

Anthropogenic Effects in Tropical Forest Patches of Sipalay City Negros Occidental, Philippines

Mae Flor G. Posadas¹

ABSTRACT

Tropical rain forests are viable economic resources for people and their surrounding communities for they serve as sources of food and other materials. This descriptive research provides baseline information that describes and analyzes the socio-economic characteristics of human communities within the three forest patches of Sipalay City and the impact of their activities on these forest reserves. Quantitative and qualitative approaches were employed using survey, ethnobiology workshops, focus group discussions, and key informant interview methods to selected respondents living in these forests. Majority of the households that were natives and lived within the watershed reservation areas relied on farming and live below the poverty threshold due to lack of education, poor road network, and poor access to electricity and communication. Hence, forest areas were utilized in planting crops to support respondents' meager incomes. Hunting, illegal logging, charcoal making, mining, dumping of garbage within the reservation, cutting of trees for firewood, *kaingin*/slash and burn system and human settlements were some of the anthropogenic activities that adversely affected the reservation and contributed to the decrease of vegetation, forest cover, and floral and faunal resources of Sipalay Forest Reserves. Given the situation, majority of the human communities living within the tropical forest were still willing to join programs that protect the remaining forest patches in Sipalay. Findings served as bases for identification of appropriate interventions for the management and development of the area.

Philippine Social Development and Resource Management Journal (2018), {1-24}.

DOI:

¹ Corresponding Author: Mae Flor G. Posadas, Central Philippines State University, Kabankalan City, Negros Occidental, Philippines. Email: mae.flor.posadas@yahoo.com

Keywords: socio-economic profile, human communities, tropical forest

INTRODUCTION

The wildlife of Southwestern Negros is threatened by anthropogenic activities and changing environmental conditions. This has resulted in some significant habitat loss, displacement of animal populations, and local animal extinctions (Alcala, Alcala, & Dolino, 2004; Paalan, Alcala, and Averia, 2004). Most vulnerable are the rare and endangered species that are native to the area. They include the Negros Bare-backed Fruit Bat, one of several bat species hunted for food, and the Negros Cave Frog (Paalan, Alcala & Averia, 2004), a frog species threatened by the changing landscape and declining environmental conditions. The latter, like most moisture-dependent species, is particularly vulnerable to climate change and drastic changes in environmental conditions (Puchendorf, Alford & Rowley, 2008; Alcala et al., 2012).

To ensure the sustainability of the forest, a rapid assessment was conducted to be able to determine the biodiversity and community profile of the three forest patches in Sipalay City. Establishing baseline information and determining the current biodiversity and socioeconomic conditions of the area were important considering the dearth of data on the socio-economic characteristics of the three forest reserves and the description of the human settlements. This study was conducted to address such gaps.

This research provided baseline data relevant to stakeholders like line agencies, the local government of Sipalay City, non-government organizations, civil society groups, people's organizations, and local communities in developing policies, programs, and projects that would lead to the rehabilitation, protection, and conservation of these remaining tropical forest reservation areas which were home to the following endangered species: Guayabero, Negros Bleeding Heart Pigeon, Tariktik Hornbill, Bareback Fruitbat, Visayas Warty Pig, Spotted Deer, and Monitor Lizard.

This study aimed to determine the anthropogenic effects in tropical forest patches of Sipalay City. Specifically, the study aimed to draw a socio-economic profile of the area that focused on the effects of demographic characteristics and human activities within the three forest patches of Sipalay and provide recommendations for improving the present management of these areas.

METHODOLOGY

Description of the Study Site

The study areas were the barangays within the tropical forest of Sipalay City. There were three forest patches in Sipalay namely; Calatong Forest Reserve (covering Barangays Cabadiangan, San Jose and part of Camindangan), Omas Forest Reserve (covering Barangay Camindangan) and Dung-I Forest Reserve (covering Barangay Manlucahoc). These forest patches had an approximate combined area of 1,917 hectares. This forest was a logged-over dipterocarp forest with many patches of agricultural clearings and geographically located in the area within 9° 46' 58" N, 122° 30' 9" E and 9° 47' 6" N, 122° 30' 16" E and 09° 49' 35.2" N 122° 31' 09.8" E, respectively at an elevation of 20 – 270 meters above sea level.

The study was done towards the end of the dry season from April 26 to 28, 2016. Households residing within the tropical forest fragments in the 1,917-hectare reserve served as sources of primary data for the survey. These areas were chosen based on the premise that they still had remaining forest cover at the time of the study.

These significant portions of the forest patches were seen in Barangays Cabadiangan, Camindangan, and Manlucahoc inhabited by large farming households living close to the three forest reserves including the members of the Bantay Bukid Brigade. These were vital areas inhabited by a large farming community situated close to the forest. These forest reserves comprised an important watershed that served as a source of water for residents of Sipalay City. The river of Calatong served as an essential tributary that flowed southwest and drained into the coastal area of Sipalay City.

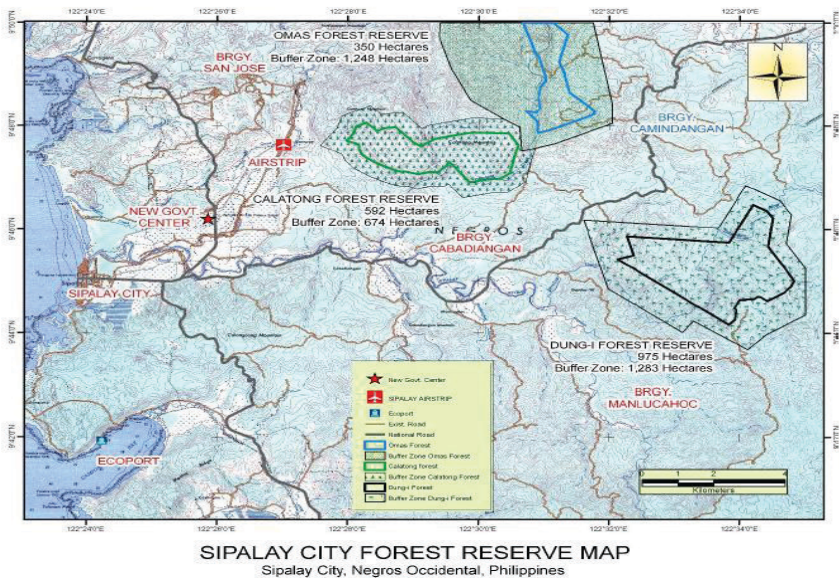


Figure 1. Map of the Sipalay City Forest Reserve showing the locations of the forest patches and their land area of coverage in hectares.

Sampling Technique and Respondents of the Study

A total of 100 respondents were selected purposively for the socioeconomic survey. They were chosen since they were residents of the communities located along the perimeter of the three forest fragments. These barangays were also selected because these forest areas lie within the boundaries of Calatong, Omas and Dung-I forest reserves.

Table 1. *Distribution of Household Population and Sample Size by Barangays*

Sampling Area	Sample	Percent
Calatong Forest Reserve		
Barangay Cabadiangan	31	31.00%
Omas Forest Reserve		
Barangay Camindangan	41	41.00%
Dung-I Forest Reserve		
Barangay Manlucahoc	28	28.00%
TOTAL	100	100.00%

The participants of the ethnobiology workshops were the 110 members of the Bantay Lasang or Bantay Bukid Brigade. These members were chosen because they were very familiar with their forest environment, including the animals and hunting activities in their community.

The Bantay Bukid Brigade (BBB) served as the arm of the People's Organizations (PO's) which were tasked in protecting the environment. They were also known as Deputized Environmental and Natural Resources Officers. There was a BBB organized in the City of Sipalay. The members helped in the enforcement of environmental laws in their areas of jurisdiction. They were also active in environmental conservation activities. Hence, they had good knowledge of what was happening in these forests.

Data Gathering Approaches

This study adopted the descriptive research design utilizing several data gathering techniques. Survey, key informant interviews, ethnobiology workshops, and focus group discussions were used to gather the primary data. Secondary data were likewise used to include maps of the project site, land area, demographic data, and health and sanitation status gathered from government offices and non-government organizations.

Data gathering Procedure

A group of selected key informants was gathered for the Focus Group Discussion (FGD) to gather first-hand data on wildlife utilization in the three forest patches of Sipalay. Before the actual data gathering procedure commenced Prior Informed Consent and requests in writing to conduct the research were sought and approved by the Local Government Unit of Sipalay City. All the data gathered for this research, from the semi-structured questionnaires, primary key informant interviews, and field observations were summarized and analyzed. The data gathered from the focus group discussions and workshops were used to validate and fill up gaps from the data gathered from interviews, informal talks, and observations.

Primary Data collection

Key Informant Interviews

Informant interviews focused only on topics relevant to the research. Identified key informants were knowledgeable on the study site and the communities that lived therein, as they had been residents of the place for most of their lives. Many were members of the 'Bantay Lasang' as well.

Semi-structured Questionnaire

This type of survey utilized a survey questionnaire duly translated into the dialect to facilitate respondents' comprehension. Before the administration of the survey, the researcher and 15 enumerators introduced themselves to the respondents. Trained enumerators gathered data from the respondents which were recorded in the research instrument.

Data collection was done through personal interviews using a structured interview schedule administered by duly trained enumerators under careful supervision of the component leader. Data was processed using Statistical Package for Social Sciences (SPSS) Version 12. Frequency distributions and means were the main statistical tools for descriptive analysis.

Ideally, interviews were conducted in respondents' homes or in their own environment to put them at ease throughout the process. However, due to logistical and funding limitations, interviews were done in the following venues: a public school in Sitio Omas at Barangay Camindangan, a local community church at Barangay Manlucahoc, and Barangay Day Care Center at Barangay Cabadiangan--all within the three forest reserves in Sipalay. These areas were identified to be the nearest and most convenient for the respondents.

Data gathered was validated with the other community members through a community meeting and focus group discussions.

Ethnobiology Workshop

This method was used to gather data on the community's perceptions of their environment, wildlife, and the community's use of wildlife and natural resources. This workshop provided data on the status of wildlife and wildlife trade within the forest reserves, as well as other practices of wildlife extraction.

The workshops were conducted on April 26, 27, and 28, 2016 in Omas, Dung-i and Calatong, respectively. There were 33, 32, and 45 community members who participated (mainly key informants like hunters and Bantay Bukid) living close to the forest patches of Omas, Dung-i, and Calatong, respectively.

Joining the workshops were the People's Organizations from different communities around the Calatong Forest, Omas Forest and Dung-I Forest Protected Area and the members of the Bantay Lasang done on separate dates per reserve area. During the workshop, the researchers presented the pictures of wildlife found in the area during the biodiversity survey to the participants who were grouped according to the community where they belonged to help

them feel at ease but more importantly, to determine the status of wildlife hunting in their respective communities.

Focus Group Discussion (FGD) and Key Informant Interview (KII).

A separate meeting with a group of 100 Bantay Lasang and identified hunters and forest resource gatherers were conducted using the focus group discussion, and key informant interview approaches. These methods were used to gather data on forest resource utilization in the area. The FGD also produced a list of commonly gathered plants and plant by-products found in the reserves.

The key informant interview was used to solicit personal views and observations that would unearth environmental issues and concerns in the forest reserve areas. This technique also made the participants feel comfortable in answering the questions clearly and honestly and served as a means of validating the data gathered through the survey.

The personal interview was done on the same date with the focus group discussion with the other groups but on a separate area near the sites. Before starting the discussion, the purpose of the FGDs and KIs Interview were made clear to the participants. Any misconceptions about the activity were clarified. The first part of the interview started with a getting-to-know-you so that participants would be at ease in the presence of the researcher and enumerators and to encourage them to answer freely any of the researcher's follow up questions.

Secondary Data Collection

Secondary data gathered from the government agencies and NGO's included previous floral and faunal assessments, land area, maps, total population, and health and sanitation status of the community. The Provincial Environment Management Office provided copies of such data.

RESULTS

Socio-Economic Characteristics

Demographic Profile

The majority (41%) of residents within the three forest patches of Sipalay City, Negros Occidental, came from Barangay Camindangan within Omas Forest Reserve. There were (31%) coming from Barangay Cabadiangan within

the Calatong Forest Reserve while the rest (28%) were residents of Barangay Manlucahoc within the Dung-I Forest Reserve.

Most of the participants (55%) were native to their areas who had lived in the three forest patches between 21-40 years. A closer look at the data revealed that out of the three Forest Reserves, Calatong and Omas had been settled by people longer than those in Dung-I (42.9%) which had been resettled only lately (0-10 years).

Most of those residing in the three forest patches had lived within 1 to 3 kilometers distance from the reservation (84.38%).

Majority of the respondents (55.0%) were females, married (86%), and aging between 46-60 years old (53.0%). The data likewise showed that those who represented Calatong forest reserve were more mature (46-60 years old) than those from Omas and Dung-I (16-45 years old).

Closer analysis of the data also showed a combined result of 41% whose age range between 16-45.

Table 2. *Demographic Profile of Respondents Living in the Three Forest Patches of Sipalay*

Demographic Profile	Calatong Forest Reserve Brgy. Cabadiangan		Omas Forest Reserve Brgy. Camindangan		Dung-I Forest Reserve Brgy. Manlucahoc		Total	
	f	%	f	%	f	%	f	%
A Native of the Area	18	58.1	22	53.7	15	51.9	55	55%
Length of stay (years)								
0-10	3	9.70	4	9.80	12	42.90	19	19
11-20	1	3.20	7	17.10	8	28.60	16	16
21-30	8	25.80	8	19.50	3	10.70	19	19
31-40	8	25.80	9	22.00	5	17.90	22	22
Distance of Residence 0.01-3.00	24	80.00	34	91.9	23	79.3	81	84.38
Sex								
Female	16	53.33	19	46.3	20	69.0	55	55.0
Civil Status								
Married	28	93.5	36	87.8	22	75.9	86	86%
Age								
16-30	0	0	8	20.5	10	34.5	18	18.0
31-45	0	0	15	38.5	8	27.6	23	23.0
46-60	30.0	100.0	13	32.50	10	33.33	53	53.0
61-above	0	0	4	10.3	2	6.9	6	6.0

Educational Attainment

The data gathered showed low educational attainment among the respondents of the three forest reserves.

Though most of them acquired elementary education (52.5%) only 17.8% graduated. While 12.9% of these respondents reached high school, only 8.9% were able to graduate. Only 1% took vocational courses and no one was able to reach college. Seven out of 100 respondents had never attended school at all.

Table 3. *Percentage Distribution of the Respondents' Educational Attainment.*

Educational Attainment	Calatong Forest Reserve Brgy. Cabadiangan		Omas Forest Reserve Brgy. Camindangan		Dung-I Forest Reserve Brgy. Manlucahoc		Total	
	f	%	f	%	f	%	f	%
No schooling	1	3.2	1	2.4	5	17.2	7	7.0
Some Elementary	20	64.5	15	36.6	17	60.7	52	52.0
Elementary Graduate	2	6.5	12	29.3	4	13.8	18	18.0
Some High School	4	12.9	7	17.1	2	6.9	13	13.0
High School Graduate	3	9.7	6	14.6	0	0	9	9.0
Some College	0	0	0	0	0	0	0	0
College Graduate	0	0	0	0	0	0	0	0
Some Technical/ Vocational Education	1	3.2	0	0	0	0	1	1.0
Total	31	100	41	100	28	100	100	100

Household Characteristics

The predominant family structure in the area was nuclear (mother, father and children) with 89.01%. The 6.59% were single-parent and 4.40% were truncated (with grandparents living in the family.)

Majority of the families living in all three forest reserves were 1-3 family member households, well within 5-member family size promoted by the poverty reduction program of the national government.

Description of the respondents' families also included the profile of their children. A vast majority of the households had 1-3 children (70.1%). Those with 4-6 children comprised 16.5% while those with 7- 9 children, 2.1%. This suggested a likely increase in population among dwellers of the forest reserve. A growing number of young people residing in the reservation were in their productive and reproductive age. Majority of them were single (55.6%) while 42.7% were already married, indicating an increase in the number of people and possible growth in settlements within the reserves.

Source of Water

The top three sources of water used by the majority of the residents in the forest areas were the spring, locally called “tuburan” (44.4%), the rivers (22.8%), and the dug well or “bobon” (17.3%) as locals referred to it; 4.9% sourced their water from the creeks and the rest used the hand pump (2.5%), creek (4.9%), faucet or level 3 water system (1.9%) and rainwater--particularly those from Calatong--(4.3%). Water from the aforementioned sources was primarily used for drinking (7.6%), cooking (4.4%), laundry (6.3%) and bathing (0.6%). Majority of respondents (75%) said no water analysis was done in the area.

Economic Characteristics

Primary data on households' economic situation showed that at least five members of the family were working with the father (35.2%) and the mother (27.3%) as the lead breadwinners. Farming was the main source of income for the majority of the respondents' head of the family (62.0%). Others were working as laborers (7.0%), housekeepers (7.0%), barangay workers (5.3%) and a fraction (1.6%) engaged in small business.

Out of those who were working, 42.2% were of permanent or regular status, 28.4% were casual, 12.8% were contractual, and 5.5% were employed on a “pakyaw” basis. Notably, 11.0% of the residents did not have permanent jobs.

Majority of the households showed a monthly earning of P5,000.00 and below from employment. Only a small number of these households earned between P5,000 to P20,000. All of the upland residents of the three forest patches (100%) were engaged in farming to augment their meager income. They produced and sold wild fruits (24.7%) “utanon” or vegetables (20.2%), animals (4.5%), honey (7.9%)--particularly those in Omas and Dung-I, medical herbs (2.2%), cogon (3.4%), nito (fern) (2.2%), rattan (1.1%), lumber (3.4%), bird's nest (2.2%), and bats (1.1%) for extra income.

Results of the Focus Group Discussion conducted revealed charcoal as a significant source of income of the households in the three forest patches. Charcoal making was a business practiced by people in all of the sites with 47.1% from Calatong and 13.3% from Omas and Dung-I.

Apparently, charcoal making was a flourishing enterprise within the forest sites. Field observations validated this information. Numerous sacks of charcoal were spotted on display along roadsides. Figure 2 presents some of these pieces of evidence.



Figure 2. Pictures of charcoal displayed along the road near the residents of the upland sites of Sipalay Forest Reserves.

A majority (56.5%) of these households earned an income of P10,001-20,000 or an equivalent of P1,666.67 pesos a month while 15.2% earned an income ranging between P1,001-5,000 followed by P5,001-10,000 earned by 13% of households. There were those (8.7%) who earned 1,000 and below while only 6.5% earned P20,001 and above. Most of them did not have a regular income per month and were unable to come up with a rough estimate. Furthermore, most of the farmers used their products at home for their own consumption.

Effects of Human Activities in the Forest

Wildlife Utilization

Many of the respondents living in the forest depended on wildlife to augment the income they got earned from farming. 38.3 of the respondents regularly gathered and sold "utanon," a wide variety of naturally occurring vegetables. "Utanon" included the "batwan" (*Garcinia busuanganensis*), a widely known sour flavoring ingredient in many Ilonggo dishes. To a lesser extent, catching and selling of wild animals were also considered as sources of income.

Duration of reservation usage in years

When asked about the number of years that they had been using the reservation, 31.75% indicated using the forest area for ten years and below. Some 20.63% used it for 31-40 years, 19.04% used it for 21-30 years, 12.70% used it for 11-20 years. Others lived longer in the area and used the reserves for 41- 50 years (9.52%) and another 6.35% used the reserve for more than 51 years. Their years of stay in the forest patches were indicative of their excellent knowledge of the changes in the reservation areas.

Awareness of the locals on forest cover and wildlife changes in the reserve

Vegetation/forest cover

The results of the Key Informant Interviews, focus group discussions and Ethnobiology Workshop conducted to gather data on the community's perceptions of their environment and wildlife, as well as the community's use of wildlife and natural resources showed that most respondents (72.04%) believed that the forest cover had decreased over time. About 24.73% indicated that the forests remained the same while 3.22% said that the forests increased over time. These answers were later validated to show that the increase of forest cover was attributed to reforestation activities while the decrease was attributed to *kaingin*, cutting of trees, the livelihood of people, and farming.

The Abundance of Flora and Fauna

There was a similar observation with regards to the changes in flora and fauna in the forest. Most of the respondents thought that the wild plants and animals in the forest decreased over time. The decline of wild animals in the forest was confirmed during validation and was attributed to hunting pressure.

Table 4. *Frequency Distribution Showing the Perceived Changes in the Vegetation/Forest Cover in the Three Forest Patches of Sipalay*

Changes in Vegetation / Forest Cover	Calatong Forest Reserve Brgy. Cabadiangan		Omas Forest Reserve Brgy. Camindangan		Dung-I Forest Reserve Brgy. Manlucahoc		Total	
	f	%	f	%	f	%	f	%
Increased	1	3.6	1	3.7	1	2.6	3	3.22
Same	7	25	9	33.3	7	18.4	23	24.73
Decreased	20	71.4	17	63	30	78.9	67	72.04
Total	28	100.0	27	100.0	38	100.0	93	100

When asked for reasons why they thought the forest cover had declined over time, majority pointed to charcoal making (25.3%), illegal logging (25.3%), and kaingin (10.7%) as the most common human activities affecting the forest.

Ethnobiological workshops

Ethnobiological workshops were conducted to validate the status of the vertebrate fauna in three forest reserves in Sipalay City. About 54 species of threatened and non-threatened vertebrates were presented and determined for the change in population over the past few decades and up to the present using PowerPoint. In addition to this, the participants also pointed out and validated other species.



Figure 3. Sample species of fauna presented in a powerpoint.

Species are considered abundant "madamo" and common when observed at near-daily basis or when sighted in large numbers. They included threatened and non-threatened species. On the other hand, the species were considered "diutay" when observed in small numbers and or when not observed regularly. The results of the fora were then subjected to statistical analyses to determine the means and significance of the workshop output (also refer to socio-economic survey methods).

Aside from the original 54 vertebrate species presented, two other species were added to make a total of 56 species validated. These were the *Rusa alfredi* and *Aceros waldeni*, two threatened species added during the

Dung-i validation. Of the 54 species presented, six were unfamiliar to the Omas participants, five were unfamiliar to the Dung-i participants, and 11 were unfamiliar to the Calatong participants. These included some of the threatened species like the Negros Bleeding Heart Pigeon (*Gallicolumba keayi*). Residents' unfamiliarity with these species was due to their absence in the forest site and their cryptic behavior. On the other hand, some (54- 72%) species presented were commonly observed by the residents in the three forest areas.

Table 5. *Summary of the Results of the Workshops Conducted in Omas, Dung-i and Calatong Forest Reserves*

Forest Area	Threatened Species (N=13)	Commonly Observed	Rarely Observed	Declining	Extinct	Unknown/ Unfamiliar
Omas	9(17%)	29 (54%)	3 (5%)	11 (20%)	5	6
Dung-i	9(17%)	39 (72%)	2 (4%)	8 (15%)	2	5
Calatong	11(20%)	39(72%)	1 (2%)	3 (5%)	1	11

Threatened Species

The total number of threatened species identified was 13. Calatong participants identified at least ten (10) threatened species in their area while Dung-i and Omas identified nine species (Table 6). The most important threatened species found in Calatong and Omas was the Negros Bare-backed Fruit Bat (*Dobsonia chapmani*), while the most important threatened species found in Dung-i was the Philippine Spotted Deer (*Rusa alfredi*). The three sites also shared two threatened species, Tarictic Hornbill and Negros Cave Frog. The Negros Bare-backed Fruit Bat and Philippine Spotted Deer were considered to be *Critically Endangered* while the Tarictic Hornbill (*Penelopides panini*) and Negros Cave Frog

(*Platymanthis spelaeus*) were considered *Endangered* under the recent IUCN category. Threatened species reported to have disappeared in Omas include the Philippine Spotted deer (*Rusa alfredi*), Wild pig (*Sus cebifrons*), Blue-backed Parrot (*Tanygnathus sumatranus*), Walden's Hornbill (Kalaw) and Pink-bellied Imperial Pigeon, while the species that had reportedly disappeared in Dung-i were the Wild pigs and the Kalaw (*Aceros waldeni*). Calatong participants also reported the disappearance of woodpeckers in their area.

Table 6. List of Threatened Species (IUCN Red List) Recently Observed in Omas, Dung-I and Calatong Forest Reserves

Species	Local name	Conservation status	Omas	Dung-i	Calatong
Avifauna					
<i>Penelopides panini</i>	Talusi	Endangered	✓	✓	✓
<i>Stachyris nigrorum</i>	Tagbalinon+ other names	Endangered	✓	✓	✓
<i>Coracina ostenta</i>	Manuig+ other names	Vulnerable	✓	✓	✓
<i>Gallicolumba keayi</i>	Manhak	Critically Endangered			✓
<i>Ducula poliocephala</i>	Hagumhum	Near Threatened		✓	✓
<i>Otus nigrorum</i>	Bukaw	Vulnerable	✓	✓	✓
Mammals					
<i>Rusa alfredi</i>	Usa	Critically Endangered		✓	
<i>Sus cebifrons</i>	Baboy/Talonon/Bakatin	Critically Endangered			✓
<i>Nyctimene rabori</i>	Kulabyaw+ other names	Endangered	✓		✓
<i>Dobsonia chapmani</i>	Laon	Critically Endangered	✓		✓
Herpetofauna					
<i>Platymantis spelaeus</i>	Paka+ other names	Endangered	✓	✓	✓
<i>Limnonectes visayanus</i>	Bugongan	Vulnerable	✓	✓	
<i>Cuora amboinensis</i>	Bao	Vulnerable	✓	✓	
Total	13 spp.		9	9	10

Commonly Observed Vertebrates

The total number of commonly observed or frequently sighted species (including threatened species) was 48. The forest site with the most number of commonly sighted species was Calatong with 40 species while Omas had only 29 species. The local sightings of these species varied from one forest site to another. Although most species may be observed in all three sites, they were not that “common” or frequently observed in some sites. Table 7 highlights the commonly sighted species for each forest site.

Table 7. List of Commonly Observed Species Validated by the Omas, Dung-i and Calatong participants

Species	Local name	English common name	Omas	Dung-i	Calatong
Avifauna					
<i>Coracina ostenta</i> *	Manuig+ other names	White-winged Cuckoo-shrike	✓	✓	✓
<i>Gallicolumba keayi</i> *	Kiywa	Negros Bleeding Heart Pigeon			✓
<i>Spilornis holospilus</i>	Sikop	Crested Serpent-Eagle	✓	✓	
<i>Otus nigrorum</i> *	Bukaw	Negros Scops Owl	✓	✓	✓
<i>Sarcops calvus</i>	Sal-ing	Coletto	✓	✓	✓
<i>Zosterops sp.</i>	Tamsi	White-eye	✓	✓	✓
<i>Copsychus luzonensis</i>	Tigbaras+ other names	White-browed Shama	✓		✓
<i>Penelopides Panini</i>	Talusi	Tarictic Hornbill			✓
<i>Caprimulgus manillensis</i>	Daplak	Philippine Nightjar	✓	✓	✓
<i>Pitta sordid</i>	Dondonay+ other names	Hooded Pitta	✓	✓	✓
<i>Chalcophaps indica</i>	Manatad	Emerald Dove	✓	✓	✓
<i>Centropus viridis</i>	Saguksuk/kokok	Philippine Coucal	✓	✓	✓
<i>Stachyris nigrorum</i> *	Tagbalinon+ other names	Negros striped-Babbler	✓	✓	✓
<i>Gallus gallus</i>	Elahas	Red Jungle Fowl		✓	✓
<i>Ducula poliocephala</i>	Hagumhum	Pink-bellied Imperial Pigeon		✓	✓
<i>Tanygnathus sumatranus</i>	Pikoy	Blue-backed Parrot		✓	✓
Mammals					
<i>Prionailurus bengalensis</i>	Maral	Leopard Cat	✓	✓	✓
<i>Paradoxurus hermaphroditus</i>	Lakwi	Common Palm Civet		✓	✓
<i>Viverra zangalunga</i>	Singgarong	Malay Civet			✓
<i>Macaca fascicularis</i>	Amo/unggoy	Long-tailed Macaque		✓	✓
<i>Pteropus pumilus</i>	Kulaknit	Little Golden-mantled Flying Fox	✓	✓	
<i>Nyctimene rabori</i> *	Kulabyaw	Philippine Tube-nosed Fruit Bat			✓
<i>Pteropus hypomelanus</i>	Kabog	Common Island Flying Fox			✓
<i>Dobsonia chapmani</i> *		Negros Bare-backed Fruit Bat			✓
<i>Hipposideros sp.</i>	Sungi	Round-leaf Bat		✓	✓
<i>Saccolaimus saccolaimus</i>	Kololaknit	Pouched Bat		✓	✓
Herpetofauna					
<i>Tropidolaemus wagleri</i>	Dupong	Wagler's Pit Viper			✓
<i>Ahaetulla prasina preocularis</i>	Anulukay	Green Whip Snake		✓	✓

<i>Lycodon capucinus</i>	Maninina	Common House/wolf Snake	✓		✓
<i>Dendrelaphis pictus</i>	Andalaw-an	Painted Bronzeback	✓	✓	✓
<i>Hemibungarus calligaster</i>	Udto-udto	Barred Coral Snake	✓	✓	✓
<i>Python reticulatus</i>	Magkal	Reticulated python		✓	✓
<i>Varanus salvator nuchalis</i>	Halo	Spiny-necked Water Monitor	✓	✓	✓
<i>Hydrosaurus pustulatus</i>	Ibid	Philippine Sailfin Lizard		✓	✓
<i>Mabuya sp.</i>	Tambilihan1	Common Mabuoya	✓	✓	✓
<i>Sphenomorphus sp.</i>	Tambilihan2	Forest Skink	✓	✓	✓
<i>Brachymeles sp.</i>	Tambilihan sa duta	Burrowing Skink	✓	✓	✓
<i>Gekko gecko</i>	Tuko	Tokay Gecko	✓	✓	✓
<i>Draco spilopterus</i>	Hambubukad	Philippine Flying Dragon	✓	✓	
<i>Cuora amboinensis</i> *	Bao	Asian Box Turtle	✓	✓	
<i>Platymantis spelaeus</i> *	Tulilok	Negros Cave Frog	✓	✓	✓
<i>Platymantis corrugatus</i>	Galing-galing	Rough-backed Forest Frog		✓	✓
<i>Platymantis dorsalis</i>	Baki	Common Forest Frog		✓	✓
<i>Limnonectes visayanus</i> *	Bugongan	Philippine Giant Frog	✓	✓	
<i>Kaloula picta</i>	Tala-tala	Chorus Frog	✓	✓	
<i>Occidozyga laevis</i>	kagot	Puddle Frog	✓	✓	
<i>Hylarana erythraea</i>	Manwit	Common Green Frog	✓	✓	
<i>Polypedates leucomystax</i>	Paka sa unas	Common Tree Frog	✓	✓	
Total			29	39	40

*Threatened species (IUCN)

Environmental Issues and Problems in the Forest Patches

Major concerns and environmental issues collated and validated through personal interviews, surveys and focus group discussions included: hunting, Illegal logging, charcoal making, mining, dumping of garbage within the reservation, cutting of trees for firewood and charcoal making, clearing the forest and converting it into a farm lot, quarrying of lime, gold and other minerals, building houses and structures along the river bank, diverting the river flow to irrigate farmlands, Kaingin/slash and burn system and human settlements.

In-depth analysis of the information provided by the people in the uplands revealed that majority of them lack basic socio-economic amenities and services such as water supply, electricity, farm to market roads, education,

facilities, health services, communication and livelihood opportunities. These basic services readily available to people residing in the lowlands were very scarce in the forest reserve due mainly to its location and distance which limit access to support and service delivery from government agencies and other organizations.

When asked whether they would be willing to be part of a program or project that would rehabilitate the forest reserve in the future, an overwhelming majority answered affirmatively. Furthermore, when asked for ways to revive and sustain the life of the forest reserves, suggestions focused on planting trees, reforestation, and provision of livelihood support. A majority indicated that they were willing to partake in the watershed restoration.

Effectiveness of the Program

Most respondents indicated that various organizations and government agencies effectively implemented forest protection.

The following were common recommendations given by the household-respondents on how to protect the three Sipalay Forest Reserves and revive the forest and protected areas:

- a) Reforestation or tree planting;
- b) Protection and strict implementation of laws;
- c) Ban the cutting of trees;
- d) Reforestation plus education;
- e) Reforestation and protection;
- f) Education campaign; and
- h) Total ban on charcoal making, transport, and use.

DISCUSSION

The Tropical Forest Patches of Sipalay City, Negros Occidental, Philippines saw an increase in human settlement in the last 3 to 4 decades. Most of the residents had dwelt very near the forest patches implying that they had been reasonably familiar with what had been happening in the forest. Many were in their late 40s and 60s (Table 2).

The forest reserves of Omas and Dung-I were inhabited by people who were in their reproductive age, an indicator of a possible increase in population resulting from a higher rate of childbirth for the coming years. As the population in upland communities increased, there would be a reduction of natural resources for this would mean an increase in the demand for these

resources. It would cause the “increased pressures on the natural resources base capacity to provide for human needs” (Alcala, 1993).

The educational situation in the area indicated a high drop-out rate for elementary school, low turn-out for high school and none for a college education (Table 3). This condition primarily attributed to the distance of households from schools and poor living conditions, among others. The nearest public school offering college education was also far from their residence which would entail additional expenses for their children’s transportation, food, allowance and other incidental expenses--a considerable burden on their meager income.

Results of the validation conducted on the three forest areas revealed a pattern of poor living condition on the households which were observed to have close family ties with each other. Their close association may be attributed to the fact that they lived in the remote area of the forest where dependence on each other was important to sustain their lives. They worked together in the forest where they got accessed most of their needs.

Generally, the households of the upland communities considered themselves poor and marginal. They source their income from employment, remittances, farming, fishing, and other sources, like collection of wildlife to augment their income.

This paper provided a list of species considered threatened and non-threatened vertebrates to validate the status of fauna in three forest reserves in Sipalay City and determined the change in population over the past few decades and up to the present (Table 6 ad Table 7).

Some of the threatened species identified by respondents during the ethnobiological workshops and Focus Group Discussions included the Negros Bleeding Heart Pigeon (*Gallicolumba keayi*), Negros Bare-backed Fruit Bat (*D. chapmani*), the Philippine Spotted Deer (*Rusa alfredi*), Tarictic Hornbill (*Penelopides panini*) and Negros Cave Frog (*Platymantis spelaeus*).

The Negros Bare-backed Fruit Bat and Philippine Spotted Deer were considered as Critically Endangered while the Tarictic Hornbill (*Penelopides panini*) and Negros Cave Frog (*Platymantis spelaeus*) were considered endangered under the recent IUCN category.

The threatened species reported to have disappeared included the Philippine Spotted deer (*Rusa alfredi*), Wild pig (*Sus cebifrons*), Blue-backed Parrot (*Tanygnathus sumatranus*), Walden’s Hornbill (Kalaw) and Pink-bellied Imperial Pigeon, Wild pigs and Kalaw (*Aceros waldeni*) and woodpeckers. The local sightings of these species varied from one forest site to another.

Hunting, Illegal logging, charcoal making, mining, dumping of garbage into the reservation, cutting of trees for firewood and charcoal making, *Kaingin*/ slash and burn system and human settlements were some of the anthropogenic activities that adversely affected the reservation and contributed to the decrease of the vegetation, forest cover, and decrease of floral and faunal resources of Sipalay Forest Reserve.

Many people in the forest reserves were observed to be impoverished. They found it challenging to engage in business and livelihood opportunities because of the poor infrastructures and the lack of road systems, electricity, and communication. Most of them did not have the educational qualifications to land a job to sustain their families. These were some of the reasons why they found refuge in the forest areas and resort to farming and hunting.

Though they were aware of the ill effects of the cutting of native forest trees and the use of the *kaingin* system of farming, many said they had no choice but to engage in these activities in order to survive.

CONCLUSION

The forest reservation was still a viable economic resource for people and their surrounding communities out of its abundance as a source of food. Majority of the households relied on farming within the watershed reservation area. Most of the upland residents lived below the poverty threshold.

Even though people depended on the forest for their source of living, human activities adversely affected the reservation area and contributed to the decrease of the vegetation/forest cover and the floral and faunal resources of the Sipalay forest reserves.

Given this situation, the majority of the residents in the forest reserves were willing to join programs and projects that would protect the Sipalay forest reserves.

RECOMMENDATIONS

The Management Council and the LGU should endeavor to provide livelihood support to the residents in the forest reserves and implement programs that would alleviate and improve their socio-economic conditions.

The support programs should focus on reducing the dependence on the use of forest resources, promoting activities that had less negative impact

on the environment, and increasing social awareness and promoting cultural values towards taking care of the environment.

Specific suggestions and recommendations:

1. The management may consider prioritizing the “poorest of the poor” households in the reserve, using the national govt. resources, “Pantawid Program.” This initiative would help encourage families living in far-flung areas to send their children to school.
2. Promote and support the production of crops suitable for the specific land area. Farmers may be given the proper training and financial support (e.g., low-interest loan) if available. In conjunction with this, farm-to-market roads or other forms of transport (e.g., River transport) should also be developed to facilitate the transport of farm products to market areas. Many of the poor farmers living in the area were far from road networks and had to shoulder the burden and relatively high cost of bringing their goods to the market where produce were offered at very competitive prices.
3. Introduce hedgerow planting to delineate farm-lot boundaries, at the same time produce coppicing materials for charcoal production, and produce fruits that can help augment the income of farmers. This concept, called Lembo System, had been successfully employed in Indonesia and can be adopted in the forest patches. A pilot program can be implemented in the forest under the supervision of the study proponent. The idea of establishing a forest production area for consumption was proposed (DENR, DA, NGO, LGU) as well as planting of fruit-bearing trees for areas conducive for agroforestry.
4. The possibility of engaging in public-private partnership as a convergence among government and local entities, the community, and private business enterprises may address socio-economic problems of households in the three barangays.
5. Findings also revealed that the Bantay Bukid Brigade had been performing their duties religiously even with minimal support from the LGU. To strengthen and encourage them to continue their work with commitment and vigor, it is highly suggested that there be available support in the form of scholarships for their children, supplies and working materials and equipment for foot patrol and modes of transportation such as horses, motorcycle, flashlight, walking boots, hats, headlights, and monetary incentives.

6. Specific enterprise found to be potential income-generating project are the following:
- a. Honey bee culture in Sitio Omas;
 - b. Citrus tree planting;
 - c. Backyard animal raising, vegetables, and root crops production;
 - d. Animal project dispersal through DA and Sipala
 - e. Handicraft;
 - f. Quail egg production;
 - g. Skills training with TESDA, DSWD, and LGU;
 - h. The Small, Medium and Micro Enterprises can work with the local government and tap local community members especially the unemployed, women and the out-of-school youth.

ACKNOWLEDGMENT

The researcher is grateful for the support and funding provided by the Local Government of Sipalay, through the Mayor, Hon. Oscar C. Montilla, Jr, Vice Mayor, Hon. Ma. Gina M. Lizares, and the members of the City Council, PAME GIZ, CPSU research team and all the barangay officials and residents of the three forest patches in Calatong, Omas, and Dung-I for the strong support and cooperation. This study likewise gives due recognition and acknowledgment to Dr. Ely L. Alcala, Project Consultant from Silliman University, Angelo King Center for Research and Environmental Management for his strong support and valuable technical assistance in the conduct of this research.

REFERENCES

- Alcala, A.C. (1976). Philippine Land Vertebrates. A College Textbook. New Day Publishers, Quezon City, Philippines. 167 pp.
- Alcala, A.C., E.L. Alcala (2000). The Negros cave frog is critically endangered. *Froglog* 2000 (39): 1.
- Alcala, E.L., Alcala, A.C. and Dolino, C.N. (2004a). Amphibians and Reptiles in Tropical Rain- forest Fragments on Negros Island, the Philippines. *Environmental Conservation J.* 31 (3): 254-26.

- Alcala, E.L., Paalan, R.B., Averia, L.T. (2004b). An assessment of the avifauna of Southwestern Negros Island, Philippines: A Terminal Report. Submitted to the ASEAN Regional Centre for Biodiversity Conservation, Los Banos Laguna. 22p.
- Alcala, E. (2006). Community-based management of rainforest biodiversity in southwestern Negros Island, the Philippines. Pp. 362-363. *In: Catibog-Sinha, C. and L. Heaney, Philippine Biodiversity: Principles and Practice.* Published by Haribon Foundation for the Conservation of Natural Resources, Inc., Quezon City, 495 p.
- Alcala, E., Hisona, J., Dulla, J., Velasco, J.B. (2007). Collaboration Among an Academic Institution, Local Communities and Local Government Units in Protecting Wildlife and Forest Habitats in Southwestern Negros Island, Philippines. *Silliman Journal*. Vol. 48: No.2.pp.71-80.
- Brooks, T.M., Pimm, S.L., Kapos, V., Ravilious, C. (1990). Threat from deforestation to montane and lowland birds and mammals in insular South-east Asia. *Journal of Animal Ecology* 68: 1061-1078.
- Brooks, T.M., Pimm, S.L., Collar, N.J. (1997). Deforestation predicts the number of threatened birds in insular Southeast Asia. *Conservation Biology* 11: 382-394.
- Brown, W.C., Alcala, A.C. (1961). Populations of amphibians and reptiles in the submontane and montane forests of Cuernos de Negros, Philippine Islands.
- Biodiversity. *In: Popoola, L (ed). Proceedings of the 32nd Annual Conference of the Forestry Association of Nigeria (FAN) held in Umuahia, Abia State between 20th and 24th October 2008.* Pp 202-207
- Brown, R.M., Diesmos, A.C., Alcala, A.C. (2001). The state of Philippine herpetology and the challenges for the next decade. *Silliman Journal* 42: 18-87.
- Bryant, D. M, Ducey, M. J., Innes, J. C., Lee, T. D., Ekert, R. T. and Zarin, D. J. (2005). Forest Community Analysis and the Point-Centered Quarter Method. *Plant Ecology* 175 (2): 193-203.

- CBD (2002). Participatory mechanisms for indigenous and local communities. ETFRN workshop on Participatory monitoring and evaluation of biodiversity; 7 - 25 January 2002: Danielsen F., Balette D. S., Poulson M. K., Enghoff M., Nozawa C. M., and Jensen A. E. 2000. A simple system for monitoring biodiversity in protected areas of a developing country. *Biodiversity and Conservation*. 9:1671-1705.
- Cook, J.E. (1996). Implications of Modern Successional Theory for Habitat Typing: A Review. *Forest Science* 42(1): 67–75.
- Conservation International (CI) (2005). Biodiversity Hotspots [CI Facts]. Internet Communication (Cited 07-05-2012). Retrieved from <http://www.fao.org/docrep/XO451E/XO45/el/htm>
- Edet, D. I. (2010). Biodiversity Utilization Pattern in Afi Mountain Wildlife Sanctuary, Cross River State, Nigeria. Ph.D. Thesis, University of Ibadan, Ibadan, Nigeria.
- Iroko, O. A., Kareem, A. A., Adio, A. F. and Gbadebo, J. O. (2008). Impact of Human Activities on the Forest and their effects on Climate Change. In: Popoola, L (ed). Proceedings of the 32nd Annual Conference of the Forestry Association of Nigeria (FAN) held in Umuahia, Abia State between 20th and 24th October 2008. Pp 208-214
- Jimoh, S. O., Haruna, E. A. (2007). Contribution of Non-Timber Forest Products to Household Food Security and Income around Onigambari Forest Reserve in Oyo State, Nigeria. *Journal of Environmental Extension*. 6:34-37.