

Riparian Flora of Kaliwa River Watershed in the Sierra Madre Mountain Range, Philippines

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INTRODUCTION

The tropical forests of the Philippines are now classified as the fourth most vulnerable forest eco-region in the world with only 7% remaining original forest cover (Conservation International 2011). Considering the fact that tropical forests shelter more than 60% of the world's biodiversity and consistent with claims that the Philippines is one of the most diverse countries in the world on an acre per acre basis, it is safe to assume that a significant number of local species were gone along with the forests. The Kaliwa River Watershed (KRW), part of the Sierra Madre Mountain Range that stretches from Northeastern to Southeastern Luzon, has not been spared from the massive deforestation in the country. Recent biodiversity assessment revealed that majority of the watershed's original forest cover has been severely depleted as a result of shifting cultivation, animal grazing and upland agriculture.

Kaliwa River Watershed has a total area of 27,608 ha wherein the southeastern side covers the municipality of Tanay, Rizal while the northeastern part straddles the municipality of General Nakar, Quezon. Based on the watershed's development and management plan (FMB-DENR 1999), more than half (53.35%) of its total area was still covered by forests. However, a significant reduction in its forest cover was observed in the last few years (Villegas & Pollisco 2008; Bucayu 2003; Laluan 2003; Vidal 2002). The residual forests, comprising the largest area of the watershed were the preferred sites for illegal timber poaching. The native Dumagats engaged in fuel wood gathering and charcoal making activities which possibly contributed to forest degradation and the loss of biodiversity.

This paper is a result of a comprehensive biodiversity study as part of the environmental impact assessment commissioned by

ABSTRACT

This paper provides an inventory of the riparian flora of the Kaliwa River Watershed (KRW) in Sierra Madre Mountain Range, Philippines including stand structure, plant diversity, endemism and ecological status. A total of 386 morpho-species belonging to 278 genera and 95 families were recorded from the study area. There are at least 60 Philippine endemics reported, six of which are Luzon endemics. Twenty-two species were listed under either the Philippine Red List or on the IUCN Red List of Threatened Species. Results of the plant diversity assessment revealed that biodiversity in riparian forests in KRW is still high despite the obvious massive disturbance in the area.

Keywords: Island endemics, Kaliwa River Watershed, Philippine endemics, plant diversity, riparian flora, threatened species

the Philippine government with regard to the proposed Kaliwa Low Dam project. It provides an inventory of the riparian flora of the KRW including stand structure, plant diversity, endemism and ecological status. These information are critically important for better protection and conservation of the watershed.

MATERIALS AND METHODS

The plant diversity assessment was conducted on February 26 to March 30, 2013. Assessment was focused on the remaining patches of forests which are mostly located along the main Kaliwa River and its tributaries. Nested quadrat sampling technique (Figure 1) was used to assess and characterize the structure and species composition of the different plant communities. This method is the most applicable in areas where almost all of the major plant groups are present. For large woody plants with diameters equal or greater than 10 cm, measurements of diameter at breast-height (DBH), merchantable height (MH), and total height (TH) were done inside the 20m × 20m quadrat. Frequency of shrubs, poles and saplings inside the 5m × 5m quadrat was counted, while percentage cover of grasses and other ground cover inside the 1m × 1m quadrat was determined. A total of nineteen quadrats were surveyed with elevation ranging from 113 to 212 m above sea level (Figure 2).

Additional survey to account for other species occurring outside the quadrats was made using transect method. Floristic survey (only involved listing of species encountered without any measurements) was conducted from the 19 10m × 100m transects along the different tributaries. The geographical locations of the 19 transects surveyed are shown in Figure 3.

Diversity indices (i.e. Shannon (H'), Simpson's (D), and Evenness (J)) and similarity matrix for each sampling transects were generated using MultiVariate Statistical Package (MVSP 3.1) software. Shannon Index gives an estimate of species richness and distribution. Evenness Index indicates how evenly

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species and/or individuals are distributed inside a plot or quadrat. Simpson's Index gives the probability of getting different species when two individuals were drawn (without replacement) inside a plot. In addition, endemism and ecological status of the different species were assessed to determine the ecological importance of the vegetation in the area. Species names followed the latest Angiosperm Phylogeny Group classification (Stevens 2001 onwards) while the common names adapted that of Rojo (1999). plot. In addition, endemism and ecological status of the different species were assessed to determine the ecological importance of the vegetation in the area.

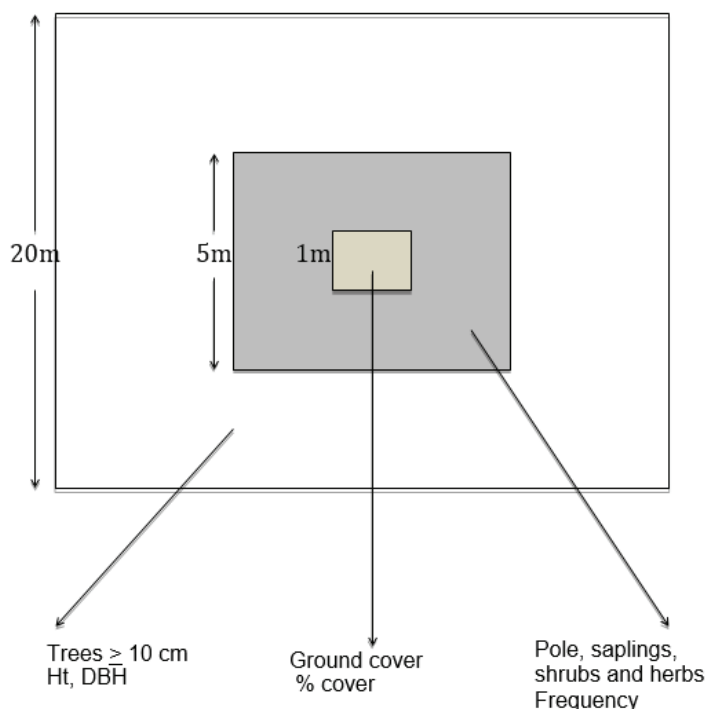


Figure 1. Nested quadrat sampling design used in the survey.

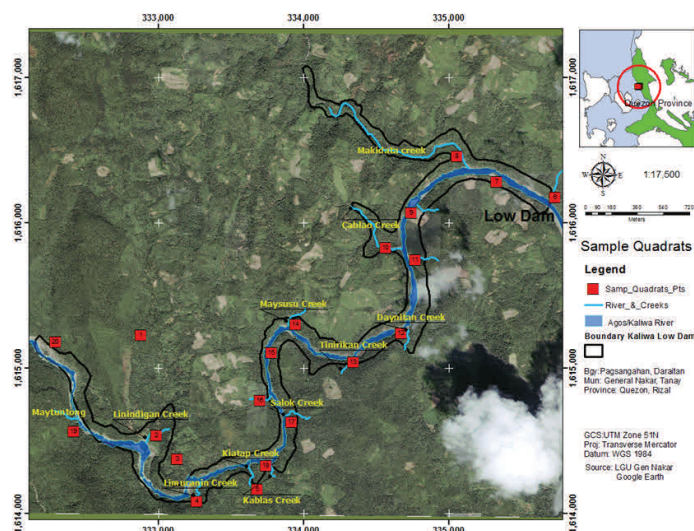


Figure 2. Location map of the different sampling quadrats.

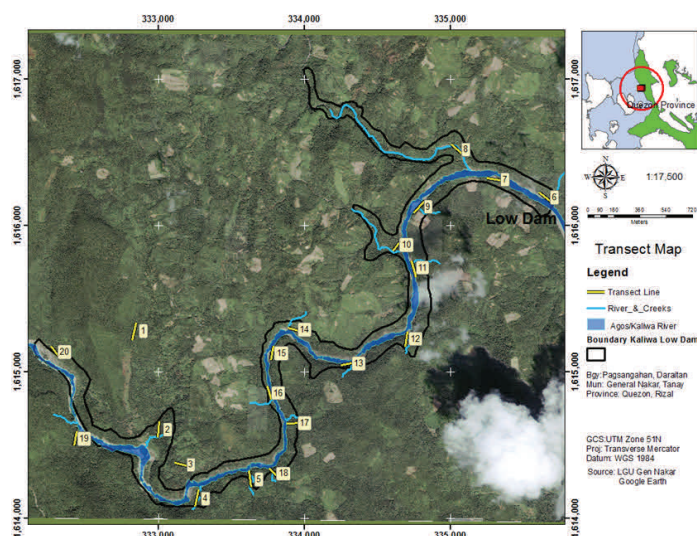


Figure 3. Location map of the different transects surveyed.

RESULTS AND DISCUSSION

General Description of the Project Area

The study area is situated between $14^{\circ} 35' 42.014''$ to $14^{\circ} 37' 21.084''$ north latitude and $121^{\circ} 26' 27.715''$ to $121^{\circ} 28' 29.95''$ east longitude, and covers Sitio Cablao and Sitio Tinipak of Brgy. Pagsangahan, Municipality of General Nakar, Province of Quezon. Based on the actual survey mapping conducted, there are 12 river tributaries draining to the main Kaliwa River namely: Mayayimit, Makidata, Mainit, Cablao, Lagundi, Dayinitan, Tinirikan, Bangian, Salok, Kiatap, Limuranin, and Maytungtong (Figure 4). It is important to mention that only six of these creeks are reflected in the available maps of NAMRIA and even on the online Google map. This alone is already an important contribution to better understand the project site, and as a future reference about the area.

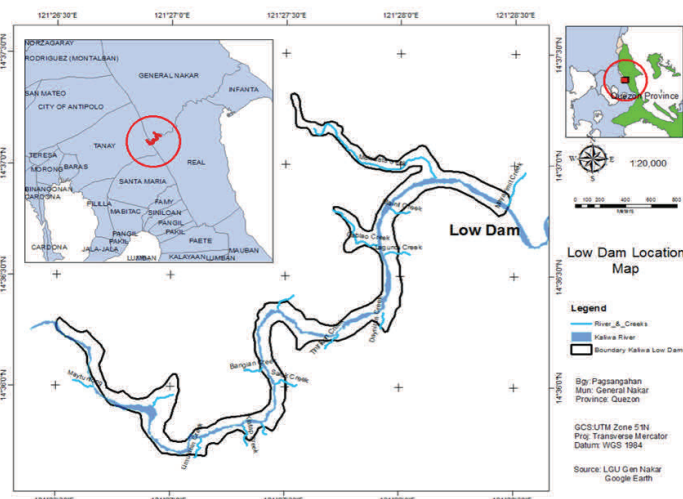


Figure 4. Location map of the study area showing Kaliwa River and its 12 tributaries.

The project site is generally a production area planted with agricultural crops with remnant of natural forests along the steep slopes of the rivers. Common agricultural crops planted in the area include Coconut (*Cocos nucifera* L.), Kalamansi (*Citrus madurensis* Lour.), Kape (*Coffea arabica* L.), Mangga (*Mangifera indica* L.) and Lanzones (*Lansium domesticum* Correa). Natural forests have very limited extent and concentrated along the sharp gradients of the riverbanks. The remaining vegetation is spared from agricultural conversion mainly because of the inappropriateness (steep slope, therefore prone to erosion) of the area for planting. The remaining natural forests are dominated by common riparian species such as Mangagos (*Homonoia riparia* Lour.), Mimisan (*Syzygium mimicum* (Merr.) Merr.), Aunasin (*Ardisia pyramidalis* (Cav.) Pers.) and several species of figs (*Ficus spp.*).

Plant Diversity and Ecological Assessment

Tree Flora

A total of 84 tree species were recorded to have a diameter of more than 10 cm. Majority of the quadrats surveyed have less than 20 individuals per quadrat. Only five quadrats have recorded 20 individuals or more. The average number of trees per plot is only 16 individuals or an average density of only about 0.04 tree/m² (4 trees for every 100 m²). The low tree density of the quadrats can be attributed to the relatively young forest along the riverbanks. In addition, most of the riparian tree species (e.g. *Ficus spp.*) are naturally small diameter trees. The tree with the largest diameter is Saplungan (*Hopea plagata* (Blanco) Vidal), which recorded a DBH of 105 cm (Figure 5), followed by Balobo (*Diplodiscus paniculatus* Turcz.), Tangisang bayawak (*Ficus variegata* Blume), Hagimit (*Ficus minahassae* (Teijsm. & Vriese) Miq.) and Taluto (*Pterocymbium tinctorium* (Blanco) Merr.).



Figure 5. Largest tree in the study site with 105 cm DBH, Saplungan (*Hopea plagata*).

The relative density, relative dominance and relative frequency values for each tree species in all the quadrats were determined to obtain their Importance Value (IV), a standard measure in ecology that determines the rank relationships of species. High Importance values of species indicate a composite score for high relative species dominance, density and frequency. Based on the computed IV (Table 1), the five most important species (with the highest IV) are Hagimit (*F. minahassae*) (32.94), Tibig (*F. nota*) (26.23), Binunga (*Macaranga tanarius* (L.) Muell.-Arg.) (19.32), Tangisang bayawak (*F. variegata*) (19.30) and Hauili (*F. septica*) (12.79). Except for Binunga, all belong to the genus *Ficus* whose members are known to be water-loving species hence, commonly found in rivers and creeks. Binunga, on the other hand, is a highly versatile pioneer species. It grows in a wide range of elevation and temperature.

Table 1. Top ten trees with the highest Importance Value (IV)

Species	Count	RDen	RF	RDom	IV
<i>Ficus minahassae</i>	21	6.774	2.941	23.221	32.936
<i>Ficus nota</i>	29	9.355	4.118	12.760	26.232
<i>Macaranga tanarius</i>	20	6.452	4.118	8.753	19.322
<i>Ficus variegata</i>	16	5.161	4.118	10.026	19.305
<i>Ficus septica</i>	14	4.516	4.118	4.155	12.789
<i>Neonauclea media</i>	13	4.194	3.529	4.782	12.505
<i>Polyscias nodosa</i>	10	3.226	3.529	3.137	9.892
<i>Hopea plagata</i>	6	1.935	0.588	7.351	9.874
<i>Palaquium foxworthyi</i>	10	3.226	1.176	2.796	7.199
<i>Litchi chinensis</i> ssp. <i>philippinensis</i>	7	2.258	3.529	0.960	6.747

*RDen – Relative density; RF – Relative frequency; RDom – Relative dominance; IV – Importance value

Intermediate and Understorey

Smaller trees and understorey species are significantly more diverse and more abundant than larger trees in the survey area. A total of 553 individuals belonging to 111 species were recorded for the intermediate species. Only 8 of the 111 species are either non-trees or non-palms. Similarly, the average density is significantly higher than that of trees, 0.07 individual/m² or equivalent to seven individuals for every 100m². Saplungan (*H. plagata*) emerged as the most abundant understorey species (Table 2) primarily because of the numerous saplings (35) growing in Q12. These saplings came from the mother tree that

Table 2. Ten most abundant understorey species

Species	Abundance	Frequency
<i>Hopea plagata</i>	37	2
<i>Pterospermum celebicum</i>	29	3
<i>Acalypha amentacea</i>	27	9
<i>Donax cannaeformis</i>	22	4
<i>Caryota rumphiana</i>	17	4
<i>Pterospermum obliquum</i>	17	5
<i>Lepisanthes fruticosa</i>	14	4
<i>Coffea arabica</i>	13	4
<i>Leucaena leucocephala</i>	13	3
<i>Melicope triphylla</i>	13	5

*Abundance – total number of individuals recorded for each species;
Frequency – total number of quadrats the species occur

recorded the largest diameter. Other species with the most number of individuals are Bayok (*Pterospermum celebicum* Miq.), Bogus (*Acalypha amentacea* Roxb.), Bamban (*Donax cannaeformis* (G.Forst.) K.Schum.), Takipan (*Caryota rumphiana* Mart.), and Kulatingan (*Pterospermum obliquum* Blanco). Most species generally have low frequency of occurrence. The highest frequency recorded is only nine out of the total 19 quadrats. The low frequency of occurrence for each species suggests high variation among quadrats. This also reflects a good sampling representation (i.e. different vegetation types were covered).

Ground Cover

There are only 39 ground cover species recorded from the 19 1m × 1m quadrats. The plants growing on the forest floor are mostly

seedlings of the different tree species, forest vines and grasses, without the occurrence of any invasive exotic grass species. This is understandable since all of the quadrats were established inside a forested area. These areas are not suitable for the growth of sun-loving species such as the cosmopolitan grasses. Based on the survey, forest litter occupies more than 67% of the forest floor (Table 3) leaving less growing spaces for the ground cover species, hence, low species diversity. The most dominant species that occupy the highest relative cover are Alikbangon (*Commelina benghalensis* L.), Bogus (*A. amentacea*), Selaginella (*Selaginella cupressina* (Willd.) Spring.), and Pakong kalabaw (*Nephrolepis biserrata* (Sw.) Schott.).

Diversity Indices

The computed Shannon Index from the different sampling quadrats varies from a low of 1.695 to a high of 3.242 (Table 4).

Table 3. Top ten ground cover species with the highest relative cover (RC)

Species	RC
Litter	67.69
<i>Commelina benghalensis</i>	5.13
<i>Acalypha amentacea</i>	3.33
<i>Selaginella cupressina</i>	2.82
<i>Nephrolepis biserrata</i>	1.54
<i>Rubus rosifolius</i>	1.54
<i>Syngonium podophyllum</i>	1.54
<i>Aglaonema philippinense</i>	1.03
<i>Momordica charantia</i>	1.03
<i>Polia secundiflora</i>	1.03

Table 4. Diversity indices and number of species for each quadrat

Quadrat	Diversity Indices			Number of Species	Relative Values
	Shannon	Simpson's	Evenness		
Q5	3.242	0.953	0.944	31	High
Q17	3.025	0.936	0.928	26	High
Q12	2.925	0.934	0.920	24	Moderate
Q4	2.900	0.935	0.938	22	Moderate
Q16	2.862	0.924	0.900	24	Moderate
Q15	2.812	0.923	0.924	21	Moderate
Q14	2.699	0.922	0.953	17	Moderate
Q9	2.654	0.906	0.918	18	Moderate
Q19	2.589	0.911	0.914	17	Moderate
Q8	2.578	0.914	0.952	15	Moderate
Q1	2.557	0.880	0.840	21	Moderate
Q10	2.434	0.878	0.859	17	Low
Q6	2.386	0.888	0.930	13	Low
Q13	2.363	0.884	0.895	14	Low
Q3	2.324	0.888	0.935	12	Low
Q7	2.255	0.851	0.879	13	Low
Q18	2.042	0.828	0.852	11	Low
Q2	1.863	0.785	0.809	10	Very Low
Q11	1.695	0.678	0.661	13	Very Low

Following diversity classification scheme based on the suggested range of Shannon Index by Fernando *et al.* 1998 (Table 5), only two quadrats have high diversity, nine are moderately diverse, six have low diversity, and the remaining two have very low diversity. Q5 emerged as the most diverse quadrat since it has the most number of species among the quadrats. However, it should be noted that there are fewer trees in this quadrat as compared to the non-tree species. Similarly, Simpson's Index and Evenness Index are highest in Q6 because no species is over dominating the area. Q11 provided the lowest value for all the indices (H' , D , and J') because the quadrat has only 13 species and there are numerous seedlings (47) of Saplungan (*H. plagata*) which dominates the area.

Table 5. Classification scheme by Fernando *et al.* 1998

Relative Values	Shannon Biodiversity (H') Index
Very High	3.5 and above
High	3.0 – 3.49
Moderate	2.5 – 2.99
Low	2.0 – 2.49
Very Low	1.99 and below

Distance Matrix/Cluster Analysis

Based on the species composition and species abundance of each sampling transects, the MVSP software provided the distance matrix (Table 6). The matrix shows the percentage similarities among sampling quadrats. Only four quadrat combinations obtained higher than 30% similarity, while 10 quadrat combinations have no similarity at all (no species in common). This implies that in terms of species composition, each quadrat has its unique floral characteristics and/or is very different from the other quadrats. The most similar quadrats are Q2 and Q4 with 36.78% similarity. These two quadrats have seven species in common and both are dominated by Binunga (*M. tanarius*) and Hagimit (*F. minahassae*).

These data can be used in deciding what particular area or quadrat can be given up for some development activities. For instance, clearing Q2 will not significantly affect the overall diversity of the area since most of its species can also be found in Q4. In the same manner, similar management strategies can be applied to related quadrat/habitats. But then again, it is always more important to consider the biological value of the species in the area, rather than their similarities.

Table 6. Cluster analysis showing the percentage similarity of each transect combination

	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q1	Q19	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q9	x																		
Q10	33.33	x																	
Q11	0.00	3.36	x																
Q12	26.37	18.18	6.06	x															
Q13	18.42	19.05	0.00	12.37	x														
Q14	20.00	14.71	5.94	12.35	12.12	x													
Q15	8.33	12.50	0.00	8.60	15.39	12.90	x												
Q16	8.60	7.92	8.96	19.30	8.08	9.64	10.53	x											
Q17	12.50	13.64	11.57	23.76	4.65	20.00	9.76	17.48	x										
Q18	3.28	2.90	3.92	4.88	0.00	0.00	3.18	7.14	22.54	x									
Q1	2.25	6.19	0.00	9.09	6.32	2.53	8.79	17.86	4.04	2.50	x								
Q19	13.95	12.77	4.72	14.95	26.09	7.90	22.73	12.84	4.17	0.00	11.43	x							
Q2	18.18	13.51	0.00	2.30	33.33	3.57	11.77	8.99	2.63	3.51	2.35	4.88	x						
Q3	19.05	19.72	1.92	4.76	14.49	18.87	33.85	11.63	8.22	3.70	4.88	15.19	23.73	x					
Q4	26.37	20.20	0.00	25.00	18.56	4.94	12.90	7.02	9.90	2.44	3.64	5.61	36.78	28.57	x				
Q5	13.95	10.64	9.45	11.22	8.70	18.42	9.09	16.51	22.92	12.99	1.91	5.88	2.44	5.06	5.61	x			
Q6	3.51	9.23	4.08	10.26	19.05	8.51	10.17	5.00	5.97	0.00	10.53	10.96	26.42	12.00	20.51	16.44	x		
Q7	12.12	16.22	5.61	9.20	13.89	3.57	5.88	24.72	5.26	7.02	11.77	4.88	6.45	13.56	6.90	14.63	15.09	x	
Q8	13.12	5.80	9.80	7.32	8.96	3.92	9.52	14.29	8.45	3.85	12.50	5.20	17.54	3.70	12.20	12.99	29.17	21.05	x

Species Diversity

A total of 386 morpho-species belonging to 278 genera and 95 families were recorded from the study area (Table 7). Of these, 357 belong to Angiosperms while only 29 species were recorded for Pteridophytes (ferns and their allies). Some specimens (35) were not identified to the species level and have therefore been tentatively assigned to the most probable genus. Most of these are in their juvenile stage and/or are sterile specimens, as identification of plants is very much dependent on the variation exhibited by the reproductive structures.

The most specious (having the most number of species) of all genera is *Ficus* with 23 species. At far second is *Syzygium* with six, followed by *Ardisia*, *Artocarpus*, *Canthium*, *Dysoxylum*, *Glochidion*, *Litsea*, *Macaranga* and *Terminalia* with four each. In terms of Family, the most specious are: Moraceae (28), Euphorbiaceae (21), Fabaceae and Rubiaceae (19 each), and Araceae and Malvaceae (17 each). This species assemblage/ranking is very much similar with the results of floral inventory study conducted in Agno River, Pangasinan (Malabrigo, 2013).

Endemic Species

The geographical distribution of plant species has been very useful for assessing biodiversity values of regions, countries, and islands. Species confined to a particular site should be given particular conservation management strategies, as they are more vulnerable to disturbance due to their narrow range. However, categorizing species as endemic is very much dependent on availability of recent revisions, nomenclatural changes, and new pieces of evidence from various disciplines used in systematic, among others.

Island Endemics

Six species (*Saurauia luzonensis*, *S. polysperma*, *Alocasia zebrina*, *Syzygium striatulum*, *Ardisia rivularis*, and *Palaquium foxworthyi*) have been recognized as island endemics (Table 7). These species are found only in mainland Luzon and nowhere else in the world. Most of these species are confined to just few provinces in Luzon, and two (*S. polysperma* and *S. striatulum*) are new records to the province of Quezon.

Philippine Endemics

There are at least 60 (15.54%) Philippine endemics (including the six island endemics) encountered in the study area (see Table 7). Except for a single species of fern, all the recorded Philippine endemics belong to the Angiosperms. The recorded endemism is significantly lower compared to the country endemism reported to be 60% based on Merrill's Enumeration of Philippine Flowering Plants. This is understandable since the study areas are mostly marginal areas characterized by open canopy forest, hence, common pioneer non-endemics are very dominant.

Threatened Species

Twenty-two species recorded from the area are listed under either the Philippine Red List (Fernando *et al.* 2008) or the IUCN Red List of Threatened Species (2012), eight of which are Philippine endemics (Table 8). Noteworthy among the list are the critically endangered (CR) premium timber species including six Dipterocarps (*Dipterocarpus caudatus* Foxw., *D. grandiflorus*, *H. plagata*, *Parashorea malaanonan* (Blanco) Merr., *Shorea contorta* Vidal and *S. guiso*) and the superior hardwoods Narra (*Pterocarpus indicus* Willd.) and Kamagong (*Diospyros blancoi* A DC). A tree fern species, Pakong buwaya (*Cyathea contaminans* (Wall.) Copel.) is listed in the CITES (Convention on International Trade of Endangered Species of Wild Fauna and Flora).

Table 8. List of threatened species recorded from the study area

Scientific Name	Family	Philippine Red List	IUCN Red List
<i>Adenanthera intermedia</i>	FABACEAE	OTS	VU
<i>Aglaiia rimosa</i>	MELIACEAE	VU	
<i>Alangium longiflorum</i>	CORNACEAE	VU	VU
<i>Aphanamixis polystachya</i>	MELIACEAE	VU	VU
<i>Celtis luzonica</i>	CANNABACEAE		VU
<i>Dimocarpus longan</i>	SAPINDACEAE	EN	
<i>Diospyros blancoi</i>	EBENACEAE	CR	VU
<i>Diospyros pilosanthera</i>	EBENACEAE	EN	
<i>Diplodiscus paniculatus</i>	MALVACEAE		VU
<i>Dipterocarpus caudatus</i>	DIPTEROCARPACEAE		CR
<i>Ficus ulmifolia</i>	MORACEAE		VU
<i>Hopea plagata</i>	DIPTEROCARPACEAE	EN	CR
<i>Litchi chinensis</i> sp. philippinensis	SAPINDACEAE	EN	
<i>Macaranga bicolor</i>	EUPHORBIACEAE		VU
<i>Macaranga grandifolia</i>	EUPHORBIACEAE		VU
<i>Parashorea malaanonan</i>	DIPTEROCARPACEAE		CR
<i>Prunus grisea</i>	ROSACEAE		VU
<i>Pterocarpus indicus</i>	FABACEAE	CR	VU
<i>Shorea contorta</i>	DIPTEROCARPACEAE	VU	CR
<i>Shorea guiso</i>	DIPTEROCARPACEAE		CR
<i>Vitex parviflora</i>	LAMIACEAE	EN	VU

Note: CR – Critically endangered; EN – Endangered; VU – Vulnerable, OTS – Other threatened species

Table 7. List of all species recorded from the study area including their endemism

Scientific Name	Common Name	Family	Endemism	Scientific Name	Common Name	Family	Endemism
<i>Andrographis</i> sp.		ACANTHACEAE		<i>Polyscias nodosa</i>	Malapapaya	ARALIACEAE	NE
<i>Dipteracanthus repens</i>		ACANTHACEAE	NE	<i>Schefflera odorata</i>	Galamay-amo	ARALIACEAE	PE
<i>Elephantopus escaber</i>	Dilang aso	ACANTHACEAE	NE	<i>Areca catechu</i>	Bunga	ARECACEAE	NE
<i>Hemigraphis primulifolia</i>		ACANTHACEAE	NE	<i>Calamus</i> sp. 1	Uway	ARECACEAE	
<i>Pseudelephantopus spicatus</i>	Dilang baka	ACANTHACEAE	NE	<i>Calamus</i> sp.2	Uway	ARECACEAE	
<i>Hydnocarpus sumatrana</i>	Bagarbas	ACHARIACEAE	NE	<i>Caryota cumingii</i>	Pugahan	ARECACEAE	PE
<i>Saurauia luzonensis</i>	Luzon Kalimog	ACTINIDIACEAE	IE	<i>Caryota rumphiana</i>	Takipan	ARECACEAE	NE
<i>Saurauia polysperma</i>		ACTINIDIACEAE	IE	<i>Cocos nucifera</i>	Niog	ARECACEAE	NE
<i>Achyranthes aspera</i>	Dayang	AMARANTHACEAE	NE	<i>Livistona rotundifolia</i>	Anahau	ARECACEAE	NE
<i>Amaranthus spinosus</i>	Uray	AMARANTHACEAE	NE	<i>Orania palindan</i>	Palindan	ARECACEAE	PE
<i>Deeringia polysperma</i>	Bayambang	AMARANTHACEAE	NE	<i>Asplenium musaefolium</i>	Pakpak lawin	ASPLENIACEAE	NE
<i>Buchanania arborescens</i>	Balinghasai	ANACARDIACEAE	NE	<i>Asplenium nidus</i>	Pakpak lawin lalaki	ASPLENIACEAE	NE
<i>Buchanania nitida</i>	Balitantan	ANACARDIACEAE	NE	<i>Asplenium</i> sp.		ASPLENIACEAE	
<i>Mangifera altissima</i>	Pahunan	ANACARDIACEAE	NE	<i>Acmella grandiflora</i>	Yellow Acmella	ASTERACEAE	NE
<i>Mangifera indica</i>	Mangga	ANACARDIACEAE	NE	<i>Ageratum conyzoides</i>	Bulak manok	ASTERACEAE	NE
<i>Semecarpus cuneiformis</i>	Ligas	ANACARDIACEAE	NE	<i>Blumea laciniata</i>	Malatabako	ASTERACEAE	NE
<i>Annona muricata</i>	Guyabano	ANNONACEAE	NE	<i>Chromolaena odorata</i>	Gonoi	ASTERACEAE	NE
<i>Dascymachylon clusiflorum</i>		ANNONACEAE	NE	<i>Crassocephalum crepidioides</i>		ASTERACEAE	NE
<i>Haplostichanthus lanceolatus</i>	Anolang	ANNONACEAE	PE	<i>Mikania cordata</i>	Uoko	ASTERACEAE	NE
<i>Haplostichanthus</i> sp.		ANNONACEAE		<i>Synedrella nodiflora</i>	Tuhod manok	ASTERACEAE	NE
<i>Miliusa vidalii</i>	Takulao	ANNONACEAE	NE	<i>Wedelia biflora</i>	Wedelia	ASTERACEAE	NE
<i>Platymitra arborea</i>	Bolon	ANNONACEAE	PE	<i>Impatiens balsamina</i>	Impatiens	BALSAMINACEAE	NE
<i>Polyalthia oblongifolia</i>	Lapnisan	ANNONACEAE	PE	<i>Begonia</i> sp.	Begonia	BEGONIACEAE	
<i>Uvaria</i> sp.		ANNONACEAE		<i>Radermachera pinnata</i>	Banai-banai	BIGNONIACEAE	NE
<i>Tabernaemontana pandacaqui</i>	Pandakaki	APOCYNACEAE	NE	<i>Spathodea campanulata</i>	African Tulip	BIGNONIACEAE	NE
<i>Voacanga globosa</i>	Bayag usa	APOCYNACEAE	PE	<i>Stenochlaena palustris</i>	Diliman	BLECHNACEAE	NE
<i>Wrightia candelii</i>	Laneteng Pula	APOCYNACEAE	PE	<i>Canarium asperum</i>	Pagsahingin	BURSERACEAE	NE
<i>Wrightia pubescens</i>	Lanete	APOCYNACEAE	NE	<i>Canarium hirsutum</i>	Dulit	BURSERACEAE	NE
<i>Aglaonema philippinense</i>	Aglaonema	ARACEAE	NE	<i>Caesalpinia latisiliqua</i>		CAESALPINIACEAE	NE
<i>Aglaonema</i> sp.		ARACEAE		<i>Aphananthe philippinensis</i>	Alasiis	CANNABACEAE	NE
<i>Alocasia zebrina</i>	Gabing Tigre	ARACEAE	IE	<i>Celtis luzonica</i>	Magabuyo	CANNABACEAE	PE
<i>Amorphophallus campanulatus</i>	Pongapong	ARACEAE	NE	<i>Celtis philippinensis</i>	Malaikmo	CANNABACEAE	NE
<i>Amydrium medium</i>	Lusegut	ARACEAE	NE	<i>Trema orientalis</i>	Anabiong	CANNABACEAE	NE
<i>Colocasia esculenta</i>	Gabi	ARACEAE	NE	<i>Carica papaya</i>	Papaya	CARICACEAE	NE
<i>Epipremnum pinnatum</i>	Tibatib	ARACEAE	NE	<i>Siphonodon celastrinus</i>	Matang-ulang	CELASTRACEAE	NE
<i>Homolomena philippinensis</i>	Alopayi	ARACEAE	PE	<i>Chloranthus erectus</i>		CLORANTHACEAE	NE
<i>Philidendron</i> sp.		ARACEAE		<i>Calophyllum blancoi</i>	Bitanghol	CLUSIACEAE	NE
<i>Photodium lobbianum</i>	Bolong kahinai	ARACEAE	NE	<i>Cratoxylum formosum</i>	Salinggogon	CLUSIACEAE	NE
<i>Pothos dolichophyllus</i>		ARACEAE	NE	<i>Cratoxylum sumatranum</i>	Paguringon	CLUSIACEAE	NE
<i>Pothos ovatifolius</i>		ARACEAE	NE	<i>Garcinia binucao</i>	Binukaw	CLUSIACEAE	NE
<i>Pothos scandens</i>	Dugtong	ARACEAE	NE	<i>Garcinia venulosa</i>	Gatasan	CLUSIACEAE	NE
<i>Syngonium podophyllum</i>	Kamay kastila	ARACEAE	NE	<i>Terminalia calamansanai</i>	Malakalumpit	COMBRETACEAE	NE
<i>Terminalia nitens</i>	Sakat	COMBRETACEAE	PE	<i>Terminalia catappa</i>	Talaisai	COMBRETACEAE	NE
<i>Commelina benghalensis</i>	Alikbangon	COMMELINACEAE	NE	<i>Terminalia microcarpa</i>	Kalumpit	COMBRETACEAE	NE
<i>Murdania nudiflora</i>	Alikbangon lalaki	COMMELINACEAE	NE				
<i>Polia secundiflora</i>	Saibangon	COMMELINACEAE	NE				
<i>Rourea minor</i>	Kamagsa	CONNARACEAE	NE				

Table 7. List of all species recorded from the study area including their endemism (Continued)

Scientific Name	Common Name	Family	Endemism	Scientific Name	Common Name	Family	Endemism
<i>Ipomoea alba</i>	Kamo-kamotehan	CONVOLVULACEAE	NE	<i>Macaranga grandifolia</i>	Takip asin	EUPHORBIACEAE	PE
<i>Merremia peltata</i>	Bulakan	CONVOLVULACEAE	NE	<i>Macaranga tanarius</i>	Binunga	EUPHORBIACEAE	NE
<i>Alangium chinense</i>	Bagaloan	CORNACEAE	NE	<i>Mallotus cumingii</i>	Apanang	EUPHORBIACEAE	NE
<i>Alangium longiflorum</i>	Malatapai	CORNACEAE	NE	<i>Mallotus mollisimus</i>	Hinlaumo	EUPHORBIACEAE	NE
<i>Costus speciosus</i>	Tubang usa	COSTACEAE	NE	<i>Melanolepis multiglandulosa</i>	Alim	EUPHORBIACEAE	NE
<i>Coccinea grandis</i>	Tamling	CUCURBITACEAE	NE	<i>Omolanthus fastuosus</i>	Buta	EUPHORBIACEAE	PE
<i>Momordica charantia</i>	Wild ampalaya	CUCURBITACEAE	NE	<i>Omolanthus populneus</i>	Balanti	EUPHORBIACEAE	NE
<i>Cyathea contaminans</i>	Pakong	CYATHEACEAE	NE	<i>Ricinus communis</i>	Itang-itang	EUPHORBIACEAE	NE
<i>Cyperus flabelliformis</i>	buwaya	CYPERACEAE	NE	<i>Trigonostemon philippinensis</i>	Katap	EUPHORBIACEAE	NE
	Umbrella grass			<i>Abrus precatorius</i>	Saga-saga	FABACEAE	NE
<i>Cyperus rotundus</i>	Mutha	CYPERACEAE	NE	<i>Acacia merrillii</i>	Sibog-aso	FABACEAE	NE
<i>Scleria scrobiculata</i>	Sarat	CYPERACEAE	NE	<i>Adenanthera intermedia</i>	Tanglin	FABACEAE	PE
<i>Scleria sp.</i>		CYPERACEAE		<i>Afzelia rhomboidea</i>	Tindalo	FABACEAE	NE
<i>Davallia solida</i>	Rabbit's foot fern	DAVALLIACEAE	NE	<i>Albizia saponaria</i>	Salingkugi	FABACEAE	NE
<i>Dillenia philippinensis</i>	Katmon	DILLENACEAE	PE	<i>Alysicarpus vaginalis</i>	Mani-manian	FABACEAE	NE
<i>Dioscorea hispida</i>	Nami	DIOSCOREACEAE	NE	<i>Bauhinia integrifolia</i>	Agpoi	FABACEAE	NE
<i>Dipterocarpus caudatus</i>	Tailed leaf Apitong	DIPTEROCARPACEAE	PE	<i>Centrosema pubescens</i>	Dilang butiki	FABACEAE	NE
				<i>Crotalaria sp.</i>	Maning-aso	FABACEAE	
<i>Dipterocarpus grandiflorus</i>	Apitong	DIPTEROCARPACEAE	NE	<i>Derris sp.</i>	Tubli	FABACEAE	
<i>Hopea plagata</i>	Saplungan	DIPTEROCARPACEAE	NE	<i>Erythrina variegata</i>	Dapdap	FABACEAE	NE
<i>Parashorea malaanonan</i>	Bagtikan	DIPTEROCARPACEAE	NE	<i>Intsia bijuga</i>	Ipil	FABACEAE	NE
<i>Shorea contorta</i>	White Lauan	DIPTEROCARPACEAE	PE	<i>Leucaena leucocephala</i>	Ipil ipil	FABACEAE	NE
<i>Shorea guiso</i>	Guijo	DIPTEROCARPACEAE	NE	<i>Mimosa invisa</i>	Makahiyang Lalaki	FABACEAE	NE
<i>Shorea polysperma</i>	Tanguile	DIPTEROCARPACEAE	NE	<i>Mimosa pudica</i>	Makahiya	FABACEAE	NE
<i>Bolbitis rhizophylla</i>		DRYOPTERIDACEAE	PE	<i>Moghania strobilifera</i>	Payang payang	FABACEAE	NE
<i>Diospyros blancoi</i>	Kamagong	EBENACEAE	NE	<i>Mucuna pruriens</i>	Nipai	FABACEAE	NE
<i>Diospyros pilosanthera</i>	Bolong Eta	EBENACEAE	NE	<i>Pterocarpus indicus</i>	Narra	FABACEAE	NE
<i>Equisetum ramosissimum</i>		EQUISETACEAE	NE	<i>Pueraria lobata</i>	Pueraria	FABACEAE	NE
<i>ssp. debile</i>				<i>Cyrtandra sp.</i>		GESNERIACEAE	
<i>Acalypha amentacea</i>	Bogus	EUPHORBIACEAE	NE	<i>Hydrangea sp.</i>		GESNERIACEAE	
<i>Acalypha hispida</i>	Lagapak	EUPHORBIACEAE	NE	<i>Curculigo capitulata</i>	Abang-abang	HYPOXIDACEAE	NE
<i>Alchornea rugosa</i>	Aguioi	EUPHORBIACEAE	NE	<i>Callicarpa erioclana</i>	Palis	LAMIACEAE	NE
<i>Baccaurea tetrandra</i>	Dilak	EUPHORBIACEAE	NE	<i>Callicarpa formosana</i>	Tambabasi	LAMIACEAE	NE
<i>Breynia vitis idaea</i>	Matang hipon	EUPHORBIACEAE	NE	<i>Clerodendrum intermedium</i>	Kasupangil	LAMIACEAE	NE
<i>Cleidion spiciflorum</i>	Paitan	EUPHORBIACEAE	NE	<i>Clerodendrum macrostegium</i>	Pay-at	LAMIACEAE	NE
<i>Cleistanthus myrianthus</i>	Aniatan	EUPHORBIACEAE	NE	<i>Hyptis capitata</i>	Hyptis	LAMIACEAE	NE
<i>Codiaeum luzonicum</i>	Putak	EUPHORBIACEAE	PE	<i>Pogostemon velatum</i>	Pink candle	LAMIACEAE	NE
<i>Endospermum peltatum</i>	Gubas	EUPHORBIACEAE	NE	<i>Symphorema luzonensis</i>	Molawing Baging	LAMIACEAE	PE
<i>Homonoia riparia</i>	Mangagos	EUPHORBIACEAE	NE	<i>Vitex negundo</i>	Lagundi	LAMIACEAE	NE
<i>Macaranga bicolor</i>	Hamindang	EUPHORBIACEAE	PE	<i>Vitex parviflora</i>	Molave	LAMIACEAE	NE
<i>Macaranga cumingii</i>	Daha	EUPHORBIACEAE	PE				

Table 7. List of all species recorded from the study area including their endemism (Continued)

Scientific Name	Common Name	Family	Endemism	Scientific Name	Common Name	Family	Endemism
<i>Actinodaphne multiflora</i>	Puso puso	LAURACEAE	PE	<i>Chisocheton pentandrus</i>	Katong Matsing	MELIACEAE	NE
<i>Litsea cordata</i>	Marang	LAURACEAE	NE	<i>Dysoxylum arborescens</i>	Kalimutain	MELIACEAE	NE
<i>Litsea fulva</i>	Limbahan	LAURACEAE	NE	<i>Dysoxylum cumingianum</i>	Tara-tara	MELIACEAE	NE
<i>Litsea glutinosa</i>	Sablot	LAURACEAE	NE	<i>Dysoxylum excelsum</i>	Kuling-babui	MELIACEAE	NE
<i>Litsea varians</i>		LAURACEAE	NE	<i>Dysoxylum sp.</i>		MELIACEAE	
<i>Persea americana</i>	Avocado	LAURACEAE	NE	<i>Lansium domesticum</i>	Lanzones	MELIACEAE	NE
<i>Dracaena angustifolia</i>	Malasambal	LAXMANNIACEAE	NE	<i>Sandoricum koetjape</i>	Santol	MELIACEAE	NE
<i>Barringtonia racemosa</i>	Putat	LECYTHIDACEAE	NE	<i>Memecylon lanceolatum</i>	Digeg	MEMECYLACEAE	NE
<i>Planchonia spectabilis</i>	Lamog	LECYTHIDACEAE	PE	<i>Pycnarrhena manillensis</i>	Ambal	MENISPERMACEAE	NE
<i>Cyclopeltis crenata</i>	Blue fern	LOMARIOPSIDACEAE	NE	<i>Artocarpus altilis</i>	Kamansi	MORACEAE	NE
<i>Nephrolepis biserrata</i>	Pakong Kalabaw	LOMARIOPSIDACEAE	NE	<i>Artocarpus blancoi</i>	Antipolo	MORACEAE	NE
<i>Lygodium circinnatum</i>	Nitong puti	LYGODIACEAE	NE	<i>Artocarpus heterophyllus</i>	Nangka	MORACEAE	NE
<i>Lygodium flexuosum</i>	Nito	LYGODIACEAE	NE	<i>Artocarpus ovatus</i>	Anubing	MORACEAE	NE
<i>Lygodium japonicum</i>	Nitong hapon	LYGODIACEAE	NE	<i>Ficus ampelas</i>	Upling Gubat	MORACEAE	NE
<i>Cuphea hypsopifolia</i>	Singapore bush	LYTHRACEAE	NE	<i>Ficus balete</i>	Balete	MORACEAE	PE
<i>Garuga floribunda</i>	Bogo	LYTHRACEAE	NE	<i>Ficus benguetensis</i>	Tabul	MORACEAE	NE
<i>Lagerstroemia speciosa</i>	Banaba	LYTHRACEAE	NE	<i>Ficus botryocarpa</i>	Basikong	MORACEAE	NE
<i>Maesa denticulata</i>		MAESACEAE	NE	<i>Ficus fistulosa</i>	Kamahiuhan	MORACEAE	NE
<i>Magnolia candolii</i>	Patangis	MAGNOLIACEAE	NE	<i>Ficus gul</i>	Butli	MORACEAE	NE
<i>Ceiba pentandra</i>	American Kapok	MALVACEAE	NE	<i>Ficus irisana</i>	Aplas	MORACEAE	NE
<i>Diplodiscus paniculatus</i>	Balobo	MALVACEAE	PE	<i>Ficus linearifolia</i>	Basikong Kalawang	MORACEAE	PE
<i>Grewia multiflora</i>	Danglin	MALVACEAE	NE	<i>Ficus magnoliifolia</i>	Kanapai	MORACEAE	NE
<i>Heritiera sylvatica</i>	Dungon	MALVACEAE	NE	<i>Ficus melinocarpa</i>	Upli	MORACEAE	NE
<i>Kleinhovia hospita</i>	Tan-ag	MALVACEAE	NE	<i>Ficus minahassae</i>	Hagimit	MORACEAE	NE
<i>Pterocymbium tinctorium</i>	Taluto	MALVACEAE	NE	<i>Ficus nervosa ssp. pubinervis</i>	Dungo	MORACEAE	NE
<i>Pterospermum celebicum</i>	Bayok-bayokan	MALVACEAE	NE	<i>Ficus nota</i>	Tibig	MORACEAE	NE
<i>Pterospermum diversifolium</i>	Bayok	MALVACEAE	NE	<i>Ficus odorata</i>	Pakiling	MORACEAE	PE
<i>Pterospermum obliquum</i>	Kulatingan	MALVACEAE	PE	<i>Ficus pseudopalma</i>	Niog-niogan	MORACEAE	PE
<i>Sida acuta</i>	Walis-walisan	MALVACEAE	NE	<i>Ficus punctata</i>	Kataupi	MORACEAE	NE
<i>Sterculia cordata</i>	Banilad	MALVACEAE	NE	<i>Ficus sagitta</i>	Balete	MORACEAE	NE
<i>Sterculia oblongata</i>	Malabuho	MALVACEAE	NE	<i>Ficus septica</i>	Hauili	MORACEAE	NE
<i>Theobroma cacao</i>	Cacao	MALVACEAE	NE	<i>Ficus sp. 1</i>		MORACEAE	
<i>Triumfetta rhomboidea</i>	Kulot-kulotan	MALVACEAE	NE	<i>Ficus sp.2</i>		MORACEAE	
<i>Urena lobata</i>	Kollo-kollot	MALVACEAE	NE	<i>Ficus suberulus</i>	Balete	MORACEAE	NE
<i>Donax cannaeformis</i>	Bamban	MARANTHACEAE	NE	<i>Ficus ulmifolia</i>	Is-is	MORACEAE	PE
<i>Phrynium philippinensis</i>	Hagithit	MARANTHACEAE	NE	<i>Ficus variegata</i>	Tangisang bayawak	MORACEAE	NE
<i>Angiopteris palmiformis</i>	Salaguisog	MARATTIACEAE	NE	<i>Streblus asper</i>	Kalios	MORACEAE	NE
<i>Melastoma malabathricum</i>	Malatungaw	MELASTOMATAACEAE	NE	<i>Muntingia calabura</i>	Datiles	MUNTINGIACEAE	NE
<i>Aglaia rimosa</i>	Bayanti	MELIACEAE	NE	<i>Musa acuminata</i>	Saging matsing	MUSACEAE	NE
<i>Aglaia sp.</i>		MELIACEAE		<i>Knema glomerata</i>	Tambalau	MYRISTICACEAE	NE
<i>Aphanamixis polystachya</i>	Kangko	MELIACEAE	NE	<i>Myristica elliptica ssp. simiarum</i>	Tanghas	MYRISTICACEAE	NE
<i>Chisocheton cumingianus</i>	Balukanag	MELIACEAE	NE	<i>Myristica philippinensis</i>	Duguan	MYRISTICACEAE	PE

Table 7. List of all species recorded from the study area including their endemism (Continued)

Scientific Name	Common Name	Family	Endemism	Scientific Name	Common Name	Family	Endemism
<i>Decaspermum blancoi</i>	Pataksik pula	MYRTACEAE	PE	<i>Drynaria quercifolia</i>	Kabkab	POLYPODIACEAE	NE
<i>Psidium guajava</i>	Bayabas	MYRTACEAE	NE	<i>Microsorium longissimum</i>	Pakong Bato	POLYPODIACEAE	NE
<i>Syzygium calubcob</i>	Kalubkob	MYRTACEAE	PE	<i>Ardisia pyramidalis</i>	Aunasin	PRIMULACEAE	NE
<i>Syzygium curtiflorum</i>	Lipoteng gubat	MYRTACEAE	NE	<i>Ardisia rivularis</i>		PRIMULACEAE	IE
<i>Syzygium mimicum</i>	Mimisan	MYRTACEAE	PE	<i>Ardisia serrata</i>	Panabon	PRIMULACEAE	PE
<i>Syzygium polycephaloides</i>	Lipote	MYRTACEAE	PE	<i>Ardisia squamulosa</i>	Tagpo	PRIMULACEAE	PE
<i>Syzygium sp.</i>		MYRTACEAE		<i>Pityrogramma calomelanos</i>	Silver fern	PTERIDACEAE	NE
<i>Syzygium striatulum</i>	Malaruhat sapa	MYRTACEAE	IE	<i>Pteridium aquilinum</i>		PTERIDACEAE	NE
<i>Anacolosia frutescens</i>	Galo	OLACACEAE	NE	<i>Pteris ensiformis</i>	Pakong sundang	PTERIDACEAE	NE
<i>Olax imbricata</i>	Malabagyo	OLACACEAE	NE	<i>Pteris vitata</i>	Rusty brake	PTERIDACEAE	NE
<i>Strombosia philippinensis</i>	Tamayuan	OLACACEAE	NE	<i>Drypetes sp.</i>		PUTRANJIVACEAE	
<i>Chionanthus coriaceus</i>	Pulat	OLEACEAE	NE	<i>Ziziphus talanai</i>	Balakat	RHAMNACEAE	PE
<i>Fraxinus griffittii</i>	Philippine Ash	OLEACEAE	NE	<i>Prunus grisea</i>	Lago	ROSACEAE	NE
<i>Dendrobium sp.</i>		ORCHIDACEAE		<i>Rubus rosifolius</i>	Wild strawberry	ROSACEAE	NE
<i>Averrhoa bilimbi</i>	Kamias	OXALIDACEAE	NE	<i>Canthium dicoccum</i>	Malakape	RUBIACEAE	NE
<i>Freycinetia sp.</i>		PANDANACEAE		<i>Canthium gynochthodes</i>	Butling babui	RUBIACEAE	NE
<i>Antidesma buniis</i>	Bignai	PHYLLANTHACEAE	NE	<i>Canthium horridum</i>	Suyak-daga	RUBIACEAE	NE
<i>Antidesma montanum</i>	Bignai kintab	PHYLLANTHACEAE	NE	<i>Canthium monstrosus</i>	Tadiang anuang	RUBIACEAE	NE
<i>Antidesma pentandrum</i>	Bignai pugo	PHYLLANTHACEAE	NE	<i>Coffea Arabica</i>	Kape	RUBIACEAE	NE
<i>Bischofia javanica</i>	Tuai	PHYLLANTHACEAE	NE	<i>Ixora alba</i>	Santang puti	RUBIACEAE	NE
<i>Bridelia insulana</i>	Subiang	PHYLLANTHACEAE	NE	<i>Ixora longistipulata</i>	Mayanman	RUBIACEAE	PE
<i>Glochidion album</i>	Malabagang	PHYLLANTHACEAE	NE	<i>Neonauclea bartlingii</i>	Lisak	RUBIACEAE	PE
<i>Glochidion luzonense</i>	Apaped	PHYLLANTHACEAE	NE	<i>Neonauclea calycina</i>	Kalamansanai	RUBIACEAE	NE
<i>Glochidion rubrum</i>	Bagnang pula	PHYLLANTHACEAE	NE	<i>Neonauclea media</i>	Wisak	RUBIACEAE	PE
<i>Glochidion urophyllodes</i>	Halakan	PHYLLANTHACEAE	PE	<i>Pertusadina multifolia</i>	Adina	RUBIACEAE	NE
<i>Pittosporum pentandrum</i>	Mamalis	PITTOSPORACEAE	NE	<i>Praravinia sp.</i>		RUBIACEAE	
<i>Pleocnemia sp.</i>		PLEOCNEMIACEAE		<i>Psychotria banahaensis</i>		RUBIACEAE	PE
<i>Bambusa vulgaris</i>	Kawayang Kiling	POACEAE	NE	<i>Psychotria linearis</i>		RUBIACEAE	PE
<i>Coix lachrima-jobi</i>	Tigbi	POACEAE	NE	<i>Psychotria sp.</i>		RUBIACEAE	
<i>Dinochloa acutiflora</i>	Bikal	POACEAE	NE	<i>Spermacoce ocymoides</i>	Landrina	RUBIACEAE	NE
<i>Eleusine indica</i>	Paragis	POACEAE	NE	<i>Timonius arboreus</i>		RUBIACEAE	NE
<i>Imperata cylindrica</i>	Cogon	POACEAE	NE	<i>Uncaria sp.</i>	Susong damulag	RUBIACEAE	
<i>Oplismenus hirtellus</i>		POACEAE	PE	<i>Wendlandia luzoniensis</i>	Daram	RUBIACEAE	PE
<i>Paspalum conjugatum</i>	Carabao grass	POACEAE	NE	<i>Citrus hystrix</i>	Dayap	RUTACEAE	NE
<i>Pennisetum purpureum</i>	Napier grass	POACEAE	NE	<i>Clausena anisum-olens</i>	Kayumanis	RUTACEAE	PE
<i>Saccharum spontaneum</i>	Talahib	POACEAE	NE	<i>Melicope confusa</i>	Bugawak	RUTACEAE	NE
<i>Schizostachyum lima</i>	Anos	POACEAE	NE	<i>Melicope triphylla</i>	Matang araw	RUTACEAE	NE
<i>Schizostachyum lumampao</i>	Buho	POACEAE	NE	<i>Micromelum minutum</i>	Tulibas tilos	RUTACEAE	NE
<i>Setaria palmifolia</i>	Ayas-as	POACEAE	NE	<i>Severinia disticha</i>	Severinia	RUTACEAE	NE
<i>Thysonolaena latifolia</i>	Tiger grass/ Tambo	POACEAE	NE	<i>Triphasia aurantiola</i>	Limoncito	RUTACEAE	NE
<i>Polygala paniculata</i>		POLYGALACEAE	NE	<i>Casearia fuliginosa</i>	Talitan	SALICACEAE	PE
<i>Belvisia sp.</i>		POLYPODIACEAE		<i>Flacourtia rukam</i>	Bitongol	SALICACEAE	NE
				<i>Homalium sp.</i>		SALICACEAE	

Table 7. List of all species recorded from the study area including their endemism (*Continued*)

Scientific Name	Common Name	Family	Endemism	Scientific Name	Common Name	Family	Endemism
<i>Osmelia philippina</i>	Oonog	SALICACEAE	NE	<i>Pleocnemia sp.</i>	Pakong Paitan	TECTARIACEAE	
<i>Xanthophyllum vitellinum</i>	Kamot	SALICACEAE	NE	<i>Tectaria crenata</i>		TECTARIACEAE	NE
<i>Allophyllus cobbe</i>	Barotongol	SAPINDACEAE	NE	<i>Amphineuron terminans</i>	Lokdo	THELYPTERIDACEAE	NE
<i>Cubilia cubili</i>	Kubili	SAPINDACEAE	NE	<i>Chingia ferox</i>		THELYPTERIDACEAE	NE
<i>Dimocarpus longan</i>	Longan	SAPINDACEAE	NE	<i>Christella dentata</i>		THELYPTERIDACEAE	NE
<i>Ganophyllum falcatum</i>	Arangen	SAPINDACEAE	NE	<i>Wikstroemia lanceolata</i>	Salagong sibat	THYMELEACEAE	PE
<i>Guioa koelreuteria</i>	Alahan	SAPINDACEAE	NE	<i>Cypholophus moluccanus</i>		URTICACEAE	NE
<i>Guioa sp.</i>		SAPINDACEAE		<i>Elatostema sp.</i>		URTICACEAE	
<i>Lepisanthes fruticosa</i>	Balinaunau	SAPINDACEAE	NE	<i>Laportea interrupta</i>	Lipang-aso	URTICACEAE	NE
<i>Lepisanthes tetraphylla</i>	Pospos	SAPINDACEAE	NE	<i>Leucosyke apitellata</i>	Alagasi	URTICACEAE	NE
<i>Litchi chinensis sp. philippinensis</i>	Alupag	SAPINDACEAE	NE	<i>Pipturus arborescens</i>	Dalunot	URTICACEAE	NE
<i>Nephelium lappaceum</i>	Rambutan	SAPINDACEAE	NE	<i>Poikilospermum suaveolens</i>	Hanopol	URTICACEAE	NE
<i>Pometia pinnata</i>	Malugai	SAPINDACEAE	NE	<i>Procris sp.</i>		URTICACEAE	
<i>Chrysophyllum cainito</i>	Caimito	SAPOTACEAE	NE	<i>Villebrunea trinervis</i>	Alilaua	URTICACEAE	NE
<i>Palaquium foxworthyi</i>	Tagotoi Malak-malak	SAPOTACEAE	IE	<i>Lantana camara</i>	Coronitas	VERBENACEAE	NE
<i>Palaquium montanum</i>	Bundok	SAPOTACEAE	PE	<i>Stachytarpheta jamaicensis</i>	Kandi-kandialaan	VERBENACEAE	NE
<i>Planchonella nitida</i>	Duklitan	SAPOTACEAE	NE	<i>Leea aculeata</i>	Amamali	VITACEAE	NE
<i>Pouteria micrantha</i>	White Nato	SAPOTACEAE	NE	<i>Leea philippinensis</i>	Kaliantan	VITACEAE	NE
<i>Selaginella cuppressina</i>		SELAGINELLACEAE	NE	<i>Tetrastigma harmandii</i>	Ayo	VITACEAE	NE
<i>Selaginella plana</i>		SELAGINELLACEAE	NE	<i>Tetrastigma loheri</i>	Loher's Ayo	VITACEAE	PE
<i>Capsicum frutescens</i>	Sili	SOLANACEAE	NE	<i>Tetrastigma sp.</i>		VITACEAE	
<i>Solanum biflorum</i>	Bagan-bagan Talong-	SOLANACEAE	NE	<i>Diplazium esculentum</i>	Edible Fern	WOODSIACEAE	NE
<i>Solanum turvum</i>	talongan	SOLANACEAE	NE	<i>Alpinia sp.</i>	Tagbak	ZINGIBERACEAE	
				<i>Zingiber sp.</i>	Puso-pusoan	ZINGIBERACEAE	

Note: For endemism: NE – Non-endemic; PE – Philippine endemic; IE – Island endemic

CONCLUSION

Results of the plant diversity assessment revealed that riparian forests in Kaliwa River Watershed are still rich in biodiversity. Despite massive disturbance, the number of species including the Philippine endemics and threatened species in the area are found to be significantly higher than most of the declared Key Biodiversity Areas (KBAs) in the Philippines (Ambal *et al.* 2012). The fact that some ecologically important species (Saplungan, White lauan, and Guijo) are dominating the area suggests high biodiversity value of the watershed. KRW is an important source of potential mother trees. There were large diameter Dipterocarp trees which could serve as sources of propagules for future reforestation efforts. These information will better guide the stakeholders in the proper management and conservation of KRW.

It is important to note that the area covered by the survey is only a small fraction of the watershed, yet a significant number of ecologically important species were recorded. Some plant groups that were not given much attention in this survey are the canopy

plants and the epiphytes (i.e. orchids and other parasitic vines). Survey of these plant groups requires huge amount of time and resources since it is difficult to collect and document species growing on top of the trees. A more comprehensive biodiversity assessment is therefore necessary for a more complete account of the plant diversity of the watershed.

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