II”

P1 – PCSD Status “Critically Endangered”

P2 – PCSD Status “Endangered”

P3 – PCSD Status “Vulnerable”

**Level of Endemism:**

\* - Palawan endemic species

\*\* - with Palawan endemic subspecies

PHES – Philippine endemic species

R – Resident species

The first two commonly recorded species were the Pygmy Flowerpecker (*Dicaeum pygmaeum palawanorum*) (Fig. 12) and the Palawan Flowerpecker (*Prionochilus plateni*) (Fig. 13). These members of the Dicaeidae family have relative

abundances of 6.99% and 5.65%, respectively. The Pygmy Flowerpecker is a Palawan endemic subspecies, while the Palawan Flowerpecker is a Palawan endemic species. The Palawan Flowerpecker was considered “Vulnerable” by the Palawan Council for Sustainable Development (PCSD 2015). These birds are usually found in small groups of 2-4 individuals or mixed with other feeding birds in the canopy. As their diet is mainly fruits, these birds contribute a lot to seed dispersal (Corlett 1998, Sritongchuay et al. 2014).

The next well-represented species were both insectivores, the Pin-Striped Tit-Babbler (*Macronous gularis woodi*)

(Fig. 14) of the family Timaliidae and the Rufous-Tailed Tailorbird (*Orthotomus sericeus*) (Fig. 15) of the family Cisticolidae. These birds have relative abundances of 5.38% and 5.11%, respectively. Both birds are resident species but the Pin-Striped Tit-Babbler is a subspecies that is endemic to Palawan. Currently, these birds are not classified as threatened or near-threatened within their range.

The high Shannon-Weiner Diversity Index ( $H' = 3.69$ ) and Shannon's Evenness ( $H_E = 0.90$ ) values indicate high avifaunal diversity and equitable distribution among the detected bird species. These values together with species



**The Pygmy Flowerpecker** is the most common bird species recorded in the area. This bird is usually found feeding on fruits, nectars and small invertebrates in the canopy of trees in the forests and open areas. This bird is also common in farms and developed areas.

**Phylum:** Chordata

**Class:** Aves

**Order:** Passeriformes

**Family:** Dicaeidae

**Genus:** *Dicaeum*

**Species:** *D. pygmaeum*

**Subspecies:** *palawanorum*

**Endemism:** Palawan Endemic Subspecies

**Conservation Status:** Least Concern

**Location:** 9.453765N 118.438372E

Fig. 12: The Pygmy Flowerpecker.



**The Palawan Flowerpecker** is one of the most common species in the area. Like the other flowerpeckers it feeds on berries, nectars, pollen, and small invertebrates.

**Phylum:** Chordata

**Class:** Aves

**Order:** Passeriformes

**Family:** Dicaeidae

**Genus:** *Prionochilus*

**Species:** *P. plateni*

**Endemism:** Palawan Endemic Species

**Conservation Status:** Vulnerable (PCSD)

**Location:** 9.447200N 118.444033E

Fig. 13: Palawan Flower Pecker.



**The Pin-Stripped Tit-Babbler** is also one of the commonly recorded species in the area. This bird usually hunts in noisy groups in the dense thickets and low-lying shrubs in the understory. It feeds on insects and small invertebrates.

**Phylum:** Chordata

**Class:** Aves

**Order:** Passeriformes

**Family:** Timaliidae

**Genus:** *Macronous*

**Species:** *M. gularis*

**Subspecies:** *woodi*

**Endemism:** Palawan Endemic Subspecies

**Conservation Status:** Least Concern

**Location:** 9.457532N 118.432311E

Fig. 14: The Pin-Stripped Tit-Babbler.



**The Rufous-Tailed Tailorbird** is also one of the common species in the area. This bird usually hunts in pairs or small groups. It feeds on insects and small invertebrates in the dense understory vegetation.

**Phylum:** Chordata

**Class:** Aves

**Order:** Passeriformes

**Family:** Cisticolidae

**Genus:** *Orthotomus*

**Species:** *O. sericeus*

**Endemism:** Resident

**Conservation Status:** Least Concern

**Location:** 9.454969N 118.437976E

Fig. 15: The Rufous-Tailed Tailorbird.

richness and abundance, are important baseline information for possible monitoring and assessment in the future.

Out of the 61 identified bird species in the study area, 19 (31%) are Philippine endemic species, and 17 (89%) of them are confined only to the Palawan faunal region. The common Palawan endemic species recorded in the study area

are Palawan Flowerpecker (*Prionochilus plateni*) (Fig. 13), Pale Spiderhunter (*Arachnothera dilutior*) (Fig. 16), Palawan Bulbul (*Alophoixus frater*) (Fig. 17), Palawan Tit (*Periparus amabilis*) (Fig. 18), Sulphur-Bellied Bulbul (*Hypsipetes palawanensis*) (Fig. 19), Ashy-Fronted Bulbul (*Pycnonotus cinereifrons*) (Fig. 20), White-Vented Shama (*Copsychus*





**The Pale Spiderhunter** is one of the commonly recorded Palawan endemic species in the area. It feeds on nectars, fruit juices, small insects, and other invertebrates.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.447806N 118.445823E

**Family:** Nectariniidae

**Genus:** *Arachnothera*

**Species:** *A. diluitor*

Fig. 16.: The Pale Spiderhunter.



**The Palawan Bulbul** prefers forested areas and seldom ventures out in the open. This bird feeds on fruits and small invertebrates in the canopy and understory.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.448508N 118.438331E

**Family:** Pycnonotidae

**Genus:** *Alophoixus*

Fig. 17: The Palawan Bulbul.

*niger*) (Fig. 21), Ashy-Headed Babbler (*Malacocincla cinereiceps*) (Fig. 22), and Yellow-Throated Leafbird (*Chloropsis palawanensis*) (Fig. 23).

Meanwhile, the less common Palawan endemic species found during the survey are Palawan Blue Flycatcher (*Cyornis lemprieri*) (Fig. 24), Blue-Paradise

Flycatcher (*Terpsiphone cyanescens*) (Fig. 25), Palawan Hornbill (*Anthracoceros marchei*) (Fig. 26), Spot-Throated Flameback (*Dinopium everetti*) (Fig. 27), Blue-Headed Racket-Tail (*Prioniturus platenae*), Palawan Peacock-Pheasant (*Polyplectron napoleonis*) (Fig. 28), Red-Headed Flameback (*Chrysocolaptes erythrocephalus*) (Fig. 29),



**The Palawan Tit** is an insectivore bird that feeds in the canopy of the forest. It occurs from lowland forests to submontane forest habitats.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:**

**Order:** Passeriformes

Vulnerable (PCSD)

**Family:** Paridae

Near-Threatened (IUCN)

**Genus:** *Periparus*

**Location:** 9.454844N 118.4416613E

**Species:** *P. amabilis*

Fig. 18: The Palawan Tit.



**The Sulphur-Bellied Bulbul** is an omnivore bird that prefers to live in the mature stands of forest. It usually avoids young stages of secondary forests and fragmented forest.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.457496N 118.438446E

**Family:** Pycnonotidae

**Genus:** *Hypsipetes*

**Species:** *H. palawanensis*

Fig. 19: The Sulphur-Bellied Bulbul.



**The Ashy-Fronted Bulbul** has a wide range of foods which includes insects and other invertebrates. It also thrives in both forested and open areas with marginal vegetation. It also frequently visits home gardens and developed areas.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Least Concern

**Order:** Passeriformes

**Location:** 9.450243N 18.440648E

**Family:** Pycnonotidae **Genus:** *Pycnonotus* **Species:** *P. cinereifrons*

Fig. 20: The Ashy-Fronted Bulbul.



**The White-Vented Shama** is a noisy bird that lives in the lowland primary and secondary forests. It also thrives in severely fragmented areas and brush lands. It feeds on insects and small invertebrates.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.450134N 118.437649E

**Family:** Muscicapidae **Genus:** *Copsychus* **Species:** *C. niger*

Fig. 21: The White-Vented Shama.



**The Ashy-Headed Babbler** prefers to live in primary, secondary, and fragmented forests with dense shrub layer. It is commonly seen hunting for insects and small invertebrates close to the ground.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.450981N 118.443334E

**Family:** Pellorneidae **Genus:** *Malacocincla* **Species:** *M. cinereiceps*

Fig. 22: The Ashy-Headed Babbler.



**The Yellow-Throated Leafbird** is a Palawan endemic species. It is commonly found feeding on insects and berries in the canopy of the primary and secondary forests.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.446817N 118.444689E

**Family:** Chloropseidae **Genus:** *Chloropsis* **Species:** *C. palawanensis*

Fig. 23: The Yellow-Throated Leafbird.

and Melodious Babbler (*Malacopteron palawanense*). In addition, two Philippine endemic species that are not restricted to the Palawan faunal region were also recorded

in the area. These are the Lovely Sunbird (*Aethopyga shelleyi shelleyi*) and the Red-Bellied Pitta (*Erythropitta erythrogaster*).



**The Palawan Blue Flycatcher** is found only in forested areas in the Palawan region. This bird prefers to live in the interior part of the forest and avoids the open areas.

<b>Phylum:</b> Chordata	<b>Endemism:</b> Palawan Endemic Species
<b>Class:</b> Aves	<b>Conservation Status:</b> Vulnerable (PCSD)
<b>Order:</b> Passeriformes	Near-Threatened (IUCN)
<b>Family:</b> Muscicapidae	<b>Location:</b> 9.451836N 118.438265E
<b>Genus:</b> <i>Cyornis</i>	
<b>Species:</b> <i>C. lemprieri</i>	

Fig. 24: The Palawan Blue Flycatcher.



**The Blue-Paradise Flycatcher** is commonly found in the dense understorey of primary and secondary forests catching insects while on the flight. This bird is also found in community green spaces in developed areas.

<b>Phylum:</b> Chordata	<b>Endemism:</b> Palawan Endemic Species
<b>Class:</b> Aves	<b>Conservation Status:</b> Vulnerable (PCSD)
<b>Order:</b> Passeriformes	<b>Location:</b> 9.451482N 118.439286E
<b>Family:</b> Monarchidae	<b>Genus:</b> <i>Terpsiphone</i>
	<b>Species:</b> <i>T. cyanescens</i>

Fig. 25. The Blue-Paradise Flycatcher



**The Palawan Hornbill** is one of the large frugivore birds in the forest of Palawan. This bird feeds on fruits and supports the forest health and plant diversity by helping in the dispersal of seeds.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Endangered (PCSD)

**Order:** Passeriformes

Vulnerable (IUCN), Appendix-II (CITES)

**Family:** Bucerotidae

**Location:** 9.453013N 118.438270E

**Genus:** *Anthracoceros* **Species:** *A. marchei*

Fig. 26: The Palawan Hornbill.



**The Spot-Throated Flameback** is one of the two flamebacks that are endemic in the Palawan region. Like the other members of the Picidae family, it feeds on insects and other invertebrates by foraging on trunks and branches of trees.

**Phylum:** Chordata

**Endemism:** Palawan Endemic Species

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

Near-Threatened (IUCN)

**Family:** Picidae

**Location:** 9.458350N 118.430965E

**Genus:** *Dinopium* **Species:** *D. everetti*

Fig. 27: The Spot-Throated Flameback.



**The Palawan Peacock-Pheasant** is a ground-dwelling forest dependent species. It has strong legs used to scratch the forest floor while looking for berries, seeds, insects, and other invertebrates.

**Phylum:** Chordata  
**Class:** Aves  
**Order:** Passeriformes  
**Family:** Phasianidae  
**Genus:** *Polyplectron*  
**Species:** *P. napoleonis*

**Endemism:** Palawan Endemic Species  
**Conservation Status:** Critically Endangered (PCSD) Appendix II (CITES), Vulnerable (IUCN)  
**Location:** 9.456357N 118.433898E

Fig. 28: The Palawan Peacock-Pheasant.



**The Red-Headed Flameback** is one of the two flamebacks found in Palawan. It feeds on insects by foraging on trunks of large trees.

**Phylum:** Chordata  
**Class:** Aves  
**Order:** Passeriformes  
**Family:** Picidae  
**Genus:** *Chrysocolaptes*

**Endemism:** Palawan Endemic Species  
**Conservation Status:** Endangered (PCSD) Endangered (IUCN)  
**Location:** 9.457159N 118.434153E  
**Species:** *C. erythrocephalus*

Fig. 29: The Red-Headed Flameback.

The high level of endemism is expected because Palawan is one of the endemic bird areas (EBA) in the Philippines, and the study area is within the eastern slopes of the Victoria-

Anipahan mountain range, one of the important bird areas (IBA) in the province (BirdLife International, 2020). Endemic birds are mostly forest-dependent and are sensitive

to habitat degradation. Thus, a good stand of old-growth forests is important to these species (Mallari et al. 2011). Seventy percent of all the Philippine endemic species found in Palawan were recorded in the study area. The presence of many endemic birds indicates that the forest habitat is still in good condition.

The ancestral domain is also home to many threatened and near-threatened bird species. Using the criteria of the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Palawan Council for Sustainable Development (PCSD), a total of 24 (39%) species of birds found in the study area are on the conservation priority list of at least one of the aforementioned criteria.

Twelve species of birds were included on the conservation priority list of the IUCN Red List of Threatened Species (IUCN, 2020). Of these, seven were classified as “Near-Threatened,” four were classified as “Vulnerable,” and one was classified as “Endangered.” Meanwhile, based on the conservation priority criteria of PCSD (PCSD, 2015), twenty-three bird species found in the study area were already threatened by extinction. Among them, fifteen were identified

as “Vulnerable,” five were assessed as “Endangered,” and three were classified as “Critically Endangered.” Moreover, some of the commonly traded bird species found in the study area were also listed in the CITES Appendices. Five species were listed in Appendix II, which recommends regulating their trade in the international market, while one species was listed in Appendix I, which recommends prohibiting the international trade of that species.

Based on the highest conservation priority status given to each bird species, twenty-three species were considered threatened with extinction. Three species were classified as “Critically Endangered”, the Common Hill Myna (*Gracula religiosa palawanensis*) (Fig. 30), Blue-Naped Parrot (*Tanygnathus lucionensis salvadorii*) (Fig. 31), and Palawan Peacock-Pheasant (*Polyplectron napoleonis*) (Fig. 28). Another five species were classified as “Endangered”, the Red-Headed Flameback (*Chrysocolaptes erythrocephalus*) (Fig. 29), Crested Serpent-Eagle (*Spilornis cheela palawanensis*) (Fig. 32), Crested Goshawk (*Accipiter trivirgatus palawanus*) (Fig. 33), Palawan Hornbill (*Anthracoceros marchei*) (Fig. 26), and Blue-Headed Racket-Tail (*Prioniturus platenae*). Meanwhile, fifteen species were classified as “Vulnerable”, the Palawan



**The Common Hill Myna** is one of the most commonly sold bird species in the local and international pet trade. This species is an important seed dispersal agent in the forest.

**Phylum:** Chordata

**Class:** Aves

**Order:** Passeriformes

**Family:** Sturnidae

**Genus:** *Gracula*

**Species:** *G. religiosa* **Subspecies:** *palawanensis*

**Endemism:** Palawan Endemic subspecies

**Conservation Status:**

Critically Endangered (PCSD)

Appendix II (CITES)

**Location:** 9.454745N 118.440773E

Fig. 30: The Common Hill Mynah.





**The Blue-Naped Parrot** is also one of the common bird species sold in the local and international pet trade.

<b>Phylum:</b> Chordata	<b>Endemism:</b> Resident (Near Philippine Endemic)
<b>Class:</b> Aves	<b>Conservation Status:</b> Critically Endangered (PCSD)
<b>Order:</b> Passeriformes	Appendix II (CITES),
<b>Family:</b> Psittaculidae	Near-Threatened (IUCN)
<b>Genus:</b> <i>Tanygnathus</i>	<b>Location:</b> 9.458208N 118.430867E
<b>Species:</b> <i>T. lucionensis</i>	
<b>Subspecies:</b> <i>salvadorii</i>	

Fig. 31: The Blue-Naped Parrot.



**The Crested Serpent-Eagle** is a Palawan endemic subspecies. This bird usually hunts prey while soaring in thermals above the forest, forest-edges and open areas.

<b>Phylum:</b> Chordata	<b>Endemism:</b> Palawan endemic subspecies
<b>Class:</b> Aves	<b>Conservation Status:</b> Endangered (PCSD)
<b>Order:</b> Passeriformes	Appendix II (CITES)
<b>Family:</b> Accipitridae	<b>Location:</b> 9.454655N 118.438254E
<b>Genus:</b> <i>Spilornis</i>	<b>Species:</b> <i>S. cheela</i>
	<b>Subspecies:</b> <i>palawanensis</i>

Fig. 32: The Crested Serpent-Eagle.



**The Crested Goshawk** is a bird of prey that hunts small vertebrates in the forest such as rats, squirrels, lizards, and birds.

**Phylum:** Chordata

**Endemism:** Palawan endemic subspecies

**Class:** Aves

**Conservation status:** Endangered (PCSD)

**Order:** Passeriformes

Appendix II (CITES)

**Family:** Accipitridae

**Location:** 9.452050N 118.438951E

**Genus:** *Accipiter* **Species:** *A. trivirgatus* **Subspecies:** *palawanus*

Fig. 33: The Crested Goshawk.



**The Great Slaty Woodpecker** is one of the largest woodpeckers in the world. It feeds on invertebrates gleaned from barks and rotten tree trunks.

**Phylum:** Chordata

**Endemism:** Resident

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

Vulnerable (IUCN)

**Family:** Picidae

**Location:** 9.457436N 118.432778E

**Genus:** *Mulleripicus* **Species:** *M. pulverulentus* **Subspecies:** *pulverulentus*

Fig. 34: The Great Slaty Woodpecker.



**The Black-Chinned Fruit Dove** is a medium sized dove that feed on fruits of trees in the forest. Occasionally, it also visits the fruit bearing trees in fragmented landscapes.

**Phylum:** Chordata

**Endemism:** Palawan endemic subspecies

**Class:** Aves

**Conservation Status:** Vulnerable (PCSD)

**Order:** Passeriformes

**Location:** 9.457037N 118.434562E

**Family:** Columbidae **Genus:** *Ptilinopus* **Species:** *P. leclancheri*

**Subspecies:** *gironieri*

Fig. 35: The Black-Chinned Fruit Dove.

Bulbul (*Alophoixus frater*) (Fig. 17), Sulphur-Bellied Bulbul (*Hypsipetes palawanensis*) (Fig. 19), Ashy-Headed Babbler (*Malacocincla cinereiceps*) (Fig. 22), Melodious Babbler (*Malacopteron palawanense*), White-Vented Shama (*Copsychus niger*) (Fig. 21), Palawan Blue Flycatcher (*Cyornis lemprieri*) (Fig. 24), Spot-Throated Flameback (*Dinopium everetti*) (Fig. 27), Great Slaty Woodpecker (*Mulleripicus pulverulentus pulverulentus*) (Fig. 34), Blue-Paradise Flycatcher (*Terpsiphone cyanescens*) (Fig. 25), Palawan Flowerpecker (*Prionochilus plateni*) (Fig. 13), Pale Spiderhunter (*Arachnothera dilutior*) (Fig. 16), Lovely Sunbird (*Aethopyga shelleyi shelleyi*), Palawan Tit (*Periparus amabilis*) (Fig. 18), Black-Chinned Fruit Dove (*Ptilinopus leclancheri gironieri*) (Fig. 35), Yellow-Throated Leafbird (*Chloropsis palawanensis*) (Fig. 23) (IUCN, 2020; PCSD, 2015).

Most of the conservation priority species recorded in the study area are also Palawan endemic species. Being restricted in Palawan, which is a small geographic region, the deforestation and habitat degradation in the province may drive these species to extinction. This observation further emphasized the importance of the forest in the ancestral

domain as a refuge for these endemic and conservation-priority species.

The supplementary bird watching in the area at night and during rest periods found seven more species. Four species were recorded at night. These are the Spotted Wood Owl (*Strix seloputo wiepkeni*), Palawan Scops Owl (*Otus fuliginosus*), Palawan Frogmouth (*Batrachostomus chaseni*), and Large-Tailed Nightjar (*Caprimulgus macrurus johnsoni*). Meanwhile, three species were found during the daytime, these are the Pied Triller (*Lalage nigra nigra*), Palawan Flycatcher (*Ficedula platenae*), and White-Bellied Woodpecker (*Dryocopus javensis hargitti*). The Palawan Scops Owl, Palawan Frogmouth, and Palawan Flycatcher are Palawan endemic species, while both the Palawan Scops Owl and Spotted Wood Owl were classified as “Endangered,” and Palawan Frogmouth and Palawan Flycatcher were classified as “Vulnerable.”

The avifaunal assemblage in the ancestral domain, particularly in the forested area, may reflect a healthy forest ecosystem, but the threat of habitat degradation and deforestation is always possible if the current anthropogenic activities intensify and become less sustainable. The current

habitat of birds and other wildlife will be affected if a large portion of the watershed is converted into swidden farms. Moreover, if the harvesting of timber and non-timber forest products exceeds the carrying capacity of the forest, it may end up in habitat degradation.

## CONCLUSIONS

The findings of the study show that the Tagbanuas are living in a fragile ecosystem characterized by a high diversity of both plants and animals. Using the diversity values for Shannon-Weiner classification, the forest area of the ancestral domain is considered *High* with a value of 3.42. The area also supports a high avifaunal diversity, as shown by the high species richness, abundance, diversity index, and evenness values. It supports many forest-dependent endemic birds and conservation priority species that are threatened by extinction. These avifaunal community attributes indicate that the forest ecosystem in the ancestral domain is still intact, healthy, in good condition, and stable amid existing anthropogenic activities taking place in the area. The high avifaunal diversity and the presence of many endemic and conservation priority bird species highlight the need to protect and conserve the forest of the ancestral domain.

## RECOMMENDATIONS

Government and other entities, including policymakers, need to consider the conduct of immediate rehabilitation activities and restore areas, especially near the watershed. Silvicultural practices must be introduced to enhance residual forest growth. Utilization of forest resources, particularly the non-timber forest products like rattan and almaciga resins, must be governed by permits. Forest Management Plans in the ancestral domain must be thorough in giving future direction to the IP. As the areas in Talakaigan River have great potential as eco-tourism destinations, management plans should be crafted by the academe or related institutions. Likewise, local communities should be involved in the development and implementation of any project to ensure its success. Government incentives such as payment for environmental services (PES) should be enforced to encourage and sustain better participation of the communities affected.

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