Mount Halcon Conservation and Management Plan (2012-2022):

Participating Institutions:
Provincial Government of Oriental Mindoro
Mindoro Biodiversity Conservation Foundation, Inc. (MBCFI)
Department of Environment and Natural Resources (DENR)
National Commission for Indigenous Peoples (NCIP)
Philippine National Police (PNP); Philippine Army (PA);
Local Government Units of Naujan, Baco, and San Teodoro;
Mangyan Mission; Mindoro Ecological and Sustainable Agriculture Federation (MESAFED); Kapulungan Para sa Lupang Ninuno (KPLN); Samahan ng mga Nagkakaisang Mangyan Alangan (SANAMA); Mal-anggatan Iraya Paranawan Kakuyayan, Inc. (MIPK); Samahan ng mga Alangan sa Baco; Halcon Mountaineering Society (HALMS); Sialdang Mountaineering Club

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FOREWORD

This conservation and management plan of the Mt. Halcon Range in Oriental Mindoro province is the general output of the planning processes convened and facilitated jointly by the Provincial Government of Oriental Mindoro and the Mindoro Biodiversity Conservation Foundation, Inc. The provincial government issued Executive Order No. 47, entitled "An Executive Order Creating the Technical Working Group to Formulate the Mt. Halcon Conservation and Protection Plan, Defining its Functions and for Other Purposes." The said EO provided a mandate for the different planning processes to proceed, and defined the framework for the development of this plan.

This plan aims to serve as a guide to stakeholders in the management of Mt. Halcon as a biodiversity important site and as a culturally significant area. Representatives from local government units, Indigenous Peoples, non-government organizations, and concerned national government agencies led by the Department of Environment and Natural Resources and the National Commission for Indigenous Peoples, participated in a series of planning workshops conducted for the development of this management plan. The different plans of these stakeholders pertaining to Mt. Halcon, including the Ancestral Domain Sustainable Development and Protection Plans of the IPs, were considered and input in this document.

It should be noted that since Mt. Halcon has no specific technical spatial coverage, the management planning attempted to define the boundaries of the site based on its biological and physical attributes as a watershed. As such, the different sub-watersheds within the Mt. Halcon Range were delineated and became the management units in the spatial analysis of this plan.

The provincial government and MBCFI commissioned a consultant, who has an extensive background on natural resources conservation planning, governance and institutional arrangements, protected area management, and project planning, monitoring and evaluation, to assist in facilitating the different planning exercises and provide technical assistance.. The consultant was tasked to ensure participatory planning processes, and develop the planning framework to make sure that the planning exercises and corresponding output are within the standards of appropriate and applicable regulations in relation to the status of Mt. Halcon as a Key Biodiversity Area of the Philippines.

In the preparation of this document, the consultant and MBCFI worked together to review the various planning output, and provided additional notes and input to elaborate more clearly on what was discussed and presented in the planning sessions. The issues and concerns presented during planning are explained further to provide more context, while the goals, objectives, and strategies are presented in detail, based on the listed points of the participants in the strategic planning workshop.

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LIST OF ACRONYMS

ADSDPP	Ancestral Domain Sustainable Development and Protection Plan
ARNP	Apo Reef Natural Park
BC	Basement Complex
CADC	Certificate of Ancestral Domain Claim
CADT	Certificate of Ancestral Domain Title
CBFM	Community-Based Forest Management
CBFMP	Community-Based Forest Management Program
CI	Conservation International
CLUP	Comprehensive Land Use Plan
CNA	Conservation Needs Assessment
CPA	Conservation Priority Area
CRMF	Community Resource Management Framework
DENR	Department of Environment and Natural Resources
DSWD	Department of Social Welfare and Development
EBA	Endemic Bird Area
EIAS	Environmental Impact Assessment System
EO	Executive Order
FFI	Flora and Fauna International
FPIC	Free and Prior Informed Consent
FTAA	Financial Technical Assistance Agreement
GIS	Geographic Information System
IBA	Important Bird Area
IP	Indigenous People/s
IPO	Indigenous Peoples Organization
IPRA	Indigenous Peoples' Rights Act
IRR	Implementing Rules and Regulations
KBA	Key Biodiversity Area
KPLN	Kapulungan Para sa Lupang Ninuno
LGU	Local Government Unit
MBCFI	Mindoro Biodiversity Conservation Foundation, Inc.
MIPK	Mal-anggatan Iraya Paranawan Kakuyayan
MOA	Memorandum of Agreement
MKFI	Mindoro Kabuhayan Foundation, Inc.
MPSA	Mineral Production Sharing Agreement
NCIP	National Commission for Indigenous Peoples
NSO	National Statistics Office
PA	Protected Area
PAMB	Protected Area Management Board
PAWB	Protected Areas and Wildlife Bureau
PBCFI	Philippines Biodiversity Conservation Foundation, Inc.
PNP	Philippine National Police
RA	Republic Act
RED	Regional Executive Director
RUP	Resource Use Permit

SANAMA	Samahan ng Nagkakaisang Mangyan Alangan
UP	University of the Philippines

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EXECUTIVE SUMMARY

A broad range of mountains extends across the entire length of Mindoro Island, from the northwest to the southeast. Its highest point is Mt. Halcon, situated on the northern central portion of the island with an estimated elevation of 2,590 meters above sea level. Six municipalities from both provinces of Mindoro Island have jurisdiction over the mountain range: four in Oriental Mindoro and two in Occidental Mindoro. However, only three municipalities in Oriental Mindoro are covered by this management plan - Baco, Naujan, and San Teodoro.

The spatial coverage of Mt. Halcon used in this management plan is based on its biological and physical attributes as a watershed. Eight sub-watersheds, measuring an estimated land area of 42,372.55 hectares, have been delineated covering Mt. Halcon Range based on their identifiable natural features on the ground, such as ridges and river systems. Available data showed that broadleaved forest plantations are the dominant forest type in Mt. Halcon Range, comprising 70.31% of the total land area of all sub-watersheds. Cultivated areas, including lands devoted to either annual or perennial crops, comprise about 9.31% of the total land area of the eight watersheds. Broadleaved closed and open forests account for 4.63% and 5.43%, respectively. Other land cover types found in these watersheds are inland water, natural barren land, natural grassland, and other woodland with shrubs.

Descriptions from previous studies of the forest formations of Mt. Halcon, however, indicate different forest types, including the lower montane rainforest above 500 meters, and the distinct tropical subalpine forest from 2,100 to 2,400 meters. The variations in elevation gradients within sub-watersheds suggest that different forest formations are likely to develop in the area.

As early as 1907, the Americans have discovered the botanical wealth of the mountain. E.D. Merrill, the first Caucasian who ascended Mt. Halcon's summit in 1906 and who is considered the most respected Philippine phytogeographer, published "The Flora of Mt. Halcon" in 1907. His varied botanical collections were considered in separate publications in that same year: the bryophytes by Brotherus, the ferns by Copeland, and the orchids by Ames.

Dr. Emelina Mandia, a botanist from De La Salle University in Manila and a Mindorena, also conducted an ethno-botanical study of the Alangan Mangyans at the foot of Mt. Halcon in 1987, followed by comprehensive botanical surveys of the summit flora in 1994, 1995, and 2004. Her studies show that this area has high floral endemism and diversity, and its summit harbors unique habitats, including a tropical alpine heath that is seemingly not found anywhere else in the Philippines.

There are 40 known species of mosses recorded in Mt. Halcon, two of which are new records (*Rhacocarpus alpinus* and *Dicranoloma daymannianum*) for the Philippines, and eight new records for the site as contributed by Tan and Mandia (2001). Mandia reported at least 206 species of ferns in Mt Halcon; thus far, three species have been identified as Mt. Halcon endemics (*Hymenophyllum edanoi*, *Selliguea calophlebia*, and *Sphaerostephanos mindorensis*). Some rare species of ferns are likewise found in Mt.

Halcon, such as the *Schizea malaccana,* and *Matonia foxworthyi*. At least 15 species of the 20 known gymnosperms in Mindoro have been recorded in Mt. Halcon.

The flowering plants in Mt. Halcon are botanically interesting, with at least 320 recorded species on its summit alone. Four of these flowering plants occur only in Mt. Halcon, namely, *Vaccinium woodianum*, *Vaccinium barandanum* var. *hutchinsonii*, *Eriocaulon brevipedunculatum*, and *Eleaocarpus mandiae*, the last named after Dr. Mandia herself. Her study also contributed the sedge *Oreobolus ambiguous,* and the aluminum-accumulating *Symplocos obtuse,* the first of its kind ever recorded in the Philippines.

Among the different priority project sites of MBCFI and Key Biodiversity Areas in Mindoro, Mt. Halcon has the most number of threatened endemic faunal species, last pegged at 16 species. Three of these are classified as critically endangered, four as endangered, and nine others as vulnerable. One of the most important species found in Mt. Halcon is the Tamaraw (*Bubalus mindorensis*), the largest endemic mammal in the Philippines and known to exist only in Mindoro. Another endemic species found in the province, the Mindoro climbing rat (*Anonymomys mindorensis*), is confined within Mt. Halcon Range and Ilong Peak. The Large Mindoro forest mouse (*Apomys gracilirostris*) is another endemic species recorded in Mt. Halcon, while the endangered Mindoro shrew (*Crocidura mindorus*) occurs only in Mindoro and Sibuyan Islands.

Most endemic bird species of Mindoro, classified as threatened species by the IUCN-World Conservation Union and the Department of Environment and Natural Resources, can also be found in Mt. Halcon. These include the critically endangered Mindoro bleeding heart pigeon (*Gallicollumba platenae*), the Black hooded coucal (*Centropus steerii*), the endangered Mindoro tarictic hornbill (*Penelopides mindorensis*), and the Mindoro imperial pigeon (*Ducula mindorensis*).

No available studies have been able to clearly describe the different habitat types of Mt. Halcon. Based on the land cover types presented in this plan, however, it can be assumed that the terrestrial forest remains the most dominant habitat in the area. The forest can further be classified into closed and open canopies, which also includes secondary and logged over areas. There are also woodlands mixed with shrubs in Mt. Halcon.

Another habitat type in Mt. Halcon that requires further study is its inland waters, which represent about .10% of the different watersheds. There are also natural grasslands and natural barren types of habitats in Mt. Halcon, while certain areas are already devoted to agriculture and cultivated with annual and perennial crops.

Mt. Halcon is the headwater of numerous river systems that serve as water sources for agricultural, industrial, and domestic uses. The protection of this critical watershed of Oriental Mindoro is, therefore, of paramount importance to the sustainable development of Mindoro Island because of its function as a life-support system.

Mt. Halcon is home to two of the eight ethno-linguistic groups in Mindoro Island - the Alangan Mangyans and the Iraya Mangyans. The Alangan Mangyans perhaps the

most primitive among the Mangyan groups, still wear clothes that they make out of bark, the same material they use for roofs and walls. Mt. Halcon is known to Mangyans as "*Siyaldang,*" which means Sacred Mountain. These IP groups assert their ancestral domain rights over a large area covered by the eight sub-watersheds delineated in this plan.

The Mangyan Tribes, in general, have preserved their original customs, beliefs, and practices through the years, and have maintained a traditional way of life that is deeply rooted in love, care, and enrichment of land and nature; this, in spite of the assimilation of a number of tribe members to non-IP culture. Some Mangyan Tribes strongly refuse to embrace lowland culture and still practice their primitive ways, wandering around in the remaining forests. There are Mangyans who avoid interactions with non-IP communities, and continue to rely on the forest for food. However, the depletion of forest resources has led several Mangyans to adopt lowland agriculture and engage in farm labor with lowlanders.

The Indigenous Peoples' Rights Act of 1997 (Republic Act No 8371) governs the management of the Mangyans' ancestral domains in Mt. Halcon. The IPRA recognizes the rights of the IPs to their ancestral domain, and mandates that the management of these ancestral domain lies primarily with them. Local government units, however, may participate in the management of ancestral domains, such as Mt. Halcon, by providing support mechanisms in the development and implementation of the Ancestral Domain Sustainable Development and Protection Plan of the IPs. If the ancestral domain of the IPs covers a large portion of the forestland of a particular LGU, the ADSDPP may be adopted by the concerned LGU as part of its forestland and comprehensive land use plans. The guideline issued by the National Commission for Indigenous Peoples allows the integration of the ADSDPP into local, regional, and national development framework plans, and LGUs are in the best position to provide the needed assistance to the different IP tribes.

The Local Government Code of 1991 (RA No. 7160) governs the transfer of authority from national government agencies to LGUs, including functions on environment and natural resources management. This policy is particularly important because in spite of Mt. Halcon's status as an ancestral domain, the authority of the LGUs over the area cannot be understated. The authority of the LGUs, as accorded in the LGC, is relevant to Mt. Halcon, relative to the accountability and responsibility of local officials in ensuring the general welfare of their constituents and the delivery of basic services, which may include the IP communities.

Presidential Decree No. 705, or the Revised Forestry Code of the Philippines, may still apply in the utilization of forest resources within the ancestral domains in Mt. Halcon, in the event of the DENR issuing forest resource extraction permits in these areas, after issuance of the IPs of their Free and Prior Informed Consent on such utilization. This particular assumption is being made because the DENR has, in fact, issued a rattan concession covering the Mangyans' ancestral domain in Mt. Halcon.

The biological and cultural importance of Mt. Halcon is no doubt a critical element for its declaration as a protected area under the National Integrated Protect Areas System Act of the Philippines (RA No. 7586). A proposal of the DENR to declare

Mt. Halcon under the NIPAS did not prosper due to vehement opposition from the IP tribes and their supporters. Moreover, since Mt. Halcon is already covered by ancestral domain claims, it would be more feasible to manage the area in accordance with the IPRA.

The Wildlife Conservation and Protection Act (RA No. 9147) is another important legislation for Mt. Halcon because of numerous endemic species and habitats found within it, and which ultimately falls under the governance of this policy. It provides a system of classifications for threatened species, and applies to all wildlife resources regardless of their location. One important provision of RA No. 9147 is the designation of critical wildlife habitat, further elaborated in DENR Memorandum Circular No. 2007-2. Critical habitats refer to "*areas outside the protected areas under the NIPAS that are known habitats of threatened species and designated as such based on scientific data, taking into consideration species endemicity and/or richness and presence of man-made pressures/threats to the survival of wildlife living in the area, among others.*" The declaration of these areas are made through issuance of an administrative order by the DENR Secretary.

The biological and cultural significance of Mt. Halcon is now defined as highly vulnerable. If left unattended, its various issues, concerns, and challenges may result to the further erosion of the IP culture, more losses to biologically important resources, and extreme deterioration of natural environment and ecological services, among others.

The remaining forests of Mt. Halcon serve as important habitats and watersheds and offer other ecological services. They are under threat of further decline over the next few years because of timber poaching, charcoal production, conversion of forestlands into other land uses, slash and burn farming, small scale mining, and other destructive and unsustainable resource use practices. Mt. Halcon's remaining natural forests are already fragmented and confined to a much higher elevation, and the use of natural resources found therein is not fully regulated. Mt. Halcon has, therefore, become an open access area because of the unresolved question of who the real authority is to undertake protection activities. It cannot be overemphasized that actual protection measures and mechanisms need to be put in place in order to properly take care of Mt. Halcon.

As a consequence of habitat destruction and excessive wildlife exploitation, several endemic species in Mt. Halcon (and Mindoro, in general) are extremely threatened with extinction in the wild and are already listed in the Red List of Threatened Species of the IUCN and DENR. In fact, Mt. Halcon accounts for a large number of threatened species, classified as critically endangered, endangered and/or vulnerable to extinction, as compared to other priority conservation sites in Mindoro Island.

The depletion and deterioration of natural resources have likewise reduced the food supply of the Mangyans, especially those who are still dependent on forest resources for food and livelihood. Some wild resources consumed as food by the Mangyans are now classified as threatened species, particularly deer and wild pigs. There are Mangyans who collect forest resources for their own use, but with the

demand from the local market, they have started to trade these products commercially to buy food. Dependency of IP and non-IP communities on the remaining natural resources for subsistence and livelihood is an important conservation concern in Mt. Halcon. With the continuing deterioration of Mt. Halcon's natural environment, its cultural integrity is also affected by migrants who have started to occupy the original territories of the IPs. The influence of lowland culture on the Mangyans' way of life is also a concern in Mt. Halcon.

The other critical issue in Mindoro is government's priority agenda to subject a large area of the island to mining. Several vital biological and cultural areas are covered by at least 92 mining tenements, measuring about 554,676 hectares, or 55.25% of the land area of the entire Mindoro. These mining tenements are classified into Exploratory Permits, Mineral Production Sharing Agreements, and Financial and Technical Assistance Agreements. There are pending mining applications, particularly in San Teodoro, that may cover certain parts of Mt. Halcon. However, the Sangguniang Panlalawigan of Oriental Mindoro has enacted a resolution declaring a mining moratorium in the entire province.

The awareness of the general public on the biodiversity relevance of Mt. Halcon is relatively low, and there is a need to enhance and strengthen the capacity of local stakeholders on biodiversity conservation. Full and meaningful participation of local stakeholders, particularly the LGUs and IP and non-IP communities, have to be mainstreamed and enlisted in the conservation of Mt. Halcon. The enormous challenges in the biodiversity conservation of Mt. Halcon, therefore, necessitate the development and implementation of clear, integrated, and unified conservation agenda that take into account both the biological and cultural features of the area.

The institutional arrangement for the management of Mt. Halcon is an important concern. While Mt. Halcon is recognized as an ancestral domain, the capacity of the Mangyans to fully manage the area and protect it from destructive activities requires further strengthening and support from other sectors. The question, therefore, is how will the other stakeholders, namely the LGUs and the DENR, participate in the management of Mt. Halcon as an ancestral domain?

Although Mt. Halcon is well recognized as a biologically important area of the Philippines, no formal institutional arrangement has ever been established to govern its conservation other than its status as an ancestral domain. The DENR has recommended the declaration of Mt. Halcon as a protected area, but no progress has been made because this management scheme is not acceptable to the IPs. The municipal governments bordering Mt. Halcon have no clear management objectives and plans, but they recognized the potential of the area for ecotourism. The provincial government of Oriental Mindoro is now preparing a tourism management plan for the area.

It should be noted that while no formal institutional mechanisms have been instituted for Mt. Halcon, Barangay Lantuyan in Baco passed a resolution in 2006 declaring a moratorium on mountaineering-related activities. This was brought on because of it was observed that certain areas have become degraded due to the unregulated entry of mountaineers, resulting in destruction created by uncaring visitors. This moratorium was recognized and respected by some LGUs and

mountaineering groups. However, with the expiration of the moratorium, mechanisms to implement proper systems in terms of mountaineering are necessary.

In general, the conservation of Mt. Halcon as a biologically and culturally important site still needs to be considered in the development agenda and policy framework of the different national government agencies, LGUs, and other sectors with interest over the area. Some interests over Mt. Halcon, particularly mining and other commercial resource extraction, are detrimental to its biodiversity conservation and cultural preservation.

This strategic plan of Mt. Halcon covers a 10-year period, beginning in 2012. This plan is the output of the different planning exercises involving relevant and important stakeholders of Mt. Halcon, facilitated by the Mindoro Biodiversity Conservation Foundation, Inc. and the provincial government of Oriental Mindoro.

The vision of the plan was broken down into several goals. These goals reflect the four elements of the vision. The first one basically refers to the conservation of Mount Halcon's biodiversity through the protection of species, habitats, and ecosystems. Complementary to the first goal, the management plan considers the socio-economic and cultural variables affecting the state of Mt. Halcon's biodiversity. As such, the second goal of this management plan hopes to institute socio-economic and cultural conditions that are conducive to biodiversity conservation of Mt. Halcon.

The plan further explores the potential of Mt. Halcon for ecological tourism because of its amazing natural features (third goal). This ecotourism potential may boost livelihood opportunities in the area. However, implementation of the ecotourism plan must be culturally and biologically sensitive relative to the status of Mt. Halcon as an ancestral domain and a KBA. Finally, the fourth goal of this plan is about the management system of the area, which will attempt to bind the different stakeholders into a collaborative management regime.

The goals of this management plan are further translated into specific objectives, as presented below.

Goals	Objectives
Bio-Physical Component Mt. Halcon's biodiversity and culturally important species, habitats, and ecosystems secured and protected from destructive activities;	• To determine and update Mt. Halcon's biodiversity status conducting baseline studies and other ecological researches; • To raise the awareness, consciousness, and appreciation of local officials, IP and non-IP communities, and the general public on the biological and cultural importance of Mt. Halcon, in particular, and Mindoro, in general; • To formulate effective forestland and other resource use plans that will harmonize the biodiversity conservation and cultural needs of Mt. Halcon with local development priorities, plans, and policies; • To develop and implement effective biodiversity protection, recovery and restoration/rehabilitation measures, and monitoring and evaluation involving key stakeholders of Mt. Halcon.
Ethno-Cultural and Socio-Economic Component Socio-cultural and economic conditions conducive and supportive to biodiversity	• To determine socio-cultural and economic variables affecting Mt. Halcon's biodiversity; • To enhance the ADSDPP of the IPs so as to reflect the biodiversity conservation needs of Mt. Halcon, and integrate the same to local development planning and policy framework of LGUs;

Goals	Objectives
conservation of Mt. Halcon instituted and functional;	• To provide technical assistance to IPs in (a) claiming their CADTs; (b) enhancing their capacities to sustain their traditional resources and cultural practices; and (c) safeguarding their ancestral domains from unsustainable and destructive activities; • To design and implement culturally appropriate and sustainable livelihood programs that will mitigate threats to Mt. Halcon's biodiversity; • To facilitate the delivery of and access to basic social service requirements of the communities within and surrounding Mt. Halcon.
Ecotourism Component Potential of Mt. Halcon for culturally and biologically sensitive ecological tourism explored;	• To conduct baseline studies on the potential of Mt. Halcon for ecotourism; • To design and implement culturally and biodiversity appropriate ecotourism products that will also provide livelihood options in the locality; • To come out with measures addressing the mountaineering moratorium in Mt. Halcon and install and implement mechanisms for its opening.
Institutional and Management Arrangement Participatory management regime involving capacitated stakeholders established and effectively operational in conserving Mt. Halcon's biological and cultural diversity.	• To enhance the technical and institutional capacities of local officials and employees, IP and non-IP communities, and other relevant stakeholders in biodiversity conservation; • To develop and carry out effective financing measures that will sustain the management of Mt. Halcon; • To establish and carry out effective coordination, partnership, and other management mechanisms between and among relevant stakeholders that will advance the conservation and protection of Mt. Halcon; • To develop an appropriate monitoring and evaluation system for the management of Mt. Halcon.

The different goals of this management plan are further translated into thematic programs. These programs are (a) Biodiversity Conservation Program; (b) Socio-Cultural and Economic Assistance Program; (c) Biodiversity and Culturally Sensitive Ecotourism Program; and (d) Institutional Strengthening and Partnership Development Program.

The biodiversity conservation program component includes (a) conservation research and studies; (b) conservation awareness and education; (c) forestland use and other resource use planning; and (d) biodiversity protection, habitat restoration, and monitoring. These program components aim to address issues related to the bio-physical conditions of Mt. Halcon.

The socio-cultural and economic development program of this management plan covers (a) baseline studies on socio-economic variables affecting Mt. Halcon's biodiversity; b) technical assistance to IPs to claim their CADTs, capacity building to sustain their traditional resource and cultural practices, and safeguarding their ancestral domains from unstainable and destructive activities; (c) enhancement of the Mangyans' ADSDPP to include important biodiversity conservation provisions; (d) sustainable livelihood support services; and (e) provision of necessary basic social services. This program is primarily intended for the Mangyans within and surrounding Mt. Halcon and will be implemented in partnership with the Mangyan Tribes, LGUs,and other interested institutions.

The ecotourism program, on the other hand, shall conduct baseline studies on Mt. Halcon's potential for sustainable ecotourism so that culturally- and biodiversity-appropriate ecotourism products will be developed and implemented. These ecotourism products shall be designed to provide sustainable livelihood options in the locality. This program shall also address another equally important concern - the moratorium imposed on trekking in Mt. Halcon. It is expected that specific measures and management systems shall have been put in place prior to any decision to lift the moratorium.

The ecotourism program shall likewise be implemented as a partnership between the Mangyans, LGUs, and other interested groups. A clear ecotourism framework shall be developed to guide the different activities, adn pilot sites shall be identified for this purpose. However, the different ecotourism activities shall be carefully designed to avoid negative socio-cultural and economic impacts. If necessary, a cultural and environmental impacts assessment shall be carried out prior to the implementation of ecotourism products and activities. Low impact ecotourism activities are preferred and shall be promoted.

The last program calls for institutional strengthening and partnership development, which will establish a participatory management regime involving the relevant stakeholders in ensuring the conservation of Mt. Halcon's biological and cultural diversity. This includes the provision of assistance in enhancing the technical and institutional capacity of local officials and employees, IP and non-IP communities, and other concerned stakeholders in biodiversity conservation. Additionally, this program sees to establish and carry out effective coordination between and among the relevant stakeholders of Mt. Halcon.

In order to sustain the effective management of Mt. Halcon, there is a need to specifically develop financing measures that will ensure the implementation of the different management activities. Various strategies shall be carried out in resource mobilization to tap various funding institutions, and local stakeholders shall be encouraged to develop their own financing schemes for the area. Specific strategies and activities, including the five year work and indicative budget plan, are likewise provided in this conservation and management plan for Mt. Halcon.

1. Introduction

Mt. Halcon Range in Oriental Mindoro province is recognized globally as an important biodiversity area. The wide range of its habitat types houses populations of numerous endemic species of Mindoro Island, with several species confined and restricted solely to the site. The high endemism of Mindoro Island is attributed to the fact that, based on geological formation and history, it was never a part of any other island in the Philippine archipelago.

Mt. Halcon is one of the 18 centers of plant diversity in the Philippines, identified by the Threatened Plants Unit at Kew (*Cox, 1988*). Similarly, Birdlife International and Haribon Foundation classified Mt. Halcon as one of the 10 Important Bird Areas (IBA) in Mindoro. Mindoro Island, as whole, is one of the 10 highest conservation priority areas globally, and the world's seventh most critical Endemic Bird Area (EBA). Mt. Halcon contributes significantly to the status of Mindoro as an important conservation area.

In a priority setting for conservation facilitated by the Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR), along with other institutions, Mt. Halcon was further identified as a highly critical important area in biodiversity conservation, as evaluated by at least 300 leading international and local scientists. Recently, Mt. Halcon was finally included in the list of 128 Key Biodiversity Areas (KBA) of the Philippines, and has been identified by the Mindoro Biodiversity Conservation Foundation, Inc. (MBCFI) as one of its 10 priority conservation sites in Mindoro Island.

Of the different KBAs in Mindoro, Mt. Halcon has the most number of threatened endemic species, last pegged at 16 species. Three of these are classified as critically endangered, four as endangered, and nine others as vulnerable to extinction in the wild based on the IUCN-World Conservation Union (IUCN) Red List of Threatened Species. Most of these species are either confined to this mountain, or within the island of Mindoro only. The summit of Mt. Halcon harbors unique habitats, including a tropical alpine heath that is seemingly not found elsewhere in the Philippines. Several endemic floral species are also known to exist in the area.

The biological richness of Mt. Halcon is similarly associated with important cultural values. It is home to two of the eight ethno-linguistic groups in the island - the Alangan Mangyans and the Iraya Mangyans. These Mangyan Tribes assert their ancestral domain rights over Mt. Halcon, which they also consider a sacred mountain. For the Mangyans, Mt. Halcon is an integral part of their well-being as a community of Indigenous Peoples (IP).

The natural features of Mt. Halcon provide great potential for nature-based tourism. Mt. Halcon is a favorite mountaineering destination in the Philippines because it is considered to be the most challenging mountain to scale due to its rugged and treacherous terrains. Aside from mountaineering, there are other ecological tourism packages that may be explored for the area, such as bird watching and other low impact tourism activities.

Mt. Halcon has much more to offer as a life-support system. The remaining forests in the area represent important watersheds for numerous river systems that supply freshwater for the domestic, agricultural and industrial needs of low lying areas. As such, the protection and conservation of Mt. Halcon is of paramount importance to the sustainable development of Oriental Mindoro, in particular, and Mindoro Island, in general.

Through the years, however, the cultural and ecological significance of Mt. Halcon have been largely threatened by numerous anthropogenic disturbances. While it is considered an ancestral domain of the Mangyans, other concerned stakeholders also need to participate in protecting Mt. Halcon from destructive and unsustainable resource exploitation. One of the key concerns for Mt. Halcon is the absence of integrated conservation efforts from relevant sectors due to the absence of a unified and commonly agreed plan for the area. As such, the provincial government took the lead in initiating participatory management planning to bring together relevant and concerned stakeholders to agree on a common agenda for Mt. Halcon.

2. Management Planning Framework

This section provides a background on how the management planning covering Mt. Halcon Range was conceptualized and implemented, including its objectives and results. The different stakeholders of Mt. Halcon actively participated in various planning exercises, with numerous input provided by several resource persons. A consultant was commissioned by MBCFI to facilitate the planning processes and prepare the final output.

The Mt. Halcon management planning is a modest attempt of the Provincial Government of Oriental Mindoro and the MBCFI to establish a management regime that will ensure the protection of the biological and cultural diversity of the area.

2.1. Objectives

The management planning was generally aimed to develop a participatory, unified, and integrated management plan for Mt. Halcon. The specific objectives of this management planning are:

- To promote discussion and gain a common understanding about the global significance of Mt. Halcon in terms of biological and cultural diversity;
- To identify conservation and management issues, concerns, and needs;
- To formulate a management plan that will address the identified issues, concerns, and needs of the area;
- To develop appropriate institutional mechanisms that will bind relevant stakeholders to the effective management of Mt. Halcon;
- To work for the adoption and integration of the agreed conservation and management plan and system in local development plans;
- To install and make operational the agreed conservation and management system.

2.2. Content, Process Flow and Methods

The management planning was conducted in modular form because of its participatory nature involving relevant and important stakeholders of Mt. Halcon. The main methodology for the planning exercises was a workshop-type session to ensure that input from stakeholders are elicited. Various input from competent resource persons were included in the design of the planning in order to contextualize the local situation with applicable policy issuances and other necessary conceptual framework related to biodiversity conservation and ancestral domain.

Module 1 provided the context for the whole planning exercise, which was conducted through a workshop held on September 23-25, 2009 at the Capitol Square, Provincial Capitol Complex. At least 60 representatives from different institutions participated in the activity. It started with presentations and discussions on the baseline information on the bio-physical and cultural features of the area in order to give representatives of the participating institutions a common understanding and appreciation of the situation of Mt. Halcon. The baseline information was further contextualized with policy frameworks relevant to the area. The potential of Mt. Halcon as an ecotourism site was further discussed. During this planning stage, the IPs were consulted in the presence of representatives from the provincial office in Oriental Mindoro of the National Commission for Indigenous People (NCIP), after which they agreed to participate in the entire planning exercise.

Based on the baseline information, a situational analysis was rendered, with participants of the planning workshop providing a list of issues, concerns, and challenges they perceived for Mt. Halcon. These were then consolidated into physical, biological, socio-economic and cultural, and institutional and management arrangements of Mt. Halcon, and the synthesized issues and concerns were later presented in plenary and affirmed by participants.

Before the session proceeded to Module 2, it was necessary to determine the current initiatives of stakeholders and define the spatial coverage of Mt. Halcon. Two separate sessions were further conducted for these purposes. The presentation of plans, programs, and projects of stakeholders for Mt. Halcon was conducted on February 19, 2010, while the preparation of an indicative map for the area was held on May 25, 2010. During these workshops, the IPs presented their Ancestral Domain Sustainable Development and Protection Plans (ADSDPP), which is being considered in this document.

The various output of Module 1 became input for Module 2 of the planning session, which involved the strategic planning workshop. During this session, held on July 28-30, 2010, the vision and strategic programs and directions for Mt. Halcon were formulated. The possible institutional mechanisms for the management of the area were also agreed upon. The general output of modules 1 and 2 comprise the main content of this document.

Module 3 of the planning sessions proceeded subsequently, elaborating on and validating the contents of this document. In addition, the resource use options for the

areas covered by Mt. Halcon were defined, while the institutional mechanisms for the management of the area were affirmed through identification of possible partnership instruments. The fourth and last module of the planning sessions was the presentation of the plan to the different stakeholders through public hearings.

3. Mindoro Bio-Geographic Setting

3.1. Mindoro as Biologically Important Site

Located in southern Luzon, Mindoro is the seventh largest island in the Philippines, with a total land area of about 1,003,854 hectares (has). It is comprised of Oriental Mindoro and Occidental Mindoro provinces, and lies within the administrative jurisdiction of Region IV–B, or MIMAROPA Region (Island Provinces of **Mi**ndoro, **Ma**rindoque, **Ro**mblon and **Pa**lawan). Roughly 19.26% or 193,372 has. of Mindoro's total land area is covered with different forest types, classified as broadleaved closed forest (49,495 has.); broadleaved forest plantation (38,441 has.); broadleaved open forest (103,608 has.); coniferous open forest (695 has.); and mangrove forest (1,133 has.).

Other major land covers of Mindoro Island are wooded grassland (74,054 has); shrub land (331,529 has.); and grassland (183,197 has.). Shrub lands dominate the entire landscape of Mindoro, estimated at 33.03% of its total land area, followed by grasslands at 18.25% coverage. Areas devoted to various human activities, such as agriculture and settlement, are about 20.12% (201,998 has.) of Mindoro's total land area. The different land cover classifications of Mindoro are presented in **Table 3.1.a** and **Figure 3.1.a.**

Table 3.1.a. Mindoro Land Cover Type (2003)

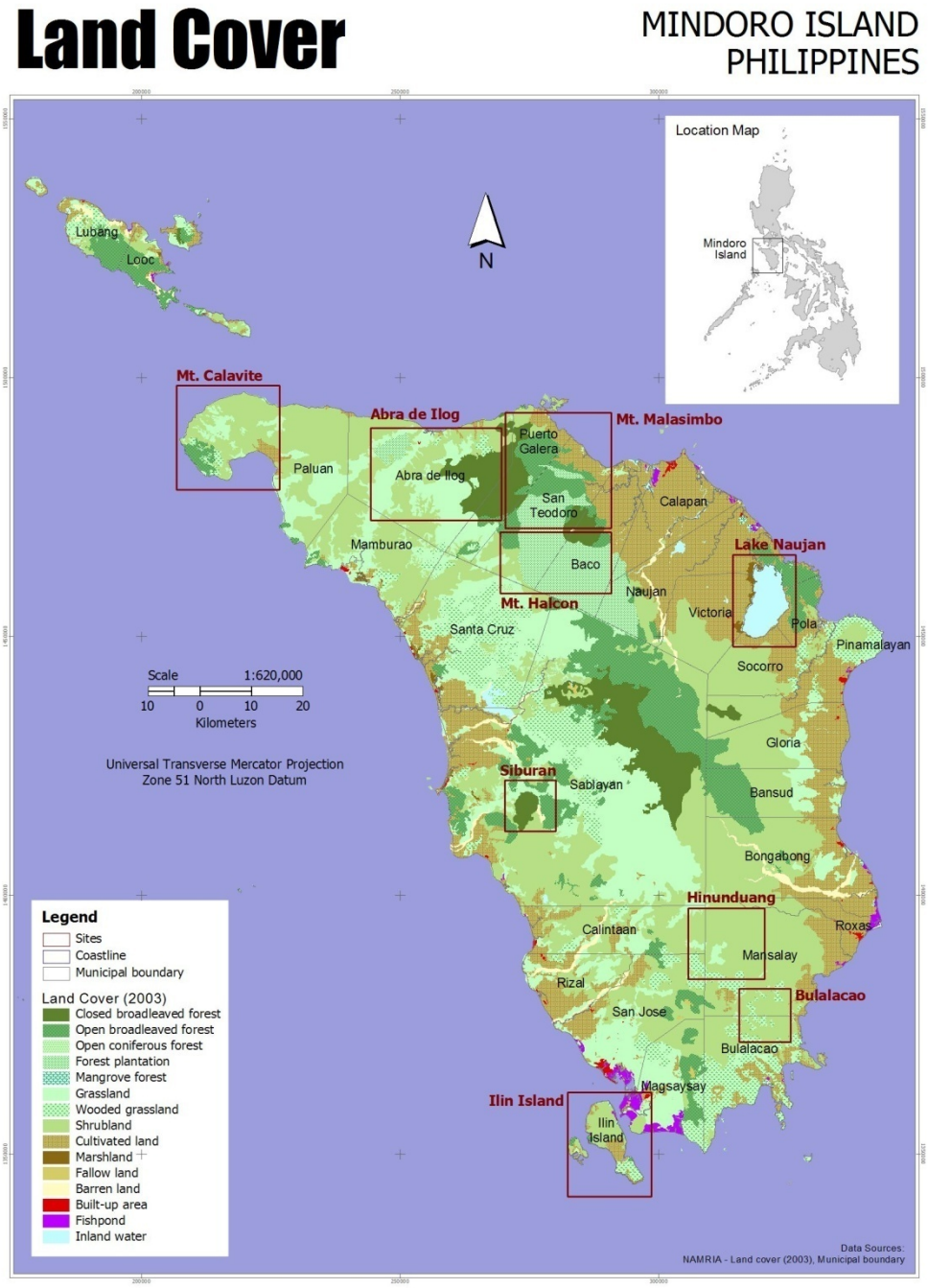
2003 Land Cover Type	Land Area (has.)	% of total land area of Mindoro
Closed forest, broadleaved	49,495	4.93
Forest plantation, broadleaved	38,441	3.83
Open forest, broadleaved	103,608	10.32
Open forest, coniferous	695	0.07
Mangrove forest	1,133	0.11
Inland water	4,058	0.40
Built-up area	2,243	0.22
Cultivated land, annual crop	116,504	11.61
Cultivated land, perennial crop	78,155	7.79
Fishpond	5,096	0.51
Barren land	11,545	1.15
Grassland	183,197	18.25
Marshland	1,904	0.19
Fallow land	595	0.06
Shrub land	331,529	33.03
Wooded grassland	74,057	7.38
No data	1,600	0.16
TOTAL	**1,003,854**	**100.00**

(Source: NAMRIA, DENR-FMB, 2003)

The marine environment of Mindoro contributes immensely to the overall national and global biological diversity. Mindoro Strait is one of the most economically

productive fishing grounds in the country, and is a migration route of commercially important fishes. It is part of the Verde Island Passage, known as the "center of the center" of marine shore fish diversity in the world (*Carpenter, 2008*). The Apo Reef Natural Park (ARNP), located in the municipality of Sablayan in Occidental Mindoro, boasts of a pristine marine environment. Its coral reefs are one of the most extensive in the Philippines and one of the few that remain in excellent condition. The municipality of Puerto Galera in Oriental Mindoro is also popular for its beaches and is a favorite tourist destination in the country.

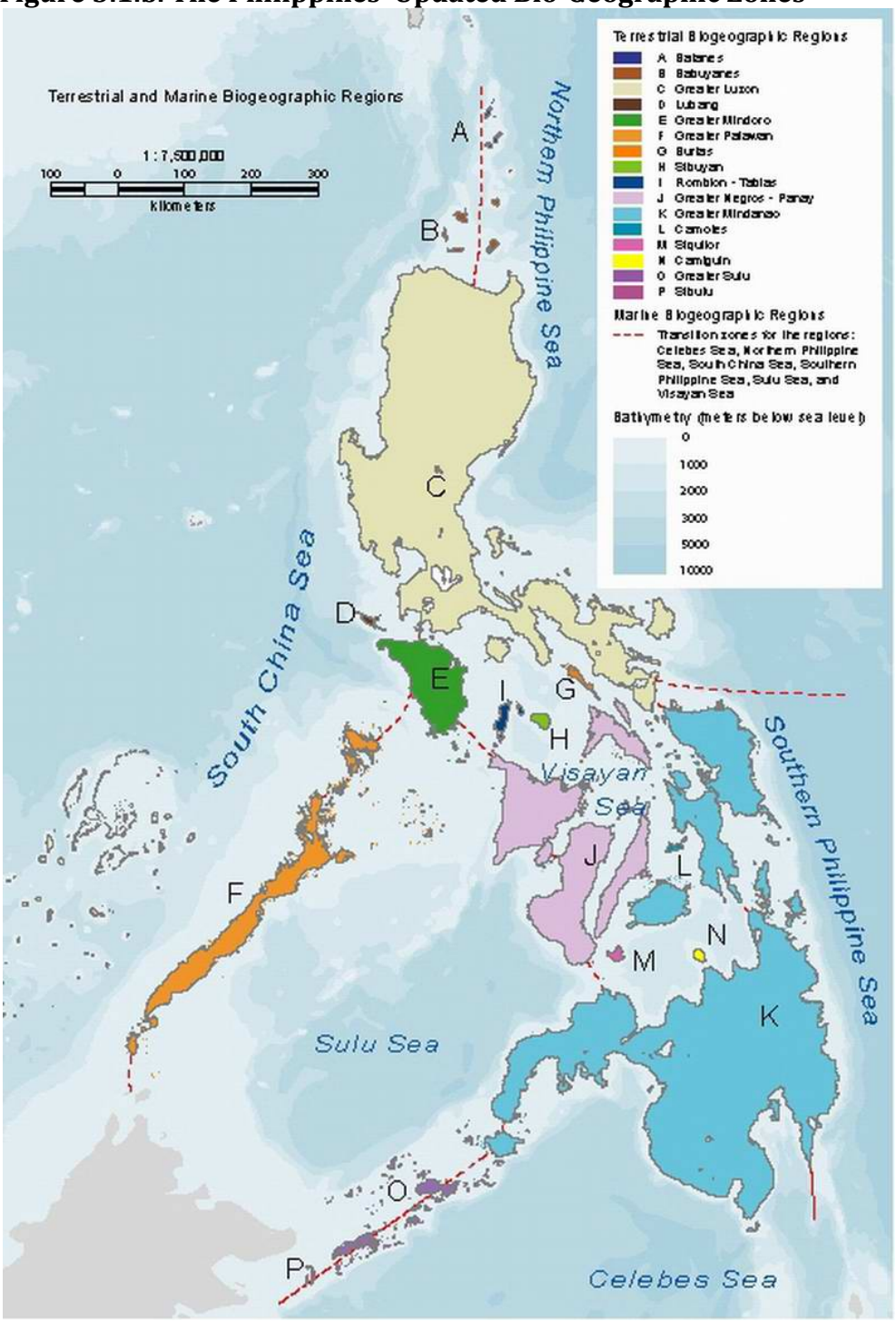
Figure 3.1.a. Mindoro Land Cover Map (2003)



(Source: NAMRIA, DENR-FMB, 2003)

Being a major bio-geographic zone of the Philippines (**Figure 3.1.b**), Mindoro is nationally and globally recognized as an important conservation area because it harbors numerous unique flora and fauna that inhabit a variety of natural habitats, from terrestrial, freshwater, coastal, to marine ecosystems (*DENR-PAWB, CI, UP-CIDS, 2002*). Several species found in Mindoro are endemic to the Philippines, found only in this island and nowhere else in the world (*Oliver, Heaney, 1997*).

Figure 3.1.b. The Philippines' Updated Bio-Geographic Zones



(Source: DENR-PAWB, CI, UP-CDIS, 2002)

Based on the compilation of Dr. Emelina Mandia, professor of the De La Salle University (DLSU) in Taft, Manila and former MBCFI Executive Director, some 49 butterfly species are endemic to Mindoro. Similarly, at least 70 flowering plant species can only be found in this island, including the Philippine pine *(Pinus merkussi*), and the Philippine teak (*Tectona philippensis*), both listed to occur restrictedly in only two locations in the country. Ten out of the Philippines' 17 endemic mammals, such as the famous Tamaraw *(Bubalus mindorensis)*, the Mindoro warty pig (*Sus philippensis oliveri*), and the Ilin Island bushy-tailed cloud rat *(Crateromys paulus*), are likewise confined to Mindoro, along with eight species and sub-species of 20 birds classified as endemic to the country. Endemic birds found in Mindoro include the Mindoro bleeding-heart pigeon (*Gallicolumba platenae*), the Mindoro imperial pigeon (*Ducula mindorensis*), and the Mindoro scops owl (*Otus mindorensis*), to name a few. There are also endemic reptiles and amphibians in Mindoro, such as the Philippine crocodile *(Crocodylus mindorensi*s), the Mindoro frog (*Philautus schamereki*), and the Mindoro barb (*Barbus hemictenus).*

In 2006, PAWB, along with several other national and international institutions, declared 10 sites in Mindoro to be among the 128 KBAs of the Philippines. These 10 KBAs have an aggregate area of about 249,381 has., or approximately 24.84% of Mindoro's total area (**Table 3.1.b and Figure 3.1.c**).

Table 3.1.b. Mindoro Key Biodiversity Areas

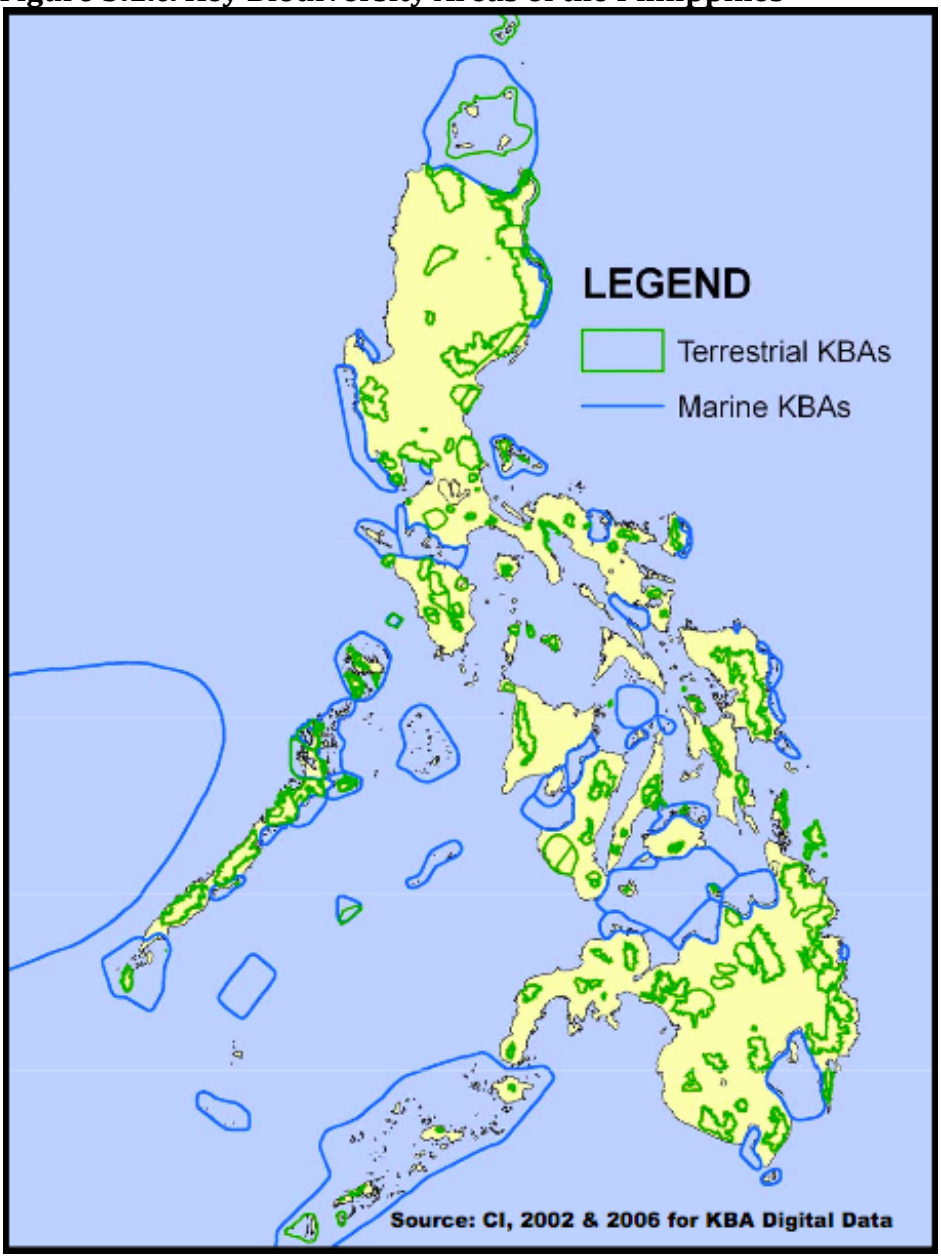
Name of KBA	Location	Estimated Area (has.)	No of Threatened Species
1. Mt. Calavite Wildlife Sanctuary	Paluan, Occidental Mindoro	18,016	8
2. Puerto Galera	Abra de Ilog and Santa Cruz in Occidental Mindoro; Puerto Galera and San Teodoro in Oriental Mindoro	37,306	8
3. Mt. Halcon	San Teodoro, Baco, Calapan and Naujan in Oriental Mindoro Sablayan and Sta. Cruz in Occidental Mindoro	48,660	16
4. Lake Naujan National Park	Naujan, Pola, Socorro, and Victoria in Oriental Mindoro	21,655	10
5. Iglit-Baco Mountains	Sablayan in Occidental Mindoro; Bongabong in Oriental Mindoro	56,300	10
6. Siburan	Sablayan, Occidental Mindoro	11,569	11
7. Malpalon	Sablayan, Occidental Mindoro	14,093	9
8. Mt. Hitding	Gloria, Bansud, and Bongabong in Oriental Mindoro	17,768	6
9. Mt. Hinunduang	Bongabong, Roxas. and Mansalay in Oriental Mindoro	8,223	6
10. Apo Reef Natural Park	Sablayan, Occidental Mindoro	15,792	2

(Source: Conservation International-Philippines, DENR-PAWB, Haribon, 2006)

The 128 KBAs were selected based on the criteria of vulnerability and "irreplaceability." Vulnerability is *"measured by the confirmed presence of one or more globally threatened species, while irreplaceability is determined through the presence of geographically concentrated species"* (CI-Philippines, DENR-PAWB, Haribon, 2006). Each KBA in Mindoro shelters anywhere from as few as two species to as many as 16

endemic species that are classified as critically endangered, endangered and/or vulnerable to extinction in the wild, based on the Red List of Threatened Species of the IUCN. Several restricted-range species are also found in these sites. Of the different KBAs in Mindoro, Mt. Halcon in Oriental Mindoro emerged with the most number of endemic threatened species, pegged at 16 species, followed by Mt. Siburan in Sablayan, Occidental Mindoro with 11 recorded threatened endemic species. Lake Naujan and Iglit-Baco Mountain each have 10 threatened endemic species.

Figure 3.1.c. Key Biodiversity Areas of the Philippines



The 10 KBAs of Mindoro were also identified in 2002 as Conservation Priority Areas (CPAs) in a conservation priority setting facilitated by DENR-PAWB, Conservation International (CI), and the University of the Philippines (UP) in Diliman. The Haribon Foundation, jointly with Birdlife International, also included these 10 sites in its directory of IBAs and Key Conservation Sites of the Philippines in 2001. Birdlife International further declared Mindoro as the world's seventh most critical EBA.

Adding to the conservation significance of Mindoro is the inclusion of Mt. Halcon as one of the 18 centers of plant diversity in the Philippines, identified by the Threatened Plants Unit at Kew (*Cox, 1988*). Moreover, Mt. Halcon and Naujan Lake are listed as priority areas for plants conservation in the country (*DENR-PAWB, CI, UP-CIDS, 2002*). Naujan Lake has also been listed as a Wetland of International Importance under the Ramsar Convention.

3.2. Mindoro as a Cultural Heritage Site

Mindoro's amazing biological diversity is associated with significant cultural value due to the presence in the island of at least eight IP tribes, collectively known as the Mangyans. These Mangyan Tribes comprise the following: Alangan Tribe, Bangon Tribe, Buhid Tribe, Hanunuo Tribe, Iraya Tribe, Tadyawan Tribe, Tau-buid Tribe, and Ratagnon Tribe. Seven of these tribes have already been organized as Indigenous Peoples' Organizations (IPOs) **(Table 3.2.a)** through the assistance of the Mangyan Mission and COMultidiversity. Both are Roman Catholic Church-based organizations that have also supported the Mangyans in publishing community organizing processes involving the Indigenous Peoples of Mindoro (*2007*).

Again with support from the Mangyan Mission and COMultidiversity, these seven IPOs were organized as a federation, known as the Kapulungan Para sa Lupang Ninuno (KPLN). The KPLN is working on the ancestral domain claims of the Mangyans and initiates activities for the unity of the different Mangyan Tribes, raising the consciousness of Mangyans about their dignity as a people and the enhancement of their relationship with the different sectors of society (*The Mangyans of Mindoro, 2007*).

According to NCIP, the Mangyan population is composed of 193,482 individuals, approximately 16.7% of the total population (1,157,721 pax) of Mindoro Island, based on the 2007 Population Census of the National Statistics Office (NSO). The Mangyans are the original inhabitants of Mindoro but the wave of civilization and the influx of migrants from other parts of the Philippines have pushed many of them towards the interior mountains (*Dinter, 2007*), scattered throughout the different municipalities in the two provinces of the island.

The Iraya Tribe has settled in the northwestern part of Mindoro, particularly within and in the periphery of Mt Halcon, while the Alangan Tribe occupies the northwest central part of the island. The Tadyawan Tribe is on the northeastern part, specifically within the area of Naujan Lake, and the Batangan Tribe stays in the central highlands of Mts, Iglit-Baco, Siburan, and Hinunduang. The Buhid Tribe occupies the central part, straddling the eastern and western portions of Mindoro, while the Ratagnon Tribe is located on the southernmost tip of the island. The Hanunuo Tribe has settled in the mountainous areas of Mindoro, mainly within the municipalities of Mansalay and Bulalacao in Oriental Mindoro, and a certain portion of San Jose in Occidental Mindoro (**Figure 3.2.a**).

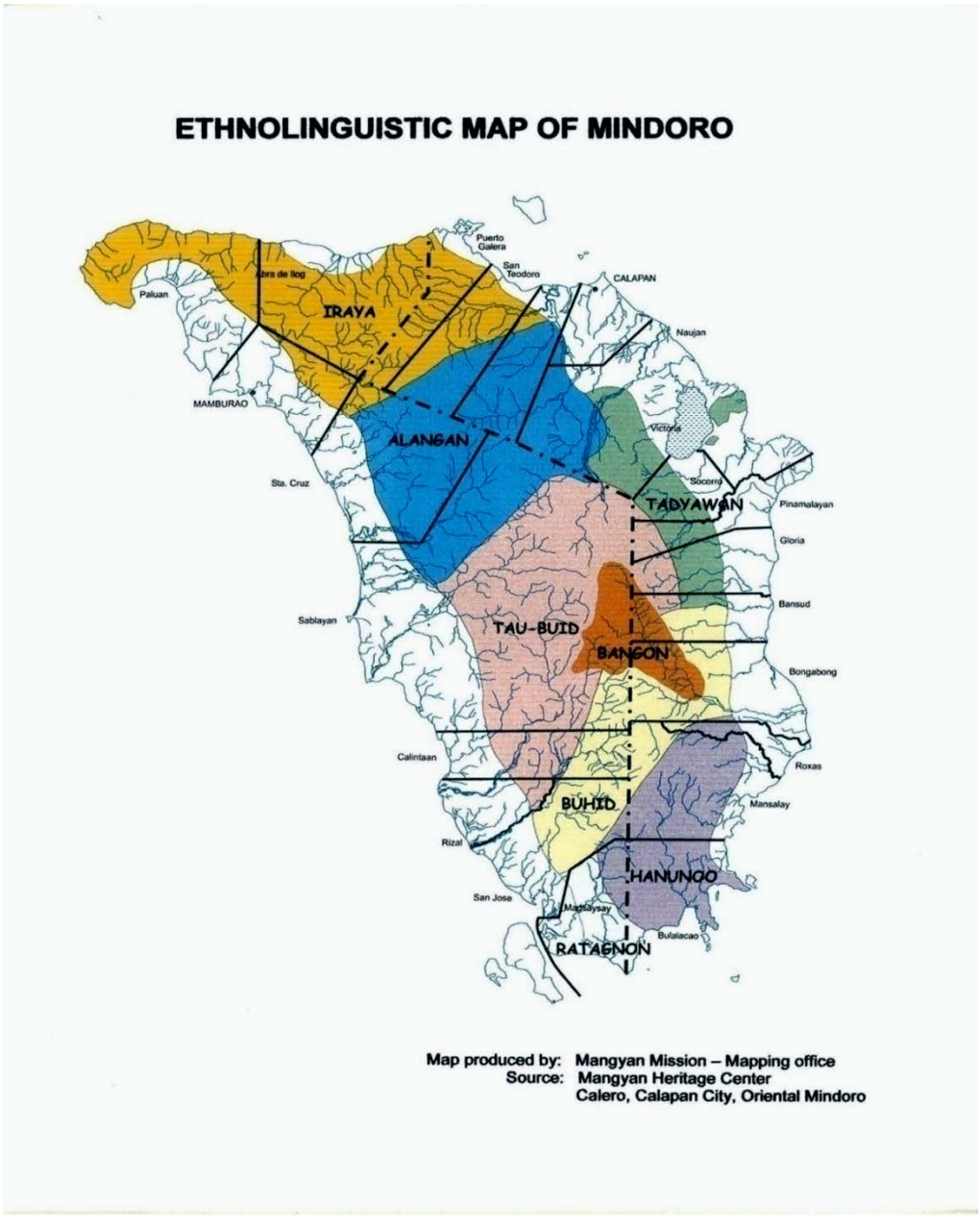
Table 3.2.a. Mangyan Tribes and their Organizations

Tribe	Name of Indigenous People's Organization (IPO)
1. Alangan	Samahan ng mga Nagkakaisang Mangyan Alangan, Inc. (SANAMA)

Tribe	Name of Indigenous People's Organization (IPO)
2. Bangon	Nagkasadian Uyugan Bangon, Inc. (NUB)
3. Buhid	Sadik Habanan Buhid Inc. (SHB)
4. Hanunuo	Pinagkausahan Hanunuo sa Daga Ginurang, Inc. (PHADAG)
5. Iraya	Mal-anggatan Iraya Paranawan Kakuyayan, Inc. (MIPK)
6. Tadyawan	Kapyan Agpaysarigan Mangyan Tadyawan, Inc. (KAMT.I)
7. Tau-buid	Mabayan Tarabangan Fagayu Tau-Buid sa Mindo, Inc. (MT.FTM)

(Source: The Mangyans of Mindoro, 2007)

Figure 3.2.a. Ethno-Linguistic Map of Mindoro



The Mangyan Tribes have managed to preserve their original customs, beliefs and practices through the years, and have maintained their traditional ways of life that are deeply rooted in love, care and enrichment of land and nature *(The Mangyans of Mindoro, 2007*); this in spite of the assimilation of a number of tribe members to non-IP

culture. Some Mangyan Tribes strongly refuse to embrace lowland culture and still practice their primitive ways, wandering around in the remaining forests, with male members of the tribes continuing to wear G-strings made of bark. There are Mangyans who avoid interaction with non-IP communities and continue to rely on forests for food. However, the depletion of forest resources has led several Mangyan groups to adopt lowland agriculture and engage in farm labor with lowlanders (*Sablayan LGU, 2005*).

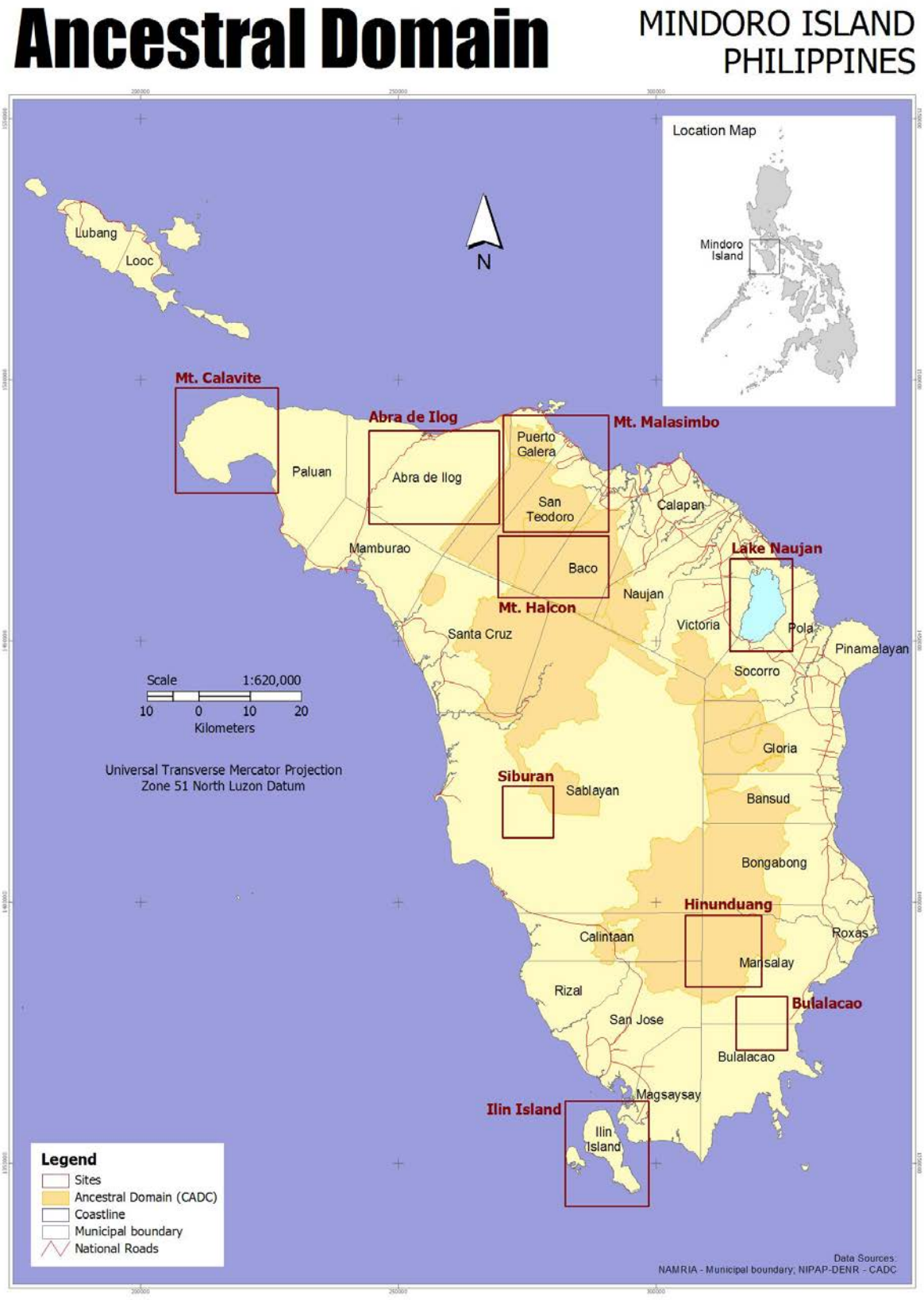
Vast areas in Mindoro, including those identified as biologically important, are being claimed as ancestral domain of the Mangyans. The NCIP, in consonance with the Indigenous Peoples' Rights Act (IPRA, RA No. 8371), has awarded Certificates of Ancestral Domain Title (CADTs) to some of these Mangyan Tribes (**Table 3.2.b and Figure 3.2.b**). The MBCFI Conservation Needs Assessment (CNA) documented the ancestral domain claims of the Mangyans to cover about 296,663.94 has., or roughly 30% of Mindoro's total land area.

Table 3.2.b. List of Certificates of Ancestral Domain Title and Claims in Mindoro

No.	Tribe	Location	Date Issued	Land Area (ha.)
Approved CADTs as of December 2004				
NA	Iraya Mangyan	Sta. Cruz, Occidental Mindoro	30-Jan-2004	5,365.11
NA	Iraya Mangyan	Puerto Galera, Oriental Mindoro	28-Apr-2004	5,700.83
Ancestral Domain Claims				
9	Iraya Mangyan	Puerto Galera, Oriental Mindoro	14-Jul-1995	4,748.00
24	Alangan Mangyan	Sta. Cruz and Sablayan, Occidental Mindoro	26-Feb-1996	74,200.00
26	Iraya Mangyan	Sta. Cruz, Occidental Mindoro	26-Feb-1996	2,851.00
85	Sulodnon	Socorro and Victoria, Oriental Mindoro	23-Jun-1997	12,000.00
86	Alangan Mangyan	Naujan, Oriental Mindoro	23-Jun-1997	7,537.00
123	Tadyawan Mangyan	Gloria and Pinamalayan, Oriental Mindoro	05-Jun-1998	3,750.00
124	Alangan Mangyan	Naujan and Baco, Oriental Mindoro	05-Jun-1998	32,000.00
125	Tau-buid Mangyan	Gloria, Socorro, and Pinamalayan, Oriental Mindoro	05-Jun-1998	21,000.00
126	Iraya Mangyan	Baco, San Teodoro, and Puerto Galera, Oriental Mindoro	05-Jun-1998	33,334.00
130	Buhid Mangyan	San Jose, Rizal, Calintaan, and Sablayan, Occidental Mindoro; Bansud, Roxas, Bongabong, and Mansalay, Oriental Mindoro	05-Jun-1998	94,077.00
???	Alangan Mangyan (MINSCAT)	Oriental Mindoro		101.00
TOTAL LAND AREA				296,663.94

(Source: NCIP, 2008)

Figure 3.2.b. Ancestral Domains in Mindoro



Source: NCIP, 2008, 2009)

4. Mt. Halcon Range Conservation Profile

The conservation profile presented in this section includes the geo-physical characteristics, biological resources socio-cultural and economic features, and institutional arrangement covering the Mt. Halcon Range. Unfortunately, literature about the area is quite limited. The main sources for the profile of Mt. Halcon, as presented in this document, are the following:

- The spatial profiling prepared by Engr. Don de Alban, which also defines the different watersheds associated with the Mt. Halcon Range. It should be noted that for planning purposes, the watershed was used as the management unit;
- The comprehensive botanical surveys on the summit of Mt. Halcon by Dr. Emelina Mandia of the De La Salle University;
- The Rapid Island-Wide Survey of the Terrestrial Fauna and Flora of Mindoro, which was implemented under the auspices of the Philippines Biodiversity Conservation Programme, administered formerly by the UK-based Fauna and Flora International (FFI) and now by the Philippines Biodiversity Conservation Foundation, Inc. (PBCFI);
- Results of the MBCFI CNA conducted in Mindoro;
- Various publications of the Mangyans and the Mangyan Mission on the cultural features of Mt. Halcon; and
- Some published and unpublished materials from several sources.

4.1. Geo-physical Characteristics[1]

The spatial analyses and modeling of different thematic maps presented in this section were undertaken using a suite of open-source geospatial tools, mainly comprised of: Quantum GIS v.1.5 Tethys (http://www.qgis.org/) and its associated vector and raster plug-ins; DIVA-GIS v.7.3 developed by R. Hijmans (http://www.diva-gis.org/); and gvSIG 1.11 and its associated extensions, mainly developed by Generalitat Valenciana (http://gvsig.org/web). The watershed boundary delineation and slope data computations were generated from the mosaicked Digital Elevation Models (DEM). All spatial data were incorporated into the geographic information system (GIS) platform in order to facilitate data integration, manipulation, calculation, and analysis. In order to have a common reference frame, all datasets were projected to Universal Transverse Mercator projection Luzon datum Zone 51 North.

For planning purposes, the sub-watershed boundaries of Mt. Halcon Range, which have been delineated based on natural topographic divides, are used all throughout this profiling as the planning unit. This has been adopted since no existing instrument can be considered as the most appropriate for conservation planning and management for Mt. Halcon, although it is also recognized that considerable portions of the area are covered by ancestral domain claims of the Mangyans.

[1] The geo-physical profile presented in this management plan was prepared by Engr. Don de Alban

The sub-watershed units of Mt. Halcon Range have been adopted since these boundaries are based on identifiable natural features on the ground, such as ridges and river systems, making them suitable units for management planning purposes. While some legal instruments were previously established and presently exist over portions of Mt. Halcon Range, these instruments and their respective boundaries either do not fully encompass the entire mountain range (as in the case of the Mt. Kadangyasan Forest Reserve), or they correspond poorly to easily identifiable natural features on the ground (as in the case of ancestral domain claims).

Eight sub-watershed units comprise Mt. Halcon Range, listed in **Table 4.1.** Bukayao is the largest in terms of land area, followed by Catibli-on and Bangaya. It should be stressed that Mag-asawang Tubig sub-watershed should not be confused with the larger river basin of the same name; the sub-watershed takes its name from being one of many tributaries of the larger river basin. Administratively, the sub-watersheds of Bangaya and Bagto are situated within the jurisdiction of four municipalities; Mag-asawang Tubig and Balion are situated in only one municipality.

Table 4.1. Mt. Halcon Range Sub-watersheds, Land Area and Administrative Coverage

	Name of Sub-watershed	Estimated land area (has.)	Municipality	Barangays
1	Bagto	4,707.36	Baco	Baras, Mayabig
			San Teodoro	Calatangan
			Sablayan	Pag-asa
			Sta. Cruz	Casague, Kurtinganan
2	Balion	5,212.49	San Teodoro	Bigaan, Caagutayan, Lumangbayan
3	Bangaya	6,298.28	Baco	Baras, Mayabig, San Ignacio
			Calapan City	Balingayan
			Naujan	Evangelista, Magtibay, Metolza, Paitan
			Sablayan	Pag-asa
4	Bukayao	8,524.50	Naujan	Arangin, Balite, Magtibay, Mahabang Parang, Malvar, Mulawin, Paitan, San Andres, San Luis, San Nicolas, Tagumpay
			Sablayan	Pag-asa, San Agustin
5	Catibli-on	6,957.03	Baco	Baras
			San Teodoro	Bigaan, Caagutayan, Calatangan, Lumangbayan
6	Catuiran	3,545.75	Baco	San Ignacio
			Calapan City	Balingayan, Personas
			Naujan	Aurora, Evangelista, Masagana, Metolza
7	Dulangan	5,032.21	Baco	Baras, Mangangan II, Mayabig, San Ignacio
			San Teodoro	Calatangan, Lumangbayan
8	Mag-asawang Tubig	2,094.93	Naujan	Arangin, Mahabang Parang, Malvar, Masagana, Metolza, Mulawin, Paitan
	Total land area	42,372.55		

4.1.1. Location

A broad range of mountains extends across the entire length of Mindoro Island, from the northwest to the southeast. Its highest point is Mt. Halcon, situated at the northern central portion of the island with an estimated elevation of 2,590 meters above sea level. Six municipalities from both provinces of Mindoro Island have jurisdiction over the mountain range: four in Oriental Mindoro and two in Occidental

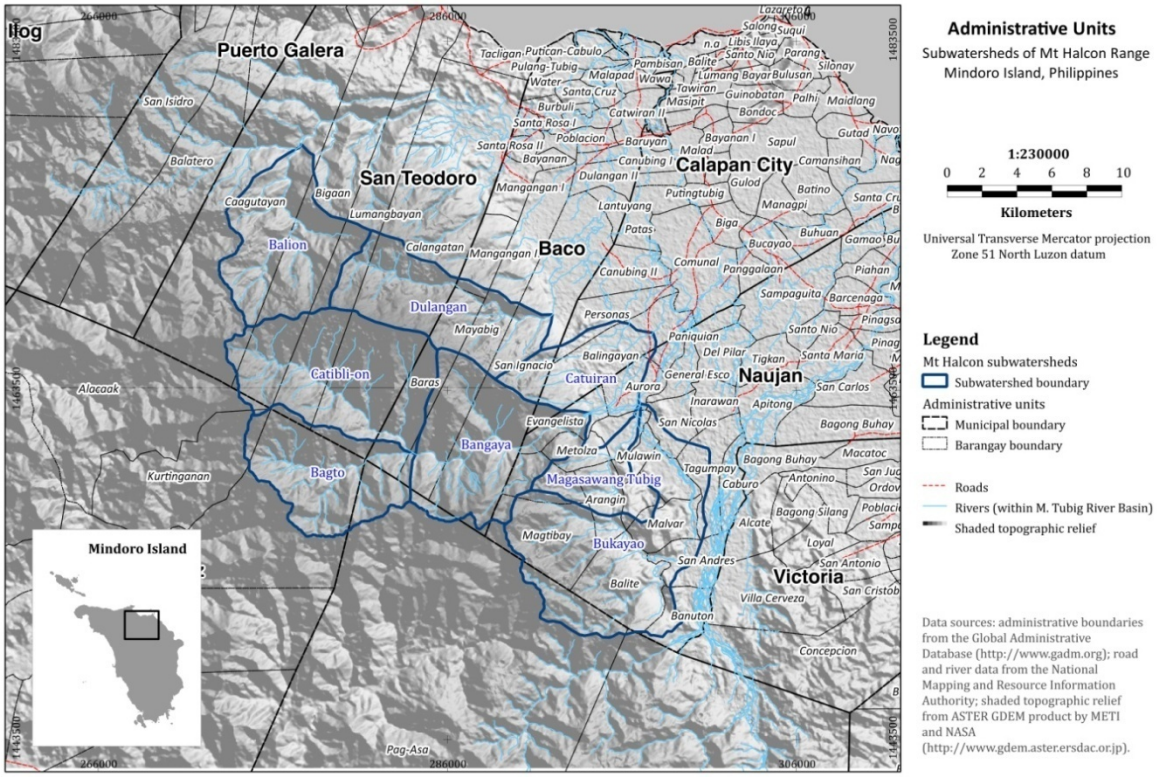
Mindoro. **Table 4.1.1** and **Figure 4.1.1** show the administrative units comprising the eight sub-watershed areas covering the range of Mt. Halcon.

Table 4.1.1. Administrative Coverage of Mt. Halcon Range Sub-Watersheds

	Province	Municipality	Barangays	Estimated land area (ha.)
1	Oriental Mindoro	Baco	Baras, Mangangan II, Mayabig, San Ignacio	9,034.55
2		Calapan City	Balingayan, Personas	1,959.35
3		Naujan	Arangin, Aurora, Balite, Banuton, Evangelista, Magtibay, Mahabang Parang, Malvar, Masagana, Metolza, Mulawin, Paitan, Paniquian, San Andres, San Luis, San Nicolas, Tagumpay	12,153.89
4		San Teodoro	Bigaan, Caagutayan, Calangatan, Lumangbayan	14,085.50
5	Occidental Mindoro	Sablayan	Pag-asa, San Agustin	1,893.79
6		Santa Cruz	Alacaak, Casague, Kurtinganan	3,245.47
			Total land area	42,372.55

Note: The names of barangays indicated in this table are not necessarily conclusive as boundaries. They are only indicative and do not correspond to their actual boundaries on the ground.

Figure 4.1.1. Administrative Coverage Map of Mt. Halcon Range Sub-watersheds



4.1.2. Elevation

Mt. Halcon Range is situated on the northern central portion of Mindoro Island with an estimated elevation of 2,590 meters (Merrill, 1907). Recent studies on the elevation of the summit of Mt. Halcon have reported it to be at 2,582 meters (Mandia, 2001). Based on the generated DEMs, the maximum elevation was determined to be at 2,549 meters. The discrepancy in reported elevation readings may be attributed to the

difference in the methodologies employed, particularly through on-site field observations by both Merrill and Mandia, and space borne satellite observations by the ASTER sensor. It should be emphasized here that the reported vertical accuracy of ASTER GDEM v.1 data is estimated to be approximately 20 meters (at 95% confidence interval) (Tachikawa et al., 2011). For the purposes of this report, the DEM-generated topographic information is used. The elevation gradient within Mt. Halcon Range sub-watershed is presented in **Table 4.1.2** and **Figures 4.1.2.a** and **4.1.2.b.**

Table 4.1.2. Elevation Gradient of Mt. Halcon Range Sub-watersheds

Watershed	Minimum (m)	Maximum (m)	Range	Mean, Ā (m)	SD, σ
Bagto	353	2,212	1,859	1,141.85	355.77
Balion	107	2,341	2,234	992.13	435.12
Bangaya	41	2,132	2,091	991.46	468.94
Bukayao	17	1,903	1,886	573.07	505.73
Catibli-on	353	2,549	2,196	1,411.93	472.83
Catuiran	14	1,484	1,470	243.09	348.65
Dulangan	35	2,538	2,503	1,337.45	539.62
Mag-asawang Tubig	19	1,565	1,546	422.64	391.55

Figure 4.1.2.a. Elevation Gradient of Mt. Halcon Range Sub-watersheds

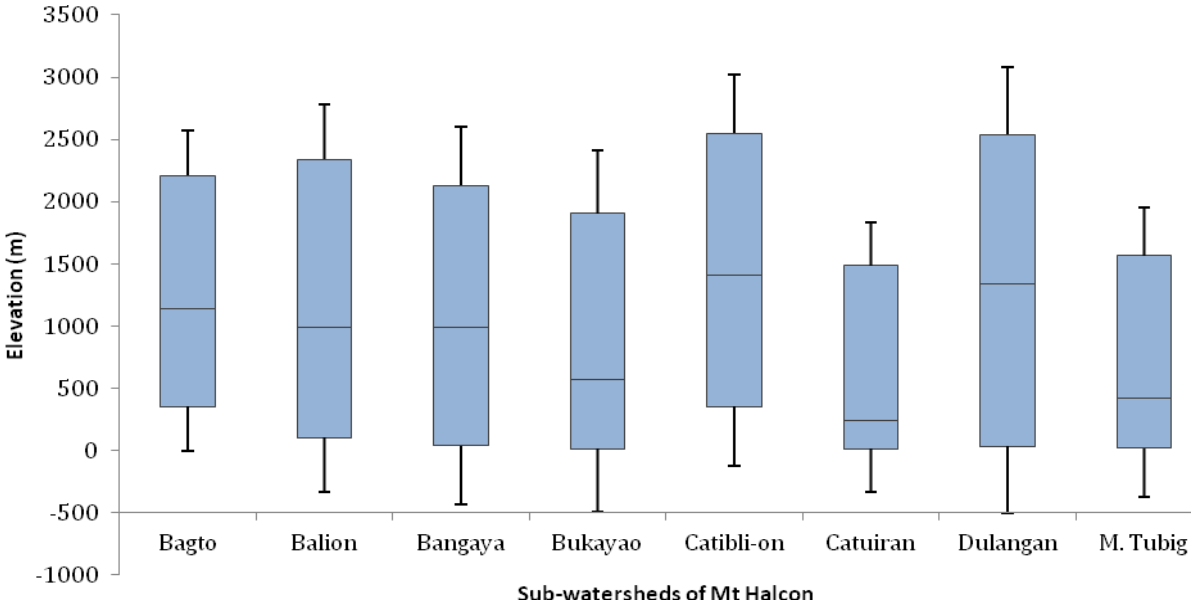


Figure 4.1.2.b. Elevation Gradient Map of Mt. Halcon Range Sub-watersheds

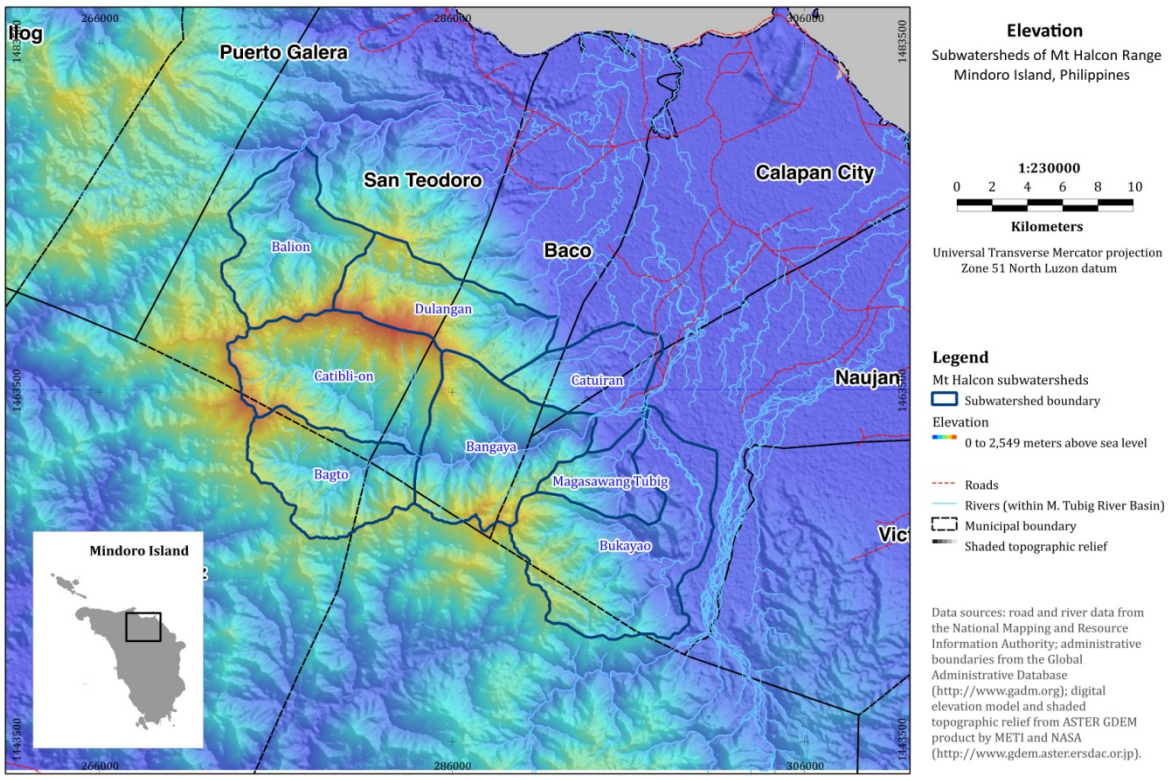


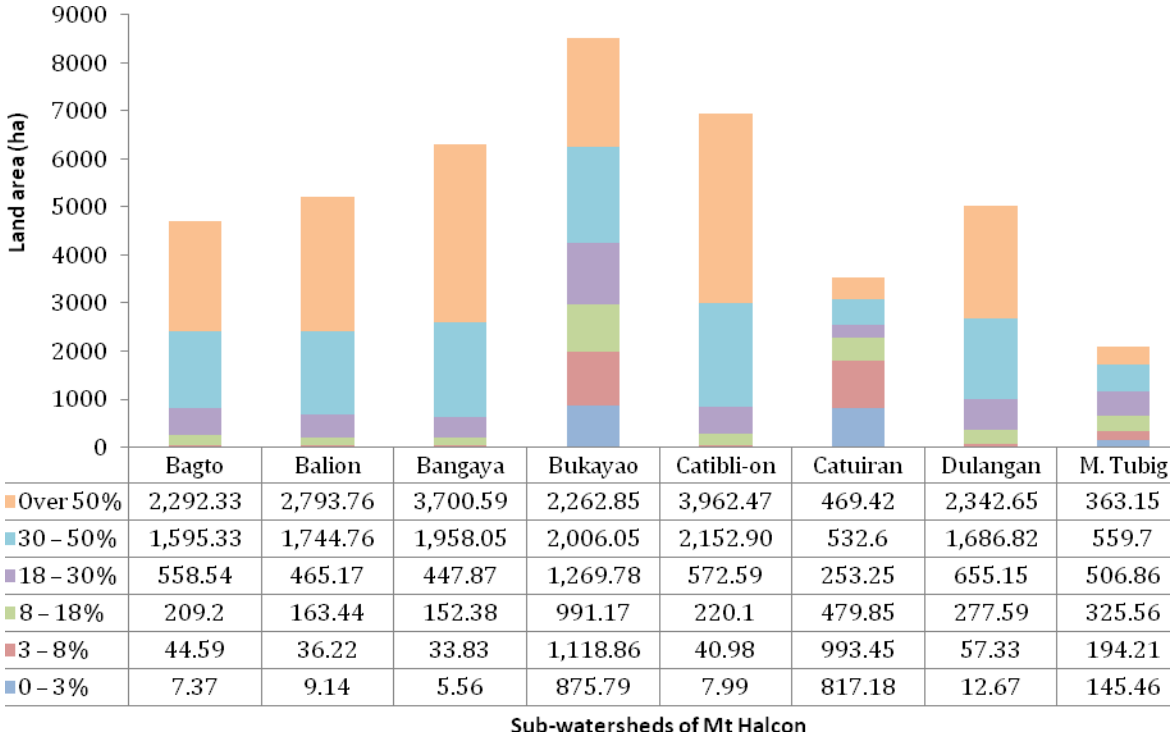
Table 4.1.2 indicates that five sub-watersheds begin at altitudes less than 100 meters, and subsequently rise to at least 1,400 meters and above. Other sub-watersheds, particularly Bagto, Balion, and Catibli-on, begin at the lowest points between 100-400 meters, and subsequently rise to 2,200 meters and above. Catuiran has the shortest altitudinal range (Ā=243.09; σ=348.65), or the elevation difference between the lowest and highest points, although the mean elevation with the sub-watershed is closer to the minimum elevation. Dulangan, on the other hand, has the longest altitudinal range (Ā=1337.45; σ=539.62). The highest point, or summit, is situated between Catibli-on and Dulangan. Catibli-on (Ā=1411.93; σ=472.83) has the highest mean elevation across all sub-watersheds.

4.1.3. Slope

Slope measures the rate of change of elevation in the direction of steepest descent. It is a topographic attribute calculated from the directional derivatives of a topographic surface, primarily significant for studying variables such as precipitation, geomorphology, soil water content, overland and subsurface flow velocity, and surface runoff, among others (Wilson & Gallant, 2000). **Figures 4.1.3.a** and **4.1.3.b** present the proportion of slope categories within each sub-watershed area of Mt. Halcon Range.

Slope units are indicated in percent, which can also exceed 100% in steep areas since 100% corresponds to a 45° slope (Gallant & Wilson, 1996). Slope percentages are grouped into the following categories: 0 – 3% = level to gently sloping; 3 – 8% = gently sloping to undulating; 8 – 18% = moderately sloping; 18 – 30% = steeply sloping; 30 – 50% = very steeply sloping; and over 50% = mountainous.

Figure 4.1.3.a. Slope Categories of Mt. Halcon Sub-watersheds (in terms of land area in hectares)

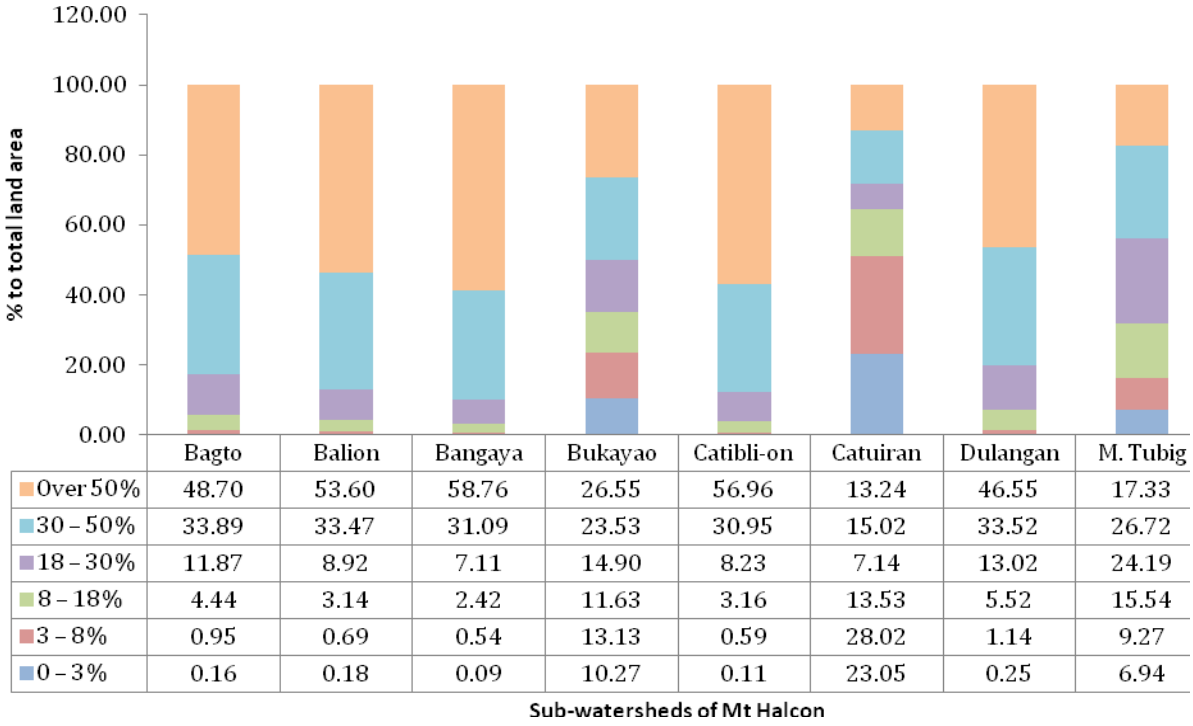


	Bagto	Balion	Bangaya	Bukayao	Catibli-on	Catuiran	Dulangan	M. Tubig
Over 50%	2,292.33	2,793.76	3,700.59	2,262.85	3,962.47	469.42	2,342.65	363.15
30 – 50%	1,595.33	1,744.76	1,958.05	2,006.05	2,152.90	532.6	1,686.82	559.7
18 – 30%	558.54	465.17	447.87	1,269.78	572.59	253.25	655.15	506.86
8 – 18%	209.2	163.44	152.38	991.17	220.1	479.85	277.59	325.56
3 – 8%	44.59	36.22	33.83	1,118.86	40.98	993.45	57.33	194.21
0 – 3%	7.37	9.14	5.56	875.79	7.99	817.18	12.67	145.46

Shown in **Figures 4.1.3.a, 4.1.3.b** and **4.1.3.c.**, five sub-watershed areas are dominantly characterized by slopes that are greater than 18% and above, or steeply sloping to mountainous terrain (slope≥18%: $93.09 \leq \Sigma \leq 96.96$, in %). Catuiran is characterized by level to moderately sloping terrain (slope≤18%: $\Sigma=64.60$, in %), which is expected since it corresponds well with its mean elevation and low altitudinal variations ($\bar{A}=243.09$; $\sigma=348.65$). Bukayao, the largest sub-watershed of Mt. Halcon Range, has an almost evenly proportioned distribution of slope categories ($\sigma=6.73$), as well as for Catuiran ($\sigma=7.54$) and Mag-asawang Tubig ($\sigma=7.86$). On the other hand, the other sub-watersheds indicate larger disproportions in terms of slope categories ($19.11 \leq \sigma \leq 23.70$).

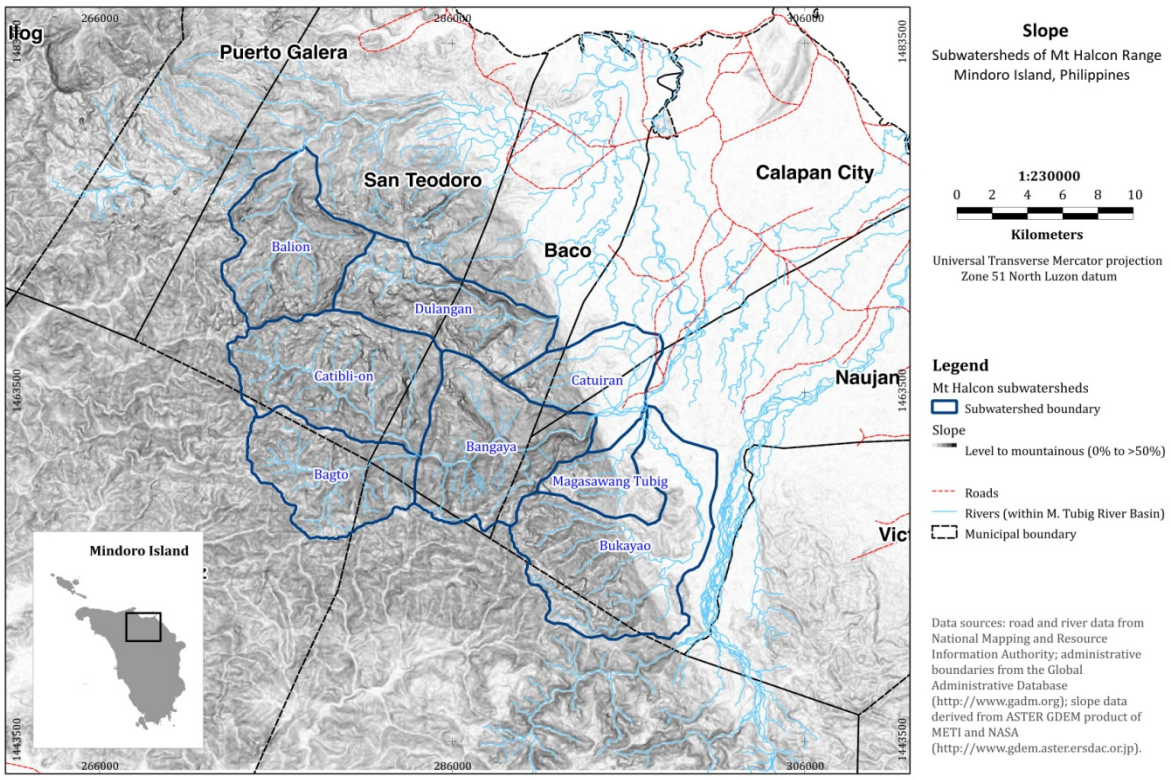
The Revised Forestry Code of the Philippines (PD No. 705) defines forestlands as areas above 18% in slope, regardless if these areas have actual forest cover. Based on this definition, all the sub-watersheds have significant portions (e.g., more than 50% of total land area of watershed) that can be classified as forestland.

Figure 4.1.3.b. Slope Categories of Mt. Halcon Sub-watersheds shown as Stacked Plots (in terms of percentage of each category to the total land area of the watershed)



	Bagto	Balion	Bangaya	Bukayao	Catibli-on	Catuiran	Dulangan	M. Tubig
Over 50%	48.70	53.60	58.76	26.55	56.96	13.24	46.55	17.33
30 – 50%	33.89	33.47	31.09	23.53	30.95	15.02	33.52	26.72
18 – 30%	11.87	8.92	7.11	14.90	8.23	7.14	13.02	24.19
8 – 18%	4.44	3.14	2.42	11.63	3.16	13.53	5.52	15.54
3 – 8%	0.95	0.69	0.54	13.13	0.59	28.02	1.14	9.27
0 – 3%	0.16	0.18	0.09	10.27	0.11	23.05	0.25	6.94

Figure 4.1.3.c. Slope Map of Mt. Halcon Sub-watersheds



4.1.4. Watershed

PCARRD-DOST et al. (1999) defines a watershed as a topographically delineated area of land from which rainwater can drain as surface runoff, via a specific stream or river system, to a common outlet point which may be a dam, irrigation system or municipal/urban water supply off-take point, or where the stream/river discharges into a larger river, lake or the sea. Ridges of higher elevation generally form the boundaries between two watersheds. At these boundaries, rain falling on one side flow toward the low point of one watershed, while rain falling on the other side of the boundary flows toward the low point of a different watershed. Watersheds are also interchangeably referred to as a river basin, a drainage basin, or a catchment. In the Philippines, watersheds vary greatly in size and extent, and usually transcend the boundaries of administrative units.

For Mt. Halcon Range, the municipal- to provincial-level scale is appropriately the minimum resolution for watershed delineation and identification. The sub-watersheds of Mt. Halcon Range, of which the estimated land areas fall within the range of 1,000 to 10,000 has., can be classified as small watersheds. (Watersheds at the municipal- to provincial-level, classified as small-sized watersheds, range from 10 to 100 km^2, of which the topographic boundaries occur within one province, and within one or more municipalities.)

Eight sub-watershed units comprise Mt. Halcon Range, with Bukayao as the largest in terms of land area, followed by Catibli-on and Bangaya. It should be stressed here that Mag-asawang Tubig sub-watershed should not be confused with the larger river basin of the same name; the sub-watershed takes it name from being one of many

tributaries of the larger river basin. Note that the estimated land area indicates the land area of each sub-watershed, not the total land area of identified administrative units corresponding to each sub-watershed.

The drainage systems of all sub-watersheds resemble dendritic patterns. All the sub-watershed river systems drain through the municipalities of San Teodoro, Baco, Naujan, and the city of Calapan. Administratively, the sub-watersheds of Bangaya and Bagto are situated within the jurisdiction of four municipalities, while Mag-asawang Tubig and Balion are situated in only one municipality. The headwaters of Bagto are mainly situated in Occidental Mindoro province, which subsequently drain through Baco municipality in Oriental Mindoro. Balion, entirely situated within San Teodoro, drains within the same municipality after joining tributaries that drain from another sub-watershed originating from Puerto Galera. Bangaya joins two tributaries; the major tributary is formed by the confluence of the sub-watershed systems of Catibli-on and Bagto; its headwaters are found within Baco municipality and drains through Naujan and Calapan.

The headwaters of Bukayao are situated mainly in Naujan municipality with some portions also in Sablayan, Occidental Mindoro. Catibli-on's headwaters are found within San Teodoro municipality, but it subsequently drains through Bangaya sub-watershed in Baco municipality. Catuiran cuts across three municipalities, although its rivers drain mainly through Calapan City. Dulangan is situated between two municipalities; its headwaters are situated in San Teodoro while it drains through Baco. Mag-asawang Tubig is the smallest sub-watershed, entirely situated in and drained through Naujan municipality.

4.1.5. Geology and Mineral Resources

The geology of Mindoro Island is considered unique compared to most parts of the archipelago. Mindoro Island is popularly believed to be a part of a micro continental block that includes northern Palawan, which drifted off from a zone spreading from the Asian continental margin in the Early Oligocene during the evolution of the South China Sea. This continental block migrated southward and collided with the existing magmatic arc of the Philippines during the Middle Late Miocene.

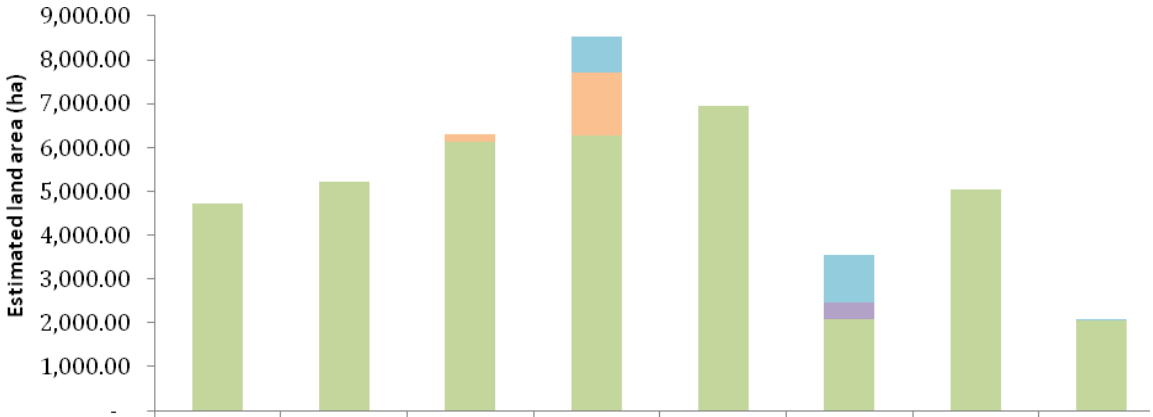
The rocks that make up Mindoro Island range in age from Carboniferous (345 mybp) to Pleistocene (approximately 2.5 mybp). The oldest rock formation identified on Mindoro Island is a series of metamorphic rocks composed of schist, phyllite, gneiss, and marble. Overlaying this formation is a thick series of sedimentary sequence, apparently deposited in varying depths of marine environment brought about by a series of uplift and subsidence. The most recent uplift is indicated by the presence of terraces along the floodplains of the major rivers draining through Mindoro Island.

The Halcon Metamorphic Complex constitutes the basement of northeastern Mindoro from Mt. Calavite to Puerto Galera, and in areas around Mt. Halcon. The underlying geology of Mt. Halcon Range sub-watersheds involves four types, described and directly adopted in this report as follows (Bureau of Mines and Geosciences, 1963):

- Basement complex (pre-Jurrasic) (BC). Metamorphic rocks; undifferentiated amphibolite, quartzofeldspathic and mica schist, and phylites-slates frequently associated with marble and quartzite. Broadly folded; some narrow zones of close folding broken by upthrusts. Prevailing schistosity generally parallel, some oblique and/or perpendicular to bedding.
- Cretaceous-Paleogene (UC). Igneous intrusive rocks; undifferentiated ultramafic and mafic plutonic rocks. Predominantly peridotite associated with late gabbro and/or diabase dikes. Generally thrusted or upfaulted into Tertiary and older rock formations. Most bodies probably late Mesozoic to early Tertiary.
- Upper Miocene-Pliocene (N2). Largely marine clastics (molasse) overlain by extensive, locally transgressive pyroclastics (chiefly tuff, tuffites) and tuffaceous sedimentary rocks. Local bog iron; laterite deposits in some elevated peneplaned surfaces.
- Recent (R). Alluvium fluviatile, lacustrine, paludal, and beach deposits; raised coral reefs, atolls, and beachrock.

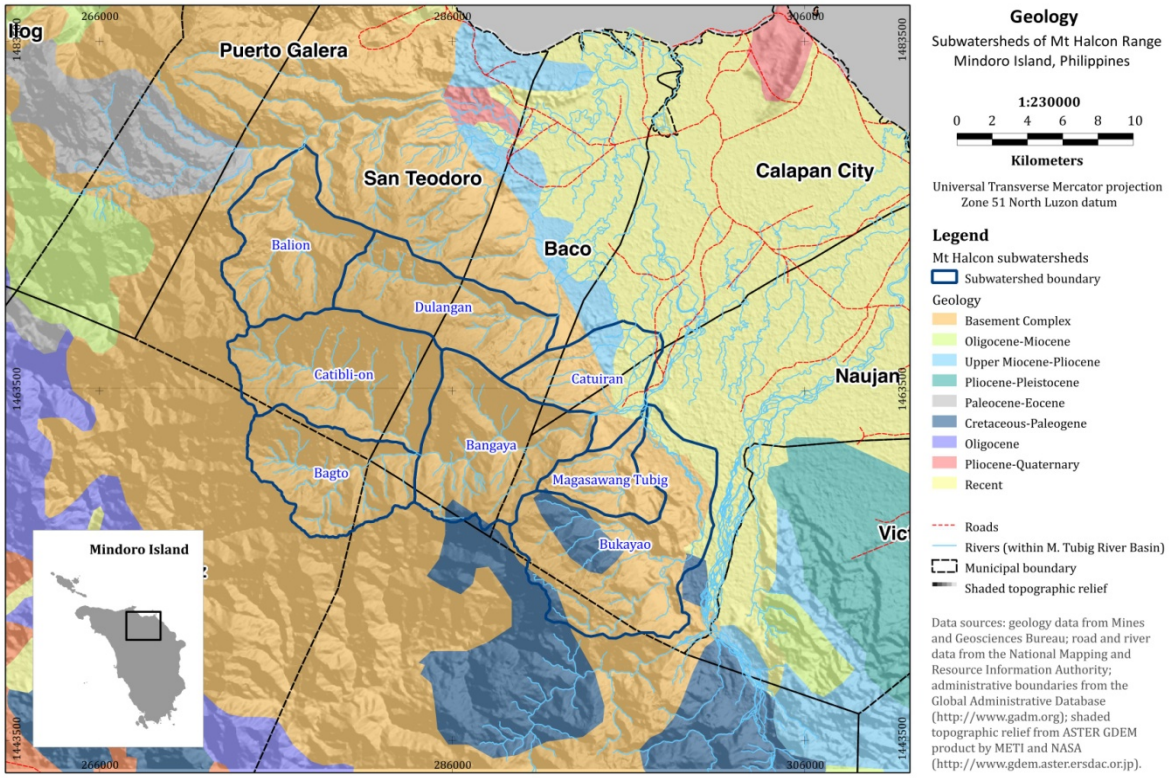
Figures 4.1.5.a and **4.1.5.b** suggest that the Basement Complex is the dominant underlying geology for all sub-watersheds. Catuiran, Mag-asawang Tubig, and Bukayao, which involve lower elevations and gently to moderately sloping terrain, are partially characterized by much recent alluvial deposits and rocks. On mineral resources, the 1986 BMG data suggests that only some iron ore prospects have been identified, roughly situated at the fringes of the sub-watersheds of Balion and Dulangan. This may suggest that Mt. Halcon Range could be understudied in terms of mineral prospecting.

Figure 4.1.5.a. Geology of Mt. Halcon Range Sub-watersheds (in terms of land area in hectares) Note: Geological types include: BC – Basement Complex or the Halcon Metamorphic Complex; UC – Cretaceaous-Paleogene; N2 – Upper Miocene-Pliocene; and R – Recent.



	Bagto	Balion	Bangaya	Bukayao	Catibli-on	Catuiran	Dulangan	M. Tubig
R	-	-	-	822.24	-	1,089.00	-	27.43
N2	-	-	-	-	-	387.58	-	-
UC	-	-	157.40	1,428.98	-	-	-	5.48
BC	4,707.36	5,212.49	6,140.87	6,273.28	6,957.03	2,069.17	5,032.21	2,062.02

Figure 4.1.5.b. Geology Map of Mt. Halcon Range Sub-watersheds



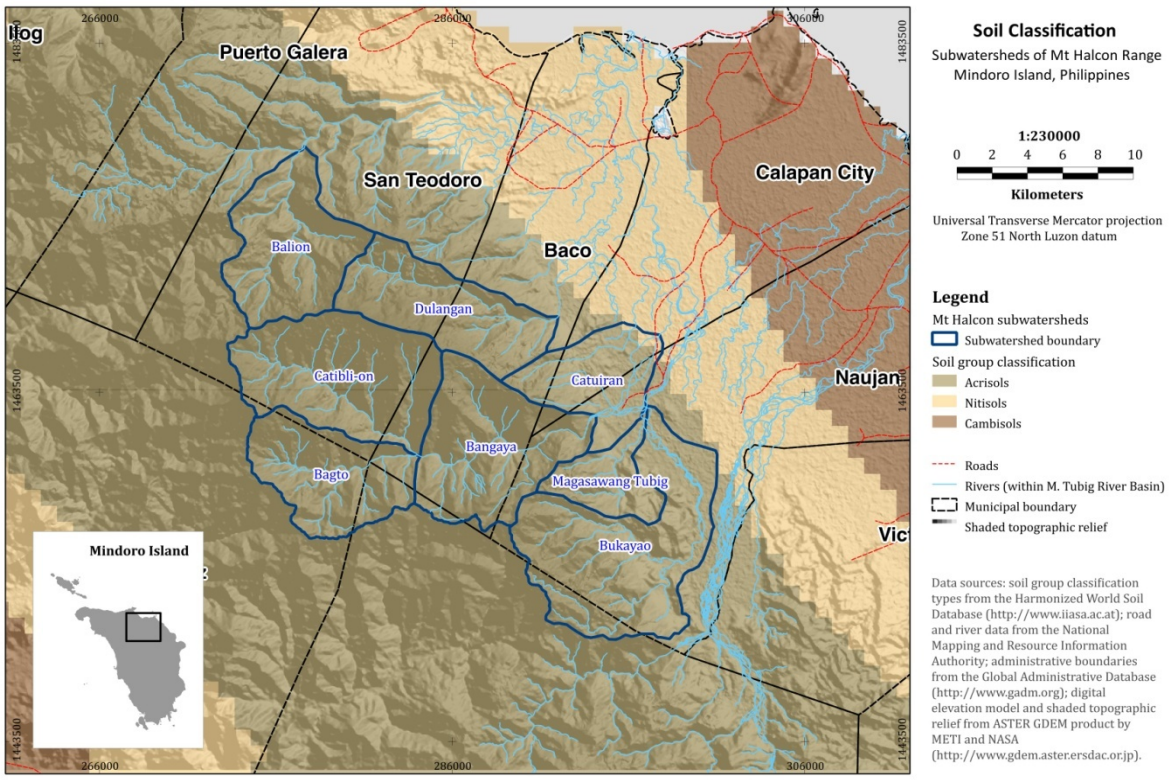
4.1.6. Soil

Mt. Halcon Range sub-watersheds are mainly comprised of Acrisols, a soil group based on the Food and Agriculture Organization's FAO's soil classification system, which may be characterized as clay-rich, and usually associated with humid, tropical climate regions, often in forested areas, ranging from high, dense rainforest to open woodland (**Figure 4.1.6**).

Due to low fertility and aluminum content of Acrisols, it has limited use for agricultural production and rather favors silviculture and pasture uses. Crops that may be cultivated given allowable climate include rubber, oil palm, coffee and sugar cane. Acrisols are soils that have higher clay content in the subsoil than in the topsoil as a result of clay migration (FAO, 2006).

The recommended use and management of Acrisols include: 1) the preservation of the surface soil with its important organic matter and prevention of erosion, if farming on Acrisols; and 2) agroforestry as a soil-protecting alternative to shifting cultivation to achieve higher yields without requiring expensive inputs (FAO, 2006).

Figure 4.1.6. Soil Classification Map of Mt. Halcon Range Sub-watersheds



4.1.7. Climate

According to the Philippine Atmospheric, Geophysical, and Astronomical Service Administration (PAG-ASA), the country's weather bureau, , Mindoro Island experiences two climatic regimes: Type I and Type III based on the Coronas climate classification. The two types are described as follows:

Type I: Two pronounced seasons, dry from December to May, and wet from June to December. Maximum rain period is from June to September. Areas characterized by this climate type are generally exposed to the southwest monsoon (*habagat*) and get a fair share of the rainfall brought about by tropical cyclones occurring especially during the maximum rain period.

Type III: No very pronounced maximum rain period, with a short dry season lasting only from one to three months. This type is intermediate between Types I and II, although it resembles the first type more closely because it has a short dry season. Areas of this climate type are partly shielded from the northeast monsoon (*amihan*), but are exposed to the southwest monsoon and are also benefited by the rainfall caused by tropical cyclones.

The *amihan* brings moist winds to Mindoro during the dry season. Due to the presence of high mountainous terrain across the central spine of Mindoro Island, the moisture brought by *amihan* descends on the northern and eastern portions of Mindoro, providing these areas with considerable rainfall during the dry season, while hardly any rain is felt on the western side. This creates an orographic lifting, or rainshadow, effect on the leeward western side of the central Mindoro highlands. During the *habagat*, the

winds strike directly on the western coast of Mindoro, and much of the rainfall brought by these winds precipitate before passing the central highland mountains. The western portion of Mindoro is, therefore, marked by a distinct dry and wet season, while the eastern portion has an evenly distributed rainfall through the year (Merritt, 1908).

The annual mean precipitation within sub-watersheds of Mt. Halcon is shown in **Table 4.1.7** and **Figures 4.1.7.a** and **4.1.7.b**. The annual mean rainfall experienced within Mt. Halcon sub-watersheds vary between 2,011 and 3,328 mm., with the lowest and highest amount of annual rainfall recorded in Balion and Catibli-on, respectively. The lowest and highest mean annual rainfall was recorded in Catuiran ($\bar{A}$ =2167.28) and Catibli-on ($\bar{A}$ =2976.16), respectively. Bukayao (σ=324.06) experiences the most varied amount of precipitation annually, while Catuiran (σ=191.02) has the least varied amount of precipitation.

In comparison, the average annual rainfall in the Philippines varies considerably in different parts of the archipelago, usually ranging from 900 to 4,500 mm. The eastern parts receive more rainfall compared to the western parts, which are generally drier and seasonal in character (Fernando et al., 2008). The maximum amount of rainfall experienced across Mt. Halcon Range is comparably as high as the rainfall occurring in the southern portion of Mindoro.

Figure 4.1.7.a. Annual Precipitation Experienced in Mt. Halcon Range Sub-watersheds

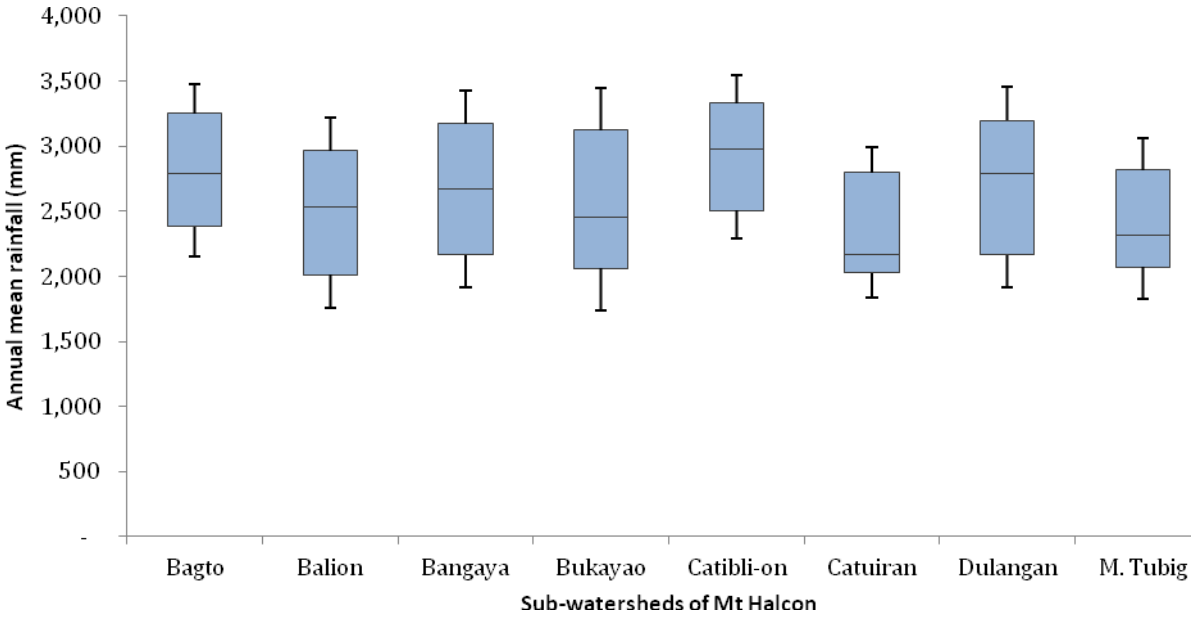
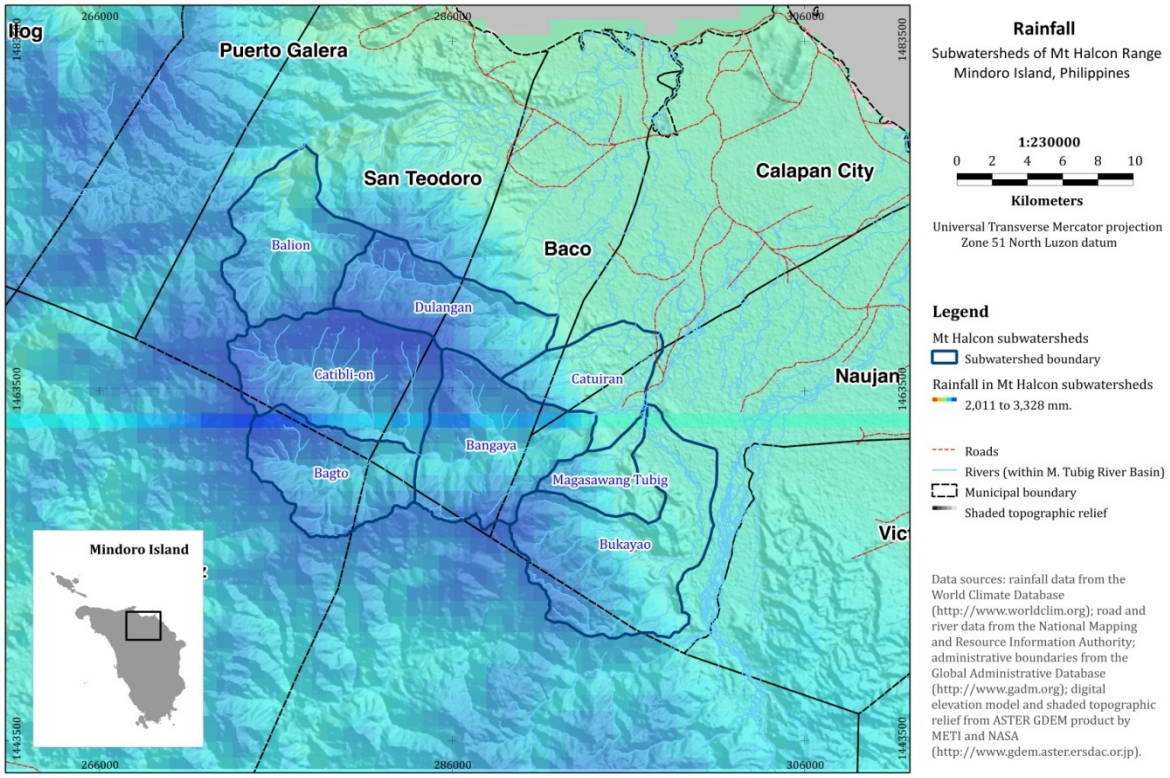


Table 4.1.7. Annual Mean Precipitation Experienced in Mt. Halcon Range Sub-watersheds

Watershed	Minimum (mm)	Maximum (mm)	Range	Mean, Ā (mm)	SD, σ
Bagto	2,383	3,252	869	2,791.70	226.99
Balion	2,011	2,964	953	2,531.48	250.17
Bangaya	2,166	3,171	1,005	2,669.70	251.96
Bukayao	2,060	3,122	1,062	2,448.65	324.06
Catibli-on	2,507	3,328	821	2,976.16	216.78
Catuiran	2,028	2,796	768	2,167.28	191.02
Dulangan	2,166	3,198	1,032	2,791.70	254.40
Mag-asawang Tubig	2,070	2,817	747	2,316.96	243.15

Figure 4.1.7.b. Rainfall Map of Mt. Halcon Range Sub-watersheds



4.1.8. Land Cover

Table 4.1.8.a presents the different land cover or vegetation types within the sub-watersheds of Mt. Halcon Range.

Table 4.1.8.a. Land Cover Types of Mt. Halcon Range Sub-watersheds

	Land Cover Type	Estimated Land Area (has.)	% of Total Land Area
1	Closed forest, broadleaved	1,960.37	4.63
2	Forest plantation, broadleaved	29,791.59	70.31
3	Open forest, broadleaved	2,302.20	5.43
4	Inland water	41.06	0.10
5	Other land, cultivated, annual crop	1,478.96	3.49
6	Other land, cultivated, perennial crop	2,465.65	5.82

7	Other land, natural, barren land	465.01	1.10
8	Other land, natural, grassland	237.12	0.56
9	Other woodland, shrubs	3,630.66	8.57
Total land area		42,372.62	100.00

Based on the data, broadleaved forest plantations are the dominant forest type covering Mt. Halcon Range, comprising 70.31% of the total land area of all sub-watersheds (**Table 4.1.8.b** and **Figure 4.1.8**). Broadleaved closed and open forest, situated entirely within Dulangan sub-watershed, respectively comprise 4.63% and 5.43% of the total land cover features within all sub-watersheds of Mt. Halcon Range. Shrubs are found in Bagto, Bukayao, and Mag-asawang Tubig sub-watersheds, and comprise about 8.57% of the total area. Cultivated areas, including lands devoted to either annual or perennial crops, comprise about 9.31% of the total land area, and are situated mainly in the lower slopes of Catuiran and Bukayao (and to some extent Mag-asawang Tubig and Dulangan). Other land cover features that are also present include grassland, barren areas, and inland water, which account for less than 2% of the total land area of all sub-watersheds.

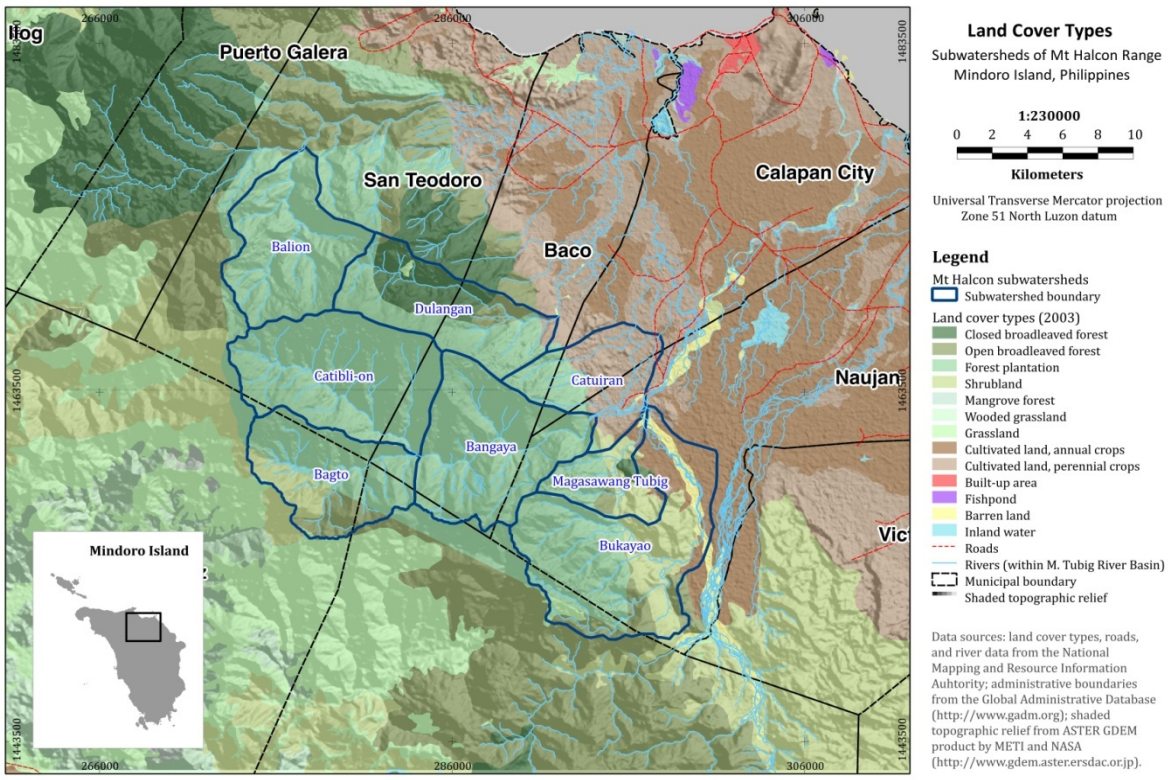
Descriptions from previous studies of the forest formations of Mt. Halcon, however, indicate different forest types including: the lower montane rainforest above 500 m., and the distinct tropical subalpine forest from 2,100 to 2,400 m. (Merrill, 1907; Mandia, 2001; Fernando et al., 2008). The variations in elevational gradients within sub-watersheds suggest that different forest formations are likely to develop.

Forests are an integral component of healthy watersheds since these help regulate water flow, maintain water and air quality, and provide soil stability through its root system up to some extent (Bruijnzeel, 2004), and serve as important habitats for wildlife. Adequate forest cover should be kept within watersheds to maintain the ecological services that it provides. The percentage of forest cover within the sub-watersheds ranges from 33.41% to 100%. Two sub-watersheds, Balion and Catibli-on, are completely forested; Catuiran, on the other hand, has the lowest proportion of forest cover in relation to its land area.

Table 4.1.8.b. Percentage of Forest Cover of Mt. Halcon Range Sub-watersheds

	Name of Sub-watershed	Estimated Land Area (has.)	Estimated Forest (has.)	% of Forest within Sub-watershed
1	Bukayao	8,524.50	4,558.53	53.48
2	Catibli-on	6,957.03	6,957.03	100.00
3	Bangaya	6,298.28	6,288.62	99.85
4	Balion	5,212.49	5,212.49	100.00
5	Dulangan	5,032.21	4,847.97	96.34
6	Bagto	4,707.36	3,843.26	81.64
7	Catuiran	3,545.75	1,184.64	33.41
8	Mag-asawang Tubig	2,094.93	1,161.55	55.45
Total land area		42,372.55	34,054.09	80.37

Figure 4.1.8. Land Cover Map of Mt. Halcon Range Sub-Watersheds



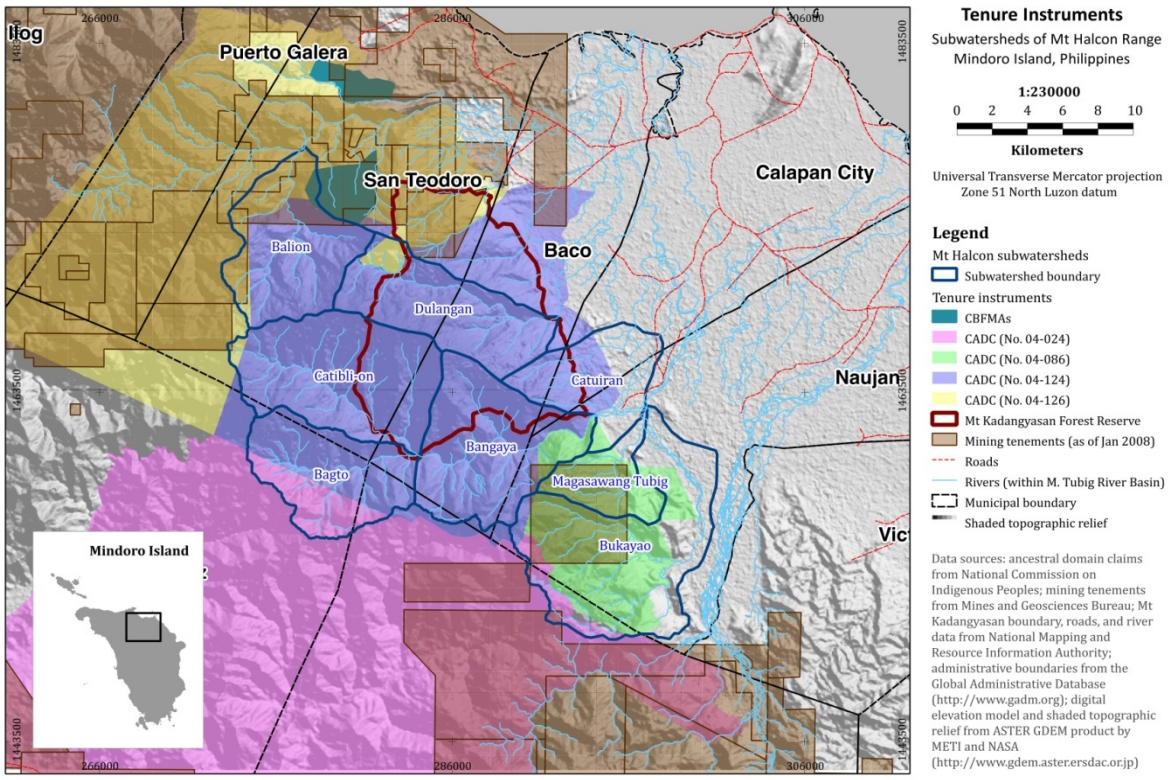
4.1.9. Land Tenure Instruments

Land tenure instruments affect the implementation of site conservation management and planning. These prior rights and arrangements need to be taken into consideration to come up with an appropriate management system. **Figure 4.1.9** presents the different tenure instruments issued over the sub-watersheds of Mt. Halcon Range including, but not limited to, the following: forest reserve, certificates of ancestral domain claims, mining tenements, and community-based forest management areas.

The Mt. Kadangyasan Forest Reserve was established on 06 August 1964 by virtue of Proclamation No. 284 (under RA No. 3092). The forest reserve encompasses the headwaters of Dulangan, Catibli-on, Bangaya, and Catuiran, and also contains the summit of Mt. Halcon Range. The reserve is also situated within the jurisdiction of San Teodoro, Baco, and Calapan City (to some extent).

Table 4.1.9.a shows the four ancestral domain claims that have been issued over the sub-watershed areas of Mt. Halcon Range. While the largest ancestral domain claimed by the Alangan Mangyan (CADC 04-024) is included in the list, only a small portion of this claim is found over the sub-watershed areas. Another Alangan Mangyan ancestral domain claim, CADC 04-124, comprises a huge area of the sub-watersheds including the summit ridge. CADC 04-086 is situated over considerable areas of Mag-asawang Tubig and Bukayao sub-watersheds.

Figure 4.1.9. Land Instruments Map within Mt. Halcon Range Sub-watersheds



The indigenous peoples group, *Samahan ng mga Mangyan Iraya sa Barangay Baras*, holds the agreement to the Community-Based Forest Management (CBFM) area adjacent to CADC 04-024 in San Teodoro municipality, with an estimated land area of 1,113 has. Only small portions of this CBFM area are situated within the boundaries of Balion sub-watershed, which can be deemed as not very significant.

A total of 10 mining tenements, which overlap with portions of the sub-watershed areas of Mt. Halcon Range, have been issued composed of seven Exploratory Permit Applications (EPA), two applications for Mineral Production Sharing Agreements (MPSA), and one Financial Technical Assistance Agreement (FTAA) (**Table 4.1.9.b**). Except for EPA-IVB-129, which sits squarely over the headwaters of Mag-asawang Tubig and Bukayao, and EPA-IVB-111 and FTAA-IVB-005, which are situated at the lower elevations of Balion, the other mining tenements only overlap with small portions along the fringes of other sub-watershed areas.

Boundary overlaps exist between some of the tenure instruments, which imply potential complications in land use management, as well as potential conflicts in jurisdiction. Notable overlaps occur between ancestral domain claims, particularly CADC 04-086 and CADC 04-126, with mining tenements. These overlaps are similarly situated within sub-watershed areas. The Mt. Kadangyasan Forest Reserve has a dominant boundary overlap with CADC 04-024, while its northern portion is in conflict with four various mining tenements. The entire CBFM area of the indigenous peoples' group is similarly situated within an area of overlap with a mining tenement, specifically EPA-IVB-111.

Table 4.1.9.a. List of Certificates of Ancestral Domain Claims Issued in Mt. Halcon Range Sub-watersheds

No.	Tribe	Location	Date Issued/Approved	Land Area (has.)
24	Alangan Mangyan	Sta. Cruz and Sablayan, Occidental Mindoro	26-Feb-1996	74,200.00
86	Alangan Mangyan	Naujan, Oriental Mindoro	23-Jun-1997	7,537.00
124	Alangan Mangyan	Naujan and Baco, Oriental Mindoro	05-Jun-1998	32,000.00
126	Iraya Mangyan	Baco, San Teodoro, Puerto Galera, Oriental Mindoro	05-Jun-1998	33,334.00

Table 4.1.9.b. List of Mining Tenements Issued in Mt. Halcon Range Sub-watersheds

Tenement No.	Holder/Corporation	Municipality	Area (has.)	Date Filed	Commodity
EPA-IVB-006	Mindex Resources Development	Puerto Galera	3,159.00	06-Oct-95	Gold
EPA-IVB-085	Astrolabe Mining and Devt.	Mamburao, Puerto Galera	4,078.30	04-Aug-06	Iron, gold, copper
EPA-IVB-111	Rizal Silica	San Teodoro	2,163.78	30-Oct-06	Iron, gold, copper
EPA-IVB-129	Epochina Mining	Naujan	2,996.00	29-Dec-06	Iron, gold, copper
EPA-IVB-155	Philorient Mining	Mamburao	8,000.00	19-Mar-07	Iron, manganese
EPA-IVB-163	JCET Resources Mining	???	15,328.63	03-Apr-07	Nickel, chromite
EPA-IVB-202	Goldenpine Development	Sablayan	3,312.09	20-Jun-07	Gold, nickel, iron, chromite
PMPSA-IVB-057	Orophil Stonecraft	San Teodoro	748.95	04-Nov-92	Gold, silver, nickel
PMPSA-IVB-069	Kantoh International Marble	San Teodoro	1,165.81	22-Feb-93	Marble
FTAA-IVB-005	Agusan Petroleum and Mining	Abra de Ilog	53,952.00	26-Feb-94	Gold, silver

4.2. Biological Resources

4.2.1. Flora

The floral composition of Mt. Halcon is remarkable. As early as 1907, the Americans have discovered the botanical wealth of the mountain. E.D. Merrill, the first white Caucasian who ascended Mt. Halcon's summit in 1906 and who is considered the most respected Philippine phytogeographer, published the book "The Flora of Mt. Halcon" in 1907. His varied botanical collections were considered in separate publications in that same year: the bryophytes by Brotherus, the ferns by Copeland, and the orchids by Ames.

Dr. Emelina Mandia, a botanist from De La Salle University-Manila and former Executive Director of MBCFI, also conducted an ethnobotanical study of the Alangan Mangyans at the foot of Mt. Halcon in 1987, as well as comprehensive vegetation analyses of the Halcon summit zone (±1950-2582 m asl) in 1994, 1995 and 2004. Her studies showed that Mt. Halcon exhibits high floral endemism and diversity, with unique habitats on its summit zone, including a tropical alpine heath that is seemingly not found anywhere else in the Philippines.

Based on Mandia's documentations, a total of 40 species of bryophytes are known to occur in Mt. Halcon. These include eight new records of true mosses for Mt. Halcon as contributed by Tan and Mandia (2001), two of which are new records for the Philippines (Box **4.2.1.a**).

Box 4.2.1. a. Annotation of the New Collection of Mt.. Halcon Mosses
(Source: Tan BC, Mandia E.H. 2001. New and noteworthy records of mosses from Mindoro, the Philippines, and their biogeographic implication. Gardens' Bull Singapore 53:315-322.) (With permission from the author)

The single asterisk (*) indicate a new record for Mindoro, and double asterisk (**), new to the Philippines.

- **Acroporium johannis-winkleri* Broth. [EHM 78]. Epiphytic on branches, this is a medium-sized *Acroporium* with rather stiff-looking and spreading leaves. Stems measure to 2 cm. tall. It is a West Malesian endemic, being common in Peninsular Malaysia and Borneo.
- *Braunfelsia dicranoides* (Dozy & Molk.) Broth. [EHM 82]. This discranaceous moss is easily recognized among its congeners by the strongly falcate, non-plicate and unicostate leaves. Its long, sheathing perichaetial leaves are also diagnostic. It is a common mossy forest epiphyte throughout Malesia.
- **Breutelia arundinifolia* (Duby) Fleisch. [EHM 76, 83]. This large moss is recognized by its big antheridial head, widely spreading to somewhat squarrose and sheathing leaves, and tomentose stem (cf. Virtancn, 1997). Widespread in East Asia and Oceania, the species is a common ground dweller on open sites at high elevations in the Philippines. It has no Palawan record (Tan, 1996).
- **Campylopus exasperatus* (Nees & Blume) Brid. [EHM 77]. This is an easily recognized *Campylopus* in the Philippine mountains. The leaves are often broadly lanceolate, acute to blunt, with a percurrent and broad costa that is poorly defined. The plants from Mt.. Halcon are large, measuring to 12 cm. tall and carpeting the soil underneath the *Falcatifolium* forest and heath vegetation.
- *C*. *hemitrichius* (C. Muell.) Jaeg. [EHM 86, 92]. Distinctive in having narrowly lanceolate leaves with concolrous, excurrent costa, this species is a ground dweller in open sites at the summit of Mt. Halcon. There seems to be two ecotypes on this mountain; one with erect, appressed leaves, and the other with somewhat second leaves. Tan (1983) clarified the taxonomic confusion of this species vis-à-vis other related Philippine congeners. At present, *Campylpopus hemitrichius* has no Palawan record.
- *Dicranoloma assimile* (Hampe) Par. [EHM 84]. This is a widespread *Dicranoloma* in Philippine mountains, growing mainly on trunks and branches, sometimes on soil.
- ***Dicranoloma daymannianum* Bartr. [EHM 85]. Found attached to the base of trunks and branches of shrubs in the *Podocarpus-Falcatifolium* scrub, the present species resembles a small form of *D. braunii* without the filamentous propagules. The presence of a central strand in stem cross-section and the short, upper laminal cells further distinguish it from *D. braunii.* Klazenga (1999) discussed and illustrated.. this uncommon Malesian taxon well. Its presence in Palawan can be predicted.
- *Leucobryum javense* (Brid.) Mitt. [EHM 81]. This is the largest *Leucobryum* found commonly in Philippine forests.
- *L. sanctum* (Brid) Hampe [EHM 80]. This is another common forest species in Malesia, including the Philippines. The opening of the perichaetial bud of this epixylic and epipetric species is thickly covered with highly branched rhizoids that arise mainly from the abaxial side, but toward the base of inner perichaetial leaves. Oddly, the larger outer perichaetial leaves do not form any rhizoidal outgrowth. Yamaguchi (1993) illustrated and labeled this structure as a "tomentum" without any taxonomic comment.
- **Macrothaminium javense* Fleisch. [EHM 75]. The species is found attached to prostate branches. The strongly spinose and toothed leaf margin of this species is characteristic among its congeners. All Philippine records, thus far, are from Luzon island.
- **Racomitrium lanuginosum* [EHM 90]. Growing in open heath vegetation at the summit, the species is identified by its whitish and strongly erose leaf apices. Mt. Halcon is the second locality in the Philippines to record this nearly cosmopolitan moss. Its first Philippine record came from Mt. Giting-Giting in Sibuyan Island in the central Philippines (Tan, 1993).
- ***Rhacocarpus alpinus* (Wright) Par. [EHM 72]. This is the northernmost locality for this species in the old world tropics. The closest population to Mt. Halcon is in Kinabalu in NE Borneo. Plants are abundant on Mt. Halcon forming extensive carpets under cushion-forming seed plants. Its presence at high mountain peaks in Palawan should be sought for.

- *Schlotheimia wallissii* C. Muell. [EHM 91]. Epiphytic on trunk bases and prostrate branches, this Malesian endemic is known from Borneo, the Philippines and New Guinea (Vitt *et al.,* 1993). The other Philippine localities include Luzon, Negros and Mindanao, but not Palawan.
- *Sphagnum junghuhnianum* Dozy & Molk. [EHM 88]. Plants are abundant on wet soil under the thick growth of *Miscanthus* grasses. It is the most common species of *Sphagnum* in Philippine mountains.
- *S. sericeum* C. Muell. [EHM87]. This is the other species of *Sphagnum* found on wet soil beneath heath vegetation on Mt. Halcon. In the Philippines, this species is also known from Negros and Mindanao.

At least 206 species of ferns and fern allies are known to occur in Mt. Halcon, three of which are endemic to this mountain (*Hymenophyllum edanoi*, *Selliguea calophlebia*, and *Sphaerostephanos mindorensis*). Some rare species of ferns are likewise found in Mt. Halcon, such as *Schizaea malaccana,* and *Matonia foxworthyi,* which are otherwise found only in Panay Island in the Philippines. At least 15 species of the 20 known gymnosperms in Mindoro also grow in Mt. Halcon. Studies on the flowering plants of Mt. Halcon (Merrill 1907, Mandia 1998, 2004) reveal at least 320 herbaceous and woody species.

The summit flora alone harbors a number of strict Halcon endemics such as *Vaccinium woodianum*, *Vaccinium barandanum* var. *hutchinsonii*, *Eriocaulon brevipedunculatum*, and a new species of *Eleaocarpus,* which was later named after Dr. Mandia herself (*E. mandiae* Coode*).* Her study also contributed the first ever record for the Philippines of the very rare sedge *Oreobolus ambiguus* and the Himalayan aluminum-accumulating *Symplocos obtusa.* Details of the Mt. Halcon summit zone vegetation are provided in **Tables 4.2.1.a** and **4.2.1.b.**

Table 4.2.1.a. List of Species on Mt. Halcon Summit Zone (± 1,950- 2,582 m asl.). Species are arranged alphabetically by family. **(Source: Mandia, E. H. 1998. The Vegetation on the Northeastern Summit Zone of Mt. Halcon, Mindoro Island, Philippines [PhD dissertation]. College, Laguna, Philippines: University of the Philippines Los Banos. 210p. (Available at UPLB and DLSU-Manila Libraries)** ***(With permission from the author).***

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
ACANTHACEAE	*Strobilanthes halconensis* Merr.	Tall much branched herb
ANACARDIACEAE	*Buchanania sp.*[b]	Tall tree up to 6 m. in ht.
	Oncocarpus sp.(Semecarpus)[b]	Tall tree up to 6 m. in ht.
APIACEAE	*Trachymene saniculaefolia Stapf*	Small herb.
APOCYNACEAE	*Alyxia concatenata (Blanco)* Merr.	With variable habitat; low shrub on heaths, lianous in forest
AQUIFOLIACEAE	*Ilex sp.*[b]	Tall tree up 10 m. in ht.
	Ilex fletcheri Merr.	Microphyllous low shrub on heaths, slender tree in forests
	Ilex halconensis Merr.	Microphyllous slender tree up to 7 m. in ht.
	Ilex luzonensis Merr.	Microphyllous/ sclerophyllous low shurb.
ARALIACEAE	*Schefflera sp.*[a]	Lianous plant
ARAUCARIACEAE	*Agathis philippinensis Warb.*	Highly sclerophyllous tall tree up to 10 m. in ht.

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
ARECACEAE	*Calamus sp.*[b]	Climbing rattan; leaf crowns at canopy level
	Heterospathe sp.[b]	Low palm with massive short trunk
ASTERACEAE	*Ainslaiea reflexa* Merr.	Small herb
	Cirsium luzoniense Merr	Spiny rosette herb; encountered on seral grassland only
BALANOPHORACEAE	*Balanophora papuana* Shltr.[b]	Parastic plant on roots of L. flavescens
BAZZANIACEAE	*Bazzania sp.*	Terrestrial/epiphytic hepatics
BLECHNACEAE	*Blechnum capense (L.)* Schltr.	Stout, erect fern
CAMPANULACEAE	*Codonopsis javanica (Bl.)*Hook.f.[b]	Small, twining herb
CENTROLEPIDACEAE	*Centrolepis philippinensis* Merr.	Rare cushion plant
CHLORANTHACEAE	*Ascarina philippinensis* C.B. Rob.[b]	Small tree up to 5 m. in ht.; rather rare
	Sarcandra glabra (Thunb.) Nakai	Tall herb with bright red berries
CLADONIACEAE	*Cladina luzonensis (Ahti)* Gruezo[b]	Terrestrial lichen forming white soft thallus
	Cladonia didyma (free) Vain.[b]	Terrestrial lichen forming much stiffer thallus
CLETHRACEAE	*Clethra canescens* Reinw. ex Bl. var. *novoguineensis* (Kaneh. & Hatus.)	Small shrub forming rust colored inflorescence
CYATHEACEAE	*Cyathea sp.*	Small tree fern
CYPERACEAE	*Carex filicina* Nees forma *depauperata* Kukeyth.	Small shade- loving sedge
	Gahnia javanica Z & M. ex Mor.	Tussocky sun loving sedge
	Machaerina falcata (Nees) Koyama	Sedge with highly sclerophyllous blade
	Oreobolus ambiguus Kuk.[b]	Tufted sedge; new record for Halcon
	Schoenus curvulus F. Muell.[b]	Slender tufted sedge; new record for Halcon
	Schoenus melanostachys R. Br.	Slender sedge with stiff culm up to <60 cm in length
DAVALLIACEAE	*Leucostegia pallida* Metten.[b]	Terrestrial fern
DENNSTAEDTIACEAE	*Paesia elmeri*[b]	Medium sized tree fern; much hairy
DICKSONIACEAE	*Dicksonia mollis*[ab]	
DICRANACEAE	*Dicranoloma leucophyllum* (Lac.) Par.[b]	Terrestrial moss
	Dicranoloma sp.[b]	Terrestrial moss
	Pilopogon blumei (Doz. et Molk.) Broth.	Terrestrial moss; very abundant on heaths
DIPTERIDACEAE	*Dipteris conjugata* Reinw.	Sclerophyllous terrestrial fern
DROSERACEAE	*Drosera peltata* J. E. Smith	Small insectivorous herb
	Drosera spathulata labill.	Small, rosette insectivorous herb
ELAEOCARPACEAE	*Elaeocarpus sp.*	Tree up to 8 m. in ht
	Elaeocarpus argenteus Merr.	Tree up to 8 m. in ht.
	Elaeocarpus culminicola Warb.	Tree up to 7 m. in ht.; also as dwarf shrub on heaths
	Elaeocarpus octopetalus Merr.	Tree up to 6 m. in ht.
EPACRIDACEAE	*Styphelia suaveolens* (Hook.f.) warb.	Microphyllous/sclerophyllous
ERICACEAE	*Diplycosia heterophylla*(Bl.) *var. latifolia* (Bl.) Sleum.[b]	Sclerophyllous scandent shrub

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
	Diplycosia luzonica (A. Gray) Merr.	Shrub to small tree
	Gaultheria leucocarpa Bl. *var. psilocarpa* (Copel.f) Sleum.	Scandent shrub
	Rhododendron quadrassianum Vidal *var. rosmarinifolium* (Vid) Copel.f.	Shrub to small tree
	Vaccinium sp.	Low shrub; prob an underscribed species
	Vaccinium sp.	Low shrub; prob. an underscribed species
	Vaccinium barandanum Vid. *var. hutchinsonii* (Merr.) Copel.f.	Shrub to tree up to 7 m. in ht.
	Vaccinium halconense Merr.	Highly sclerophyllous tree up to 6 m. in ht.
	Vaccinium indutum Vid.[a]	Tree up to 6 m. in ht.
	Vaccinium microphyllum Blume	Microphyllous/sclerophyllous very low growing shrub
	Vaccinium whitfordii Merr.	Dwarf shrub
	Vaccinium woodianum Copel.f.	Shrub to small tree up to 5 m. in ht.
ERIOCAULACEAE	*Eriocaulon brevipedunculatum Merr.*[a]	Mound forming herb
EUPHORBIACEAE	*Homalanthus populneus* (Geisel) Pax	Shrub to small tree
FAGACEAE	*Lithocarpus* sp.	Sclerophyllous tree up to 6 m in ht.
FRULLANIACEAE	*Frullania* sp.	Ground/epiphytic wiry hepatics
GENTIANACEAE	*Gentiana luzonensis* Merr.	Very small herb flowering only when sun is up
GESNERIACEAE	*Tetradema rebrum* (Merr.) Schltr.	Delicate herb
GLEICHENIACEAE	*Dricanopteris linearis* (Burn.f) Underw. var. *linearis* Holtt.[b]	Terrestrial to climbing fern
	Gleichenia dicarpa R. Br.	Terrestrial, wiry fern indicative of aridity
	Gleichenia loheri Christ[a]	Terrestrial fern
	Gleichenia longissima Bl.[b]	Terrestrial to climbing fern
GOODENIACEAE	*Scaevola oppositifolia* R. Br.[b]	Scandent shrub
GROSSULARIACEAE	*Polyosma philippinensis* Merr.[b]	Sclerophyllous tree up to 7 m. in ht.
HALORAGACEAE	*Haloragis halconensis* Merr.	Stiff, sclerophyllous herb up to 60 cm. in ht.
	Haloragis micrantha (Thub.) R. Br.	Small caespitose herb
HYDRANGEACEAE	*Hydrangea lobbii* Maxim.[a]	Small shrub
HYMENOPHYLLACEAE	*Trichomanes meifollium* Bory	Very delicate filmy fern
HYPNODENDRACEAE	*Hypnodendron dendroides* (Brid.) Touw	Terrestrial moss on forest floor
ILLICIACEAE	*Illicium anisatum* L.[b]	Sclerophyllous tree up to 7 m. in ht.
IRIDACEAE	*Patersonia lowii* Stapf	Small herb; occurs only on Halcon among Phil. mountains
LAURACEAE	*Cryptocarya acuminata*[b]	Very slender shrub
LAURACEAE	*Persea philippinensis*[b]	Tree up to 6 m. in ht.
LEUCOBRYACEAE	*Leucobryum subsanctum* Broth.	Terrestrial moss
LILIACEAE	*Aletris foliolosa* Stapf	Small rosette herb
	Dianella javanica (Blume) Kunth.	Branched lily
LINDSEACEAE	*Lindsea odorata*[a]	Small terrestrial fern

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
LORANTHACEAE	*Korthalsella japonica* (Thunb.) Engler[a]	Small parasitic herb on llex, Eleaocarpus and Eurya spp.
	Lepeostegeres congestiflorus (Merr.) Merr.[b]	Parasitic woody plant up to 4 m. in ht; *Leptospermum flavescens, Vaccinium* spp. and *Myrica javanica* as hosts
LYCOPODIACEAE	*Lycopodium casuarinoides* Spring	Scandent clubmoss on scrubs and heaths
	Lycopodium cernuum L.	Erect or creeping clubmoss on heaths
	Lycopodium halconense Copel.	Erect, stiff, rosette like branching clubmoss
	Lycopodium hippuris Desv.	Small, erect clubmoss 10-12 cm. in ht .
	Lycopodium sp.	Slender, much branched climbing clubmoss in forests
MATONIACEAE	*Matonia foxworthyi* Copel.[a]	Sclerophyllous/terrestrial fern with fronds borne on terminal end of erect, stiff stipe; an endangered fern
MELASTOMATACEAE	*Medinilla cordata* Merr.	Small tree up to 6 m. in ht.
	Medinilla ramiflora Merr.	Slender tree up to 9 m. in ht. Occurs on scrubs as small shrub
	Melastoma sp.[b]	Much hairy shrub up to 2 m. tall found in scrubs
	Sarcopyramis nepalensis Wall.	Delicate small herb on forest floor
MYRICACEAE	*Myrica javanica* Bl.	Shrub or small tree up 5m. in ht.
MYRSINACEAE	*Discocalyx sp.*[b]	Shrub to a very tall slender tree up to 10 m. in ht.
	Myrsine amorosoana Pipoly	Sclerophyllous/microphyllous shrub to tree 2-7 m. in ht.
MYRTACEAE	*Decaspermum* sp.[b]	Largest/tallest tree on summit zone, 12 m. in ht., 59 cm. in DBH
	Leptospermum flavescens Sm.	Most common shrub/tree <1-7 m in ht.
	Tristania sp.[b]	Shrub to small tree up to 7 m. in ht.
	Xanthomyrtus diplycosifolia (C.B. Rob.) Merr.[b]	Much branched tree up to 7 m. in ht.
NEPENTHACEAE	*Nepenthes burkei* Masters	Scrambling pitcher plant; found in Halcon and Madiaas only
ORCHIDACEAE	*Bulbophyllum* sp.	Small terrestrial orchid
	Calanthe angustifolia (Bl.)Lindl	Small terrestrial orchid on forest floor
	Dendrochilum clemensiae Ames[b]	Small terrestrial orchid
	Dendrochilum latifolium Lindi.[b]	Small terrestrial orchid
	Dendrochilum microphyllum Ames[b]	Very common small terrestrial orchid
	Dendrochilum tenellum Ames	Small, slender terrestrial orchid
	Eria philippinensis Ames.	Large, terrestrial orchid
	Habenaria halconensis Ames	Very common small, terrestrial orchid
PANDANACEAE	*Freycinetia sp.*[b]	Large, highly conspicuous plant
PIPERACEAE	*Piper* sp.	Small herb on forest floor
PITTOSPORACEAE	*Pittosporum resiniferum* Hemsley	Tree up to 6 m. in ht.
PLAGIOGYRIACEAE	*Plagiogyria falcata* Copel.	Terrestrial fern with falcate pinnae; endemic on Halcon
POACEAE	*Isachne pangerangensis* Z.& M. var. *halconensis*[b]	Small tufted grass

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
	Miscanthus sinensis Anders.	Tall grass
	Yushania niitakayamensis (Hayata) Keng f.	Dwarf bamboo
PODOCARPACEAE	*Dacrycarpus cumingii* (Parl.) de Laub.	Shrub to tree <1- 8 m. in ht.; very common
	Dacrydium xanthandrum Pilger[b]	Shrub to a very tall tree <1-12 m. in ht.
	Falcatifolium gruezoi Laubf.	Very common shrub to tree <1-8 m. in ht.; with tapered crown
	Phyllocladus hypophyllus Hook.f.	Very common shrub to tree <1-6 m… in ht.
	Podocarpus glaucus Foxw.	Very common shrub to tree <1-10 m in ht.
	Podocarpus neriifolius D. Don.[a]	Tree up to 8 m. in ht.; rare
POLYGONACEAE	*Polygonum* sp.[a]	Spreading herb along stream bank
POLYPODIACEAE	*Crypsinus taeniatus* (SW.) Copel.[b]	Very common stiff terrestrial fern
	Selliguea feei Bory	Common stiff, terrestrial fern
PROTEACEAE	*Helicia cumingiana* Presl. var. *parviflora* Merr.[b]	Tree up to 7 m. in ht.
PTERIDACEAE	*Histiopteris incisa* (Thunb.) J.Sm.[a]	Terrestrial fern
ROSACEAE	*Rubus moluccanus* L.	Scrambling or creeping liane
RUBIACEAE	*Hedyotis elmeri* Merr.	Very common small herb
	Hedyotis eucapitata Merr.	Common small herb with capitate inflorescence
	Nertera depressa Banks & Sol. Ex Gaertn.[a]	Small creeping herb found along stream bank
	Psychotria luconiensis (Cham. & Schlect) F. Vill.[b]	Tree up to 6 m. in ht.
RUTACEAE	*Evodia reticulata* Merr.	Very common shrub to small tree <1-5 m. in ht.
SCHIZAEACEAE	*Schizaea malaccana* Bak.[b]	Very small stiff terrestrial fern; new record for Phils.
SMILACACEAE	*Smilax china L.*	Scrambling reticulately veined monocot
SPHAGNACEAE	*Sphagnum junghuhnianum* Doz.et Molk.	Peatmoss growing abundantly under *Miscanthus sinensis*
SYMPLOCACEAE	*Symplocos adenophylla* Wall.	Shrub to small tree <1-6 m tall.
	Symplocos cochinchinensis (Lour.) Moore[c]	Large tree up to 6 m. in ht.
	Symplocos filipes Noot.[a]	Shrub <2 m. tall; endemic on Halcon
	Symplocos lancifolia S & Z. [b]	Shrub to slender tree <1-7 m. in ht.
	Symplocos odoratissima BI. Choisy ex Zoll.[b]	Slender tree up to 7 m. in ht.
	Symplocos pendula Wight. *var. hirtistylis* (Clarke) Noot.[b]	Shrub to a large tree <1-8 m. in ht.
	Symplocos wikstroemifolia Hayata[b]	Shrub <3 m. tall with tapered stem & crowded terminal leaves; new record for Halcon
THEACEAE	*Adinandra* sp.	Shrub to small tree <4 m. in ht.
	Eurya amplexicaulis Moore[b]	Shrub <3 m. tall.
	Eurya coriacea Merr.[c]	Highly sclerophyllous shrub <2 m. tall.
	Ternstroemia sp.[b]	Shrub to small tree <1-5 m. tall.

FAMILY	SPECIES NAME & AUTHORITIES	NOTES
URTICACEAE	*Elatostema* sp.[a]	Spreading herb along stream bank
WINTERACEAE	*Drimys piperita* Hook.f.	Very common shrub <1-4 m. in ht.
ZINGIBERACEAE	*Alpinia* sp.	Large herb on forest floor

[a] Excluded from classification of community types; either occurring within the outlier quadrats or outside of any quadrats
[b] Not included in The Flora of Mt. Halcon (Merrill 1907)

Table 4.2.1.b. Geographic Distribution* of Plants Encountered on the Summit Zone of Mt. Halcon. (Source: Mandia E. H. 1998. The Vegetation on the Northeastern Summit Zone of Mt. Halcon, Mindoro Island, Philippines [PhD dissertation]. College, Laguna, Philippines: University of the Philippines Los Banos. 210p. (Available at UPLB and DLSU-Manila Libraries) *(With permission from the author)*

1. Endemic to Mt. Halcon

Eriocaulon brevipedunculatum
Habenaria halconensis
Hedyotis eucapitata
Lycopodium halconense
Plagiogyria falcata
Symplocos filipes
Vaccinium woodianum
Vaccinium barandanum var. hutchinsonii

2. Endemic to the Philippines
(In parenthesis are occurrences other than in Mt. Halcon.)

Ainsliaea reflexa (Luzon)
Astronia candolleana (Luzon)
Cryptocarya acuminate (Luzon)
Dencrochilum tenellum (Luzon, Leyte)
Dendrochilum clemensiae (Luzon, Mindanao)
Dendrochilum latifolium (Luzon, Mindanao)
Diplycosia luzonica (Luzon, Mindanao)
Elaeocarpus argenteus (Luzon)
Elaeocarpus culminicola (Luzon, Leyte, Mindanao)
Eria philippinensis (Luzon)
Eurya amplexicaulis (Negros)
Eurya coriacea (Luzon)
Evodia reticulata (Luzon)
Gaultheria leucocarpa (Mindanao, Negros, Luzon)
Gentiana luzonensis (Luzon)
Gleichenia loheri (Luzon)
Hedyotis elmeri (Luzon)
Hydrangea lobii (Luzon, Panay)
Llex 385 (cf. pachyphylla) (Luzon)
llex fletcheri (Luzon, Mindanao)
llex halconensis (Luzon, Mindanao)
Isachne pangerangensis var. halconensis (Luzon)
Lepeostegeres congestiflorus (in all higher Phil. mountains)
Medinilla cordata (Luzon, Panay)
Myrsine amorosoana (Luzon, Sibuyan, Mindanao)
Myrsine peregrina (Luzon, Mindanao)
Nepenthes burkei (Panay)
Persea philippinensis (Luzon, Mindanao)
Polyosma philippinensis (Luzon)

Psychotria luzonensis (Luzon, Masbate, Leyte, Panay)
Rhododendron quadrassianum var. rosmarinifolium (Luzon, Biliran)
Tetradema rubrum (Luzon)
Vaccinium halconense (Luzon, Mindanao, Negros)
Vaccinium indutum (in all higher Phil. mountains)

3. Malesian endemics (i.e. in addition to Phil. occurrence)

Agathis philippinensis (Celebes to Halmaheira)
Aletris foliolosa (Borneo, Sumatra)
Alyxia concatenata (New Guinea)
Ascarina philippinensis (Borneo, Celebes)
Balanophora papuana (Borneo, Celebes, New Guinea)
Blechnum capense (Malaya)
Calanthe angustifolia (Java, Sumatra, Malay Pen.)
Centrolepis philippinensis (Borneo, Celebes, New Guinea)
Clethra canescens var. novoguinensis (Celebes, New Guinea)
Crypsinus taeniatus (Malaya, Sumatra, Borneo)
Dacrycarpus cumingi (Sumatra, Borneo)
Dacrydium xanthandrum (throughout Malesia)
Decaspermum sp. (Borneo, Sumatra)
Dicksonia blumei (Celebes, Borneo, Java)
Diplycosia heterophylla var. latifolia (West Malesia)
Drimys piperita (Borneo to New Guinea)
Falcatifolium gruezoi (Malaya to Moluccas)
Gahnia javanica (throughout Malesia)
Haloragis halconensis (New Guinea)
Homalanthus populneus (throughout Malesia)
Matonia foxworthyi (Borneo, Moluccas, New Guinea)
Myrica javanica (throughout Malesia)
Phyllocladus hypophyllus (Borneo to New Guinea)
Pittosporum resiniferum (Borneo)
Podocarpus glaucus (Borneo, Moluccas, New Guinea)
Schizea malaccana (Borneo to New Guinea)
Symplocos conchinchinensis (throughout Malesia)
Symplocos odoratissima (throughout Malesia except New Guinea)
Vaccinium microphyllum (Moluccas)

4. Asiatic (i.e. occurs in Asia in addition to Malesian distribution)

Carex filicina forma depaupaerata (Cont. SE Asia to East Asia,)
Codonopsis javanica (Cont. SE Asia to East Asia)
Gahnia javanica (China Malesia)
Gleichenia longissima (Cont. Asia)
lllicium anisatum (Cont. Asia)
Lycopodium casuarinoides (Cont. SE Asia to E Asia)
Lycopodium cernuum (Cont. SE Asia)
Miscanthus sinensis (Cont. Asia to E Asia)
Smilax china (Cont. SE Asia to E. Asia)
Sphagnum junghuhnianum (Cont' SE Asia to E Asia)
Symplocos adenophylla (Cont. Asia)
Symplocos lancifolia (Cont. SE Asia to E Asia)
Symplocos pendula var. hirtstylis (Cont SE Asia)
Symplocos wikstroemifolia (Cont. SE Asia to E Asia)
Yushania niitakayamensis (Cont. SE Asia to E Asia)

5. Others (Australasian/Papuasian/Old World/New World)

Dianella javanica (Cont. SE Asia, Australia)

Dicranopteris linearis (Cont. SE Asia, Australia, Africa)
Dipteris conjugata (China, Siam, New Caledonia)
Drosera peltata (Cont. SE Asia, Australia, Tasmania)
Drosera spathulata (Cont. SE Asia, Australia, New Zealand)
Heloragis micrantha (Cont. SE Asia, Australia, New Zealand)
Helicia cumingiana (Indiana, Indochina)
Lindsea odorata (Cont. SE Asia to E Asia, Australia, Madagascar)
Nertera depressa (China to Java, Australia, NZ Hawaii, S. Am, Madagascar)
Rubus moluccanus (Cont. SE Asia, Australia, Pacific Islands)
Sarcandra glabra (Cont. SE Asia to Asia, India)
Trichomanes meifolium (Madagascar to New Caledonia)

6. Australia-derived types (i.e. largely developed in Australia)

Ascarina philippinensis
Centrolepis philippinensis
Gleichenia dicarpa
Haloragis halconensis
Leptospermum flavescens
Machaerina falcata
Patersonia lowii
Phyllocladus hypophyllus
Scaevola oppositifolia
Schizea malaccana
Schoenus curvulus
Styphelia suaveolens
Trachymene saniculaefolia
Tristania sp. (=Tristaniopsis sop.)

* **Includes only the fully identified species and is largely based on *Flora Malesiana* revisions.**

Mandia (1998) wrote the following to summarize and conclude her analysis of Mt. Halcon summit zone vegetation (Box 4.2.1.b).

Box 4.2.1.b. Summary and Conclusion of the study on "The Vegetation on the Northeastern Summit Zone of Mt. Halcon, Mindoro Island, Philippines"

(Source: Mandia E. H. 1998. The Vegetation on the Northeastern Summit Zone of Mt. Halcon, Mindoro Island, Philippines [PhD dissertation]. College, Laguna, Philippines: University of the Philippines Los Banos. 210 p. (Available at UPLB and DLSU-Manila Libraries) *(With permission from the author).*

- Mt. Halcon's northeastern summit zone extends between ± 1,950 to 2,582 m. asl. It is covered by low-growing vegetation interrupted by patches of forest and tall shrubberies. No part of the zone is substantially rocky as in other Malesian mountains.
- One hundred fifty-five species belonging to 116 genera and 78 families were documented on the summit zone. Of these, eight are endemic to Halcon, while 18 represent new records for the mountain. One species belonging to the genus *Elaeocarpus* is undescribed. Families represented by the most number of species include Ericaceae (12), Orchidaceae (8), Symplocaceae (7), Cyperaceae (6), Podocarpaceae (6), Lycopodiaceae and Melastomataceae (5). The greater bulk of the vegetation belong to the coniferous genera *Podocarpus, Dacrycarpus, Dacrydium, Phyllocladus* and *Falcatifolium* and the angiospermous genera *Leptospermum, Vaccinium, Rhododendron, Ilex, Symplocos, Polyosma, Styphelia* and *Drimys,* among woody plants. Most widespread herbaceous genera include *Hedyotis, Trachymene, Machaerina, Schoenus, Gahnia, Dianella, Patersonia, Nepenthes, Dipteris, Gleichenia,* and *Lycopodium*. The moss *Pilopogon blumei* tends to carpet the ground on the most open areas.
- Seven plant communities are recognized based on structure and floristic composition. These include a tropical subalpine forest (*Podocarpus glaucus- Polyosma philippinensis-Carex filicina* association); a tropical subalpine scrub (*Leptospermum flavescens-Rhododendron quadrassianum* association); *Leptospermum* scrub (*Leptospermum flavescens-Gahnia javanica* association); a tropical subalpine

dwarf scrub (*Podocarpus glaucus-Falcatifolium gruezoi* association); a tropical subalpine heath (*Styphelia suaveolens – Cladina Luzonensis* association); and a seral grassland (*Miscanthus sinensis – Sphagnum junghuhnianum* association).

- The tropical subalpine forest is observed to be three-layered with canopy height at 6 m. and few emergent species, projecting 2-6 m. above it. It is open-canopied, lacks buttress, generally thin-trunked, and composed of evergreen coniferous species admixed with broadleaved plants. The tropical subalpine scrub, on the other hand, is closed-canopied, two-layered, growing to less than 4 m. tall, and possesses a cauliform canopy conferred by the constant species *Leptospermum flavescens* intermixed with many ericads. The tropical subalpine dwarf scrub is relatively more open and shorter than the subalpine scrub. It is easily distinguished from the latter by its dominance of coniferous species. *Leptospermum* scrub differs from all other scrub formations by its dominance of a single species (*Leptospermum flavescens*), which grows farther apart. The two heath formations occupy the bulk of the summit zone and essentially differ from each other by the presence (subalpine heath) or absence (alpine heath) of coniferous species. The seral grassland is the simplest and most limited in extent among the plant community types. It exhibits features indicative of its past wooded condition, e.g. presence of species in common with the tropical subalpine forest and scrub, and the charcoaled or standing dried tree trunks.
- Based on Colgan's Index of Floral Diversity, the following plant community types contain almost identical floras: tropical subalpine heath and dwarf scrub, tropical subalpine forest and scrub, and tropical subalpine and alpine heaths. On the other hand, the limited seral grassland exhibits the greatest floristic dissimilarity with all the other plant community types.
- The distribution of the plant community types on the Halcon summit zone follows the mosaic of habitats conferred by both physical and edaphic regimes. Of the seven variables examined, altitude, soil depth, and soil temperature account for the greatest variation in the distribution of the community types. The other parameters (exposure, slope, soil pH, and parent rock) appear uniform for the plant community types. Thus, the tropical subalpine forest, scrub, dwarf scrub, heath and dominate the actual peak. *Leptospermum* scrub and subalpine scrub, however, occupy the fringes between shrubland and open heathlands from the base to nearly the peak of the summit zone. Plant community types dominated by tall shrubs and trees occupy areas with deeper and cooler soils while those dominated by dwarf shrubs, herbs and other cryptogams are found on shallow, warmer soils.
- As an adaptation to nutrient-poor soil and a cold but dry environment, majority of the plants exhibit a microphyllous/sclerophyllous habit as elsewhere. Certain plants *viz. Centrolepis philippinensis, Oreobolus ambiguus and Eriocaulon brevipedunculatum* form cushion while many geophytes exist, e.g. *Drosera spp., Patersonia lowii, Aletris foliolosa,* etc.
- In general, Halcon summit plants largely belong to the floristic region of Malesia (West Malesia, in particular). Asiatic representatives, however, outnumber Malesian ones at the generic level. This supports the hitherto believed origin of Mindoro from south mainland China. Characteristic Australian-derived plants also occur in Halcon, whose presence is largely attributed to a nutrient-poor soil that prevails on the summit zone.
- The floristic assemblage on the Halcon summit zone fits well within the tropical subalpine and alpine environments of the high Malesian mountains despite Halcon's relatively lower elevation. On Halcon, as on other high Malesian mountains, heath plants of the genera *Rhododendron, Vaccinium, Styphelia* and associated species, e.g. *Trachymene saniculaefolia, Haloragis micrantha, Centrolepis philippinensis, Oreobolus ambiguus* and *Schoenus curvulus* characterize an alpine environment while conifers (e.g. *Dacrydium, Dacrycarpus, Podocarpus spp.*) admixed with broadleaved trees (e.g. *Tristania, Polyosma, Ascarina, etc.*.) dominate subalpine zones.
- On comparing Merrill's (1907) description of the Halcon summit with the present study, it is found that Merrill did not truly reach the actual summit, which he described as forested. This study gathered that, instead of a forest, an extensive tropical alpine heath actually ascends to the summit. This study, thus, provides baseline information about Halcon's summit vegetation.
- The presence of plants interpreted as relics of tropical flora isolated by aridity in the Pleistocene-Recent Period, the general absence of grasses except for the microtherm *Isachne pangerangensis,* and their extensive occurrence on the most windswept exposed areas on the summit zone strengthen the tropical subalpine and alpine heaths as being climax community types, rather than transitional stages to woodland. Except for the seral grassland, the scrubs and forest formations can be regarded as natural vegetation units by virtue of their structure and floristic composition. The occurrence of charcoaled or dried but standing tree trunks in the seral grassland indicates the vulnerability of the zone to drought.

- In its entirety, Halcon's summit zone plant community types show greater structural and floristic alliance with the geographically closer to Mt. Kinabalu, Borneo than the more distant Mt. Wilhelm, New Guinea. This strengthens the West Malesian alliance of Halcon's summit zone plants.

In 2004, Mandia published her observations on the Mt. Halcon summit plant communities. The discussion, summary and conclusions are given in Box **4.2.1.c.**

Box 4.2.1.c. Mt. Halcon Summit Zone Plant Communities
Source: Mandia E. 2004. Gradient analysis of the plant communities on Mt. Halcon summit zone, Mindoro Island, Philippines. The Philippine Scientist 41: 91-116. *(With permission from the author)*

The plant communities on the Mt. Halcon summit zone generally thrive on shallow, acidic and consequently, oligotrophic soil. This type of soil results from slow weathering rock types (e.g. schist and quartz) superimposed by a leaching climate (heavy rainfall regime). The low soil temperature and the abundant presence of slowly decomposing sclerophyllous angiosperms and resinous species of gymnosperms (e.g. *Podocarpus, Falcatifolium, Phyllocladus, Dacrycarpus*, and *Dacrydium)* characteristic of the plant community types further enhance soil acidity. Plant communities with only few individuals of these gymnosperms, i.e. tropical alpine health, subalpine scrub and *Leptospermum* scrub, occur on less acidic soils. According to Jeffrey (1987), the mere presence of Ericales and Cyperales, plus the carnivorous species, is a fairly reliable marker of terrestrial oligotrophy. On the Mt. Halcon summit zone, Ericales is represented by 14 species belonging to the genera *Rhododendron, Vaccinium, Gaultheria, Diplycosia, Dimorphanthera,* and *Styphelia;* Cyperales by four species of the genera *Schoenus, Gahnia* and *Machaerina* and the carnivorous plants by species of *Nepenthes* and *Drosera.*

In most parts of the world, oligotropic soils generally support a depauperate vegetation like what has been observed in the moorland of Africa (Salt 1954), the *maquis* or *garrigue* of Mediterranean Europe (Tivy 1993), and the *kerangas* forests and subalpine heathlands of the Malesian mountains (Specht and Womersley 1979). In all these vegetation types, plants possess nanophyllous to microphyllous-sclerophyllous leaves. Beadle (as cited by van Steenis, 1979) considers scleromorphy as important to survival on low-fertility soils. According to Grubb (1971, 1977), microphylly (i.e. possession of leaves 225-2025 mm^2 in size, Gillison 1994) and sclerophylly (i.e. possession of thick leathery leaves) become more pronounced with increase in altitude, and are known to be related to the shortage of nitrogen and phosphorus. He further considered these features as adaptive mechanisms that tend to maximize CO_2 uptake relative to water loss. Based on Kitayama (1993) and Leuschner (2,000), these features are also indicative of aridity, which were, in turn, previously attributed to the effects of low temperature, high radiation and strong winds typical of high tropical mountain environments. The oligotrophic soil condition also explains the occurrence on Mt. Halcon of many species having Australia as their center of species diversity, e.g. *Leptospermum, Patersonia, Centrolepis, Phyllocladus, Schoenus, Trachymene, Haloragis, Styphelia, Gleichenia,* and *Schizea*. Outside Australia, these plants only occur in areas having the same nutrient-deficient soil characteristics of the continent (van Steenis 1979).

Of the parameters studied, altitude, soil depth and temperature were found to confer greater variation on the present distribution of the plant communities on the Mt. Halcon summit zone. Both physiognomic characteristic and floristic composition become increasingly simple as altitude increases. Conifers, which dominate the tropical subalpine forest and scrubs on the lower part zone, for instance, became increasingly reduced in size and number on the tropical alpine heath. Altitude was also found by Walker (1968) to be the main determinant of the distribution of plant community types on Pindaunde Catchment (4400 m. asl), Mt. Wilhelm, New Guinea. Whittaker (1953) noted that altitudinal gradient presents a complex pattern of vegetation, soil and climate. The composition of Afroalpine plant communities on Mount. Kenya (4900 m. asl), for instance, is correlated with altitude, soil moisture, slope, and the local *Senecio keniodendron* stand height (Young and Peacock 1992). Soil depth and temperature, on the other hand, correlate well with the structural and floristic simplicity along the altitudinal gradient on Mt. Halcon. According to Eyre (1968), soil depth decreases as altitude increases since increasing steepness entails removal of topsoil by soil creep so that the shallow condition and permanent immaturity of soil are ensured. Such shallow soils on steeper slopes support the extensive tropical alpine heath that ascends to Halcon's actual peak. On sheltered sites at the lower portion of the summit zone, however, e.g. valley floors, gullies and large crevices, soils tend to accumulate, thus, promoting development of forest and

scrub formations. Conversely, as soil depth decreases, its corresponding temperature increases since unweathered minerals can hardly hold moisture but easily absorb radiation. The effects of parent rock material on the vegetation, therefore, remain strong as unweathered minerals are kept near the surface. On Mt.. Kinabalu (4101 m. asl), Borneo, however, Kitayama (1992) considers edaphic factors, mainly temperature, as exerting a secondary effect on vegetation after climate.

Exposure or wind influence appears largely manifested on the dwarf almost prostrate habit heathland plants, particularly *Leptospermum flavescens*. According to Eyre (1968), wind speed is the only significant factor in the original distribution of climatic climax heath while Jeffrey (1987) regarded treeless heathlands as climax community types rather than transitional stages to woodland. Of the 17 families of heathland taxa in subhumid Australia as listed by Specht (1981), 10 are represented on Halcon. This collection of taxa may be interpreted as a relic of tropical flora isolated by aridity in the Pleistocene-Recent period (Jeffrey 1987). However, the heathlands on the Mt. Halcon summit zone may not be climax communities as could be seen below. Nevertheless, it is interesting to note that these heathlands occur very extensively on Mt. Halcon. Extensive alpine grassland, on the other hand, occurs on Mt. Pulog, northern Luzon, while a community of kremnophytes (=volcanic plants) inhabits the summit area of Mt. Apo, central Mindanao, the Philippines' highest peak.

In 1907, Merrill described the actual summit of Mt. Halcon as a somewhat flattened ridge covered with a dense growth of stunted trees <10 feet in height, with branches festooned with up to 15 inches of moss. This succeeded a well-developed heath at 2400 m. asl. As shown above, this structural configuration of the summit vegetation is different from our present observation. The forest and scrub formations on the summit zone might have been more extensive in the past than they are at present as could be deduced from the observations of the Mangyans roaming the area in search of rattan. There are also tell-tale signs of the many standing tree ghosts (dried trees) and charcoaled trunks on the very extensive open areas observed by this author. Extensive fires could have occurred several times in the past that eventually changed the landscape of the summit zone. That fires, natural or anthropogenic, are occurring on the summit zone is clearly evident by the episodes of extensive fires in 1983 and 1998, as well as the isolated fires occurring every now and then on parts of the summit zone, the latest being documented in April 2004. The highly resinous nature of the vegetation and the occurrence of easily drying sedges make the zone highly vulnerable to fire. Once the shallow soil becomes stripped of vegetation as what fire does, erosion ensues exposing the parent rock. Mosses eventually carpet the ground promoting growth of only shallow but extensively rooted herbs and low shrubs characteristic of the heathlands. The physico-edaphic conditions prevailing towards Halcon's actual summit, however, could have been especially selected for the occurrence of an alpine vegetation that is floristically different from its subalpine counterpart. Further investigation of these selective factors would be an interesting topic for future research.

On Mt. Kinabalu, Beaman and Beaman (1990) opined that catastrophic selection in speciation brought about by the regular occurrence of the El Nino Phenomenon coupled with the characteristic edaphic condition may account for the high endemism observed on Malesia's highest peak. Halcon summit zone, just about 800 km from Kinabalu, also exhibits high endemism with its eight currently known endemic flowering plant species. But whether this high endemism on the Halcon summit zone is brought about by the regular drought and fire occurrences has also yet to be uncovered by further study.

In summary, the floristic and environmental information obtained from 94 out of 104 quadrats (10 quadrats being outliers) laid on the windward slope of the Mt. Halcon summit zone (±1950-2582 m. asl) revealed that the mosaic spread of the recognized plant community types follows the mosaic of both physical and edaphic conditions currently characterizing the zone. Of the seven parameters investigated that include soil pH, exposure, slope, parent rock, altitude, soil depth and temperature, the last three were found to cause greater variation on the present distribution of the plant community types as determined by both indirect (DECORANA) and direct (DCCA) gradient analyses. All community types share the lower part of the zone except for the very extensive tropical alpine heath, which ascends to the actual summit. *Leptospermum* scrub, which thrives well on steeper, more exposed slopes, however, occur in small patches on both lower and upper parts of the zone. The tropical subalpine forest and scrubs generally occur where soil is deeper and cooler. On the other hand, both tropical subalpine and alpine heaths occur on relatively shallower and warmer soils. All plant community types thrive on acidic, oligotropic soil that is underlain by a hardpan of slow weathering white quartz and mica schist.

However, this current mosaic of the plant communities on the Mt. Halcon summit zone is presumably configured by the extensive fires, natural or anthropogenic, that repeatedly disturb the summit zone. More long term studies are, therefore, recommended to better understand the dynamics of the Mt. Halcon summit zone ecosystem.

4.2.2. Fauna

The Mindoro faunal region contains some 250 species of birds, 45 species of mammals, 15 species of amphibians, and more than 60 species of reptiles (half of the species are endemic to the Philippines). About 35 are taxa considered to be endemic only to the region, while 17 are recognized as Mindoro Island endemics. Among the most notable of these island endemics are the majestic Tamaraw *Bubalus mindorensis*, and the critically threatened Mindoro Bleeding-heart *Gallicolumba platenae*. New island records are being added, and new species are still being discovered. At present, two new species of mammals and one amphibian await formal description by biologists. During the island-wide rapid assessment alone, there were a total of 99 species of butterflies found, with 17 species considered to be endemic to the region (such as *Mycalesis tagala mindorana,* and *Tanaecia alpheda mindorensis*). An endemic freshwater fish, locally known as 'pait' *Barbus* (Puntius) *hemictenus,* was known to occur in the rivers near Naujan Lake.

Of the different priority project sites of MBCFI and KBAs in Mindoro, Mt. Halcon has the most number of threatened endemic faunal species, last pegged at 16 species, of which three are classified as critically endangered, four endangered, and nine others as vulnerable. One of the most important species found in Mt. Halcon is the Tamaraw (*Bubalus mindorensis*), the largest endemic mammal in the Philippines and known to exist only in Mindoro. Another endemic species of Mindoro, the Mindoro climbing rat (*Anonymomys mindorensis*), is confined to Mt. Halcon Range and Ilong Peak. The Large Mindoro forest mouse (*Apomys gracilirostris*) is another endemic species recorded in Mt. Halcon, while the endangered Mindoro shrew (*Crocidura mindorus*) only occurs in Mindoro and Sibuyan Islands.

Most endemic bird species of Mindoro, classified as threatened species by the IUCN and the DENR, can also be found in Mt. Halcon. These include the critically endangered Mindoro bleeding heart pigeon (*Gallicollumba platenae*), the Black hooded coucal (*Centropus steerii*), the endangered Mindoro tarictic hornbill (*Penelopides mindorensis*), and the Mindoro imperial pigeon (*Ducula mindorensis*). Some important bird species recorded in Mt. Halcon are listed in **Table 4.2.2.**

Table 4.2.2. Some Important Bird Species Recorded in Mt. Halcon

Species	Conservation Status	Notes
Philippine Hawk-eagle *Spizaetus philippensis*	Threatened	Possible sightings in 1991
Mindoro Bleeding-heart *Ducula mindorensis*	Threatened/ Restricted Range	Recorded from several localities and found to be not uncommon during a survey in the 1990s
Spotted Imperial-pigeon	Threatened	Recorded from several localities, most

Ducula carola		recently in 1964, but could not be found during a survey in the 1990s
Black-hooded Coucal *Centropus steerii*	Threatened/ Restricted Range	Specimens have been collected in several localities, most recently in the 1950s
Mindoro Scops-owl *Otus mindorensis*	Restricted Range	Recorded from several localities and found to occur at high densities during a survey in the 1990s
Mindoro Hornbill *Penelopides mindorensis*	Threatened/ Restricted Range	Specimens have been collected, most recently in the 1930s, and reported from there by residents in the 1990s
Mountain Shrike *Lanius validirostris*	Restricted Range	Recorded in Mt. Dulangan
Ashy Thrush *Zoothera cinerea*	Threatened/ Restricted Range	Specimens were collected in or near Baco River in the early 20th century
Scarlet-collared Flowerpecker *Dicaeum retrocinctum*	Threatened/ Restricted Range	Recorded from several localities and found to be one of the most common bird species during a survey in the 1990s

Source: Haribon Foundation and Birdlife International. Directory of Important Bird Areas: Key Conservation Sites in the Philippines. 2001.

4.2.3. Habitat and Life Support Function

No available studies have been able to clearly describe the different habitat types of Mt. Halcon. But based on the land cover type presented in this plan, however, it can be assumed that the terrestrial forest remainsthe most dominant habitat in the area. The forest can further be classified into closed and open canopies, which also includes secondary and logged over areas. There are also woodlands mixed with shrubs in Mt. Halcon.

Another habitat type in Mt. Halcon that requires further study is its inland waters, which represents only about .10% of the different watersheds. Similarly, there are also natural grasslands and natural barren types of habitats in Mt. Halcon, while certain areas are already devoted to agriculture, cultivated with annual and perennial crops.

Aside from its amazing flora and fauna, Mt. Halcon is among the last frontiers for the remaining forests in Mindoro Island. Out of the 25,200-hectare. coverage of the CNA conducted by MBCFI in Mt. Halcon, about 85% (approximately 21,420 has.) is vegetated with various forest types. Of the total area, 10% and five percent are brushlands and grasslands, respectively.

Mt. Halcon is the headwater of numerous river systems that supply water sources for agricultural, industrial, and domestic uses. The protection of this critical watershed of Oriental Mindoro is therefore, of paramount importance to the sustainable development of Mindoro Island because of its function as a life-support system.

4.3. Socio- Cultural and Economic Conditions

4.3.1. Cultural Significance of Mt. Halcon Range

Mt. Halcon is home to two of the eight ethno-linguistic groups in Mindoro Island - the Alangan Mangyan and the Iraya Mangyans. The Alangan Mangyans, perhaps the

most primitive among the Mangyan groups (*Mandia, 2004*), still wear clothes they make out of bark, and use the same material for roofs and walls. Mt. Halcon is known to Mangyans as "*Siyaldang,*" meaning Sacred Mountain.

The Mangyan Tribes, in general, have preserved their original customs, beliefs, and practices through the years, and have maintained the traditional ways of life that are deeply rooted in love, care, and the enrichment of land and nature *(The Mangyans of Mindoro, 2007*). This in spite of the assimilation of a number of tribe members to non-IP culture. Some Mangyan Tribes strongly refuse to embrace lowland culture, and still practice their primitive ways, wandering around in the remaining forests. There are Mangyans who avoid interaction with non-IP communities, and continue to rely on forests for food. However, the depletion of forest resources has led several Mangyans to adopt lowland agriculture and engage in farm labor with lowlanders.

Mt. Halcon is covered by Certificate of Ancestral Domain Title (CADT) applications of the Iraya and Alangan Mangyan Tribes. The Samahan ng Nagkakaisang Mangyan Alangan (SANAMA) in Baco, San Teodoro, and Naujan has an application for CADT, covering more than 32,000 has. The Mal-anggatan Iraya Paranawan Kakuyayan, Inc. (MIPK), another organization of the Iraya Mangyan, has a separate CADT application, estimated at about 38,082 has of Mt. Halcon, extending up to Mt. Malasimbo in Puerto Galera municipality. The detailed description of the Alangan, based on the study of Mandia, is presented in **Box 4.3.1.**

Box 4.3.1. The Alangan Mangyan of Mt. Halcon
Source: Mandia E.H. 2004. The Alangan Mangyan of Mt. Halcon, Oriental Mindoro: their ethnobotany. Philippine Quarterly of Culture & Society 32:96-117. (With permission from the author)

INTRODUCTION

The Alangan (henceforth Alangan) constitute one of the seven major ethnolinguistic groups in Mindoro Island who all call themselves Mangyan (Lopez 1976, Romualdez 1978). They belong to the northern group of Mangyan that include the Batangan and the Iráya as conveniently grouped by Tweddel (1977) based on the relatedness of their languages. Leykamm (1979) indicated that the Alangan refer to themselves as *taga*-Alangan (from the Alangan) in the same manner that the Batangan Mangyan who occupy the Batangan Mountain, as well as the headwaters of the Batangan River, refer to themselves as *taga*-Batangan (from the Batangan). Alangan is the local name for a river coming down from the upper slopes of Mt. Halcon; its fertile valleys are occupied by a considerable number of Mangyan. The term *alangan* originates from the root word *alang*, a tree trunk used as a bridge. A story has it that an *alang* was placed by a forefather across the swollen river when he was trapped on its far side in his swidden. In time, the river became known as *pag-alangan* (where the bridge is), and then its name was eventually shortened to Alangan. Leykamm (1967) wrote that in scientific research, all Mangyan living on the eastern and western slopes of Mt. Halcon are referred to as the Alangan Mangyan, although according to Maceda (1967), the natives themselves refer to *alangan*-Mangyan as those living in the mountains in contradistinction to the *latag*-Mangyan who live in the plains.

The northern group (Alangan, Batangan and Iraya) exhibits a more primitive way of life compared to the southern Mangyan (Hanunuo, Buhid, and Ratagnon). The Batangan and Alangan groups, for instance, still make and wear bark cloth, and in earlier times, subsisted mainly on hunting, gathering of edible forest products, and the "intermittent cultivation" of root crops (Landicho 1952), Lebar 1975:73. They have occupied the much higher mountains in Mindoro up to the present, where some are believed to still lead a semi-nomadic existence. The Batangan inhabit the higher altitudes, such as Mt. Baco (2488 m. asl) and Mt. Wood (2000 m. asl) (Pennoyer 1977). The Alangan, as mentioned above, are confined to Mt. Halcon (2,587 m. asl), Mindoro's highest peak and considered third in height among Philippine mountains. A

good number of both tribes, however, have now settled at the foot of their respective mountains. These groups can be located on maps made by Conklin, Tweddell, the U.S. Army Map Sevice, and Barbian, all in Barbian (1977), and on the map of *The Filipino People* (Fox and Flory 1974).

Morphologically, the Alangan are decidedly Malay, with brown to dark brown skin, straight to somewhat wavy hair, prominent cheekbones, slightly slanting eyes, and somewhat flattened noses with oftentimes frontally visible nostrils, although some have narrow noses. Like other Mangyan groups, their lean bodies and unusually sturdy feet enable them to move with uncanny agility through the thick forest. Compared with the southern Mangyan, however, the Alangan are generally shorter in stature, but are taller in constant with the northern group, the Iraya who are of Negrito descent.

Research on plants used by the Mangyan began with Bartlett (1940) who listed the medicinal plants exploited by the Iraya. Sulit (1953) compiled in dictionary form the names of 137 plants useful to the Hanunuo. Conklin (1995) presented a very comprehensive analysis of plant culture relationship among the Hanunuo. Schmutz (1971) made a brief study of the medicinal plants also of the Hanunuo. Maceda (1967) prepared a brief report on the northern Mangyan, mentioning certain plants of importance to the Alangan. Pennoyer (1977) presented the plants and ritual complexes among the Tau-buid. Leykamm (1979) covered sickness and healing among the Alangan, describing the role of certain medicinal plants used against the spirits of the forest and the dead believed to inflict sickness. Batallones *et al.* (1992) documented the useful plants of the Buhid.

The present report concerns the vascular plants, native or introduced, considered by the Alangan as significant to them. By "cultural significance" is meant the manner by which plants are utilized or regarded as sources of food and drink, stimulants, body care and adornment, construction material, firewood and cordage, as well as aspects related to their beliefs and musical expressions. Being primarily ethnobotanical, this study does not dwell exhaustively on the Alangan culture per se, but merely includes aspects which bear on the cultural significance of the local flora.

RESULTS AND DISCUSSION

Dwellings

Each of the sparsely locate settlements of the Alangan has a certain individuality in its type of dwelling and degree of acculturation. Based on the degree of cultural change, the villages visited by this researcher may be grouped into three: "deep" and more isolated, slightly acculturated, and more acculturated.

The deep and more isolated Alangan are typified by those living in Basal and Bugayan. Their settlements are located high up in the mountains at about 600-700 m. asl, securely positioned on the gentle sides of the mountains. They appear centered amidst vast swidden sites in all stages of development, from those in cultivation to those returning to forest conditions. Only a litter farther away from their swidden sites is relatively untouched primary forest. Factors such as the heavy infestation of leeches (*limatek*) and the steepness of the trails leading to the settlements contribute to the seeming isolation of these villages from the modern world.

A community consists of 10-15 families living in single thatched huts called *balay-kaloy* or *paykamalayan* (big house, communal house). Kikuchi (1975) described them in much detail, basing his description on the balay-kaloy in Bugayan. In Basan, this hut measures about 9m. x 5m. and is elevated about 4-5 feet from the ground. Thatch and walls are made of shingles from the bark of certain large trees such as *balagayan* (*Toona calantas*), *lauan-puti* (*Shorea contorta*) and *tangili* (*Shorea polysperma*). The floor is made of small logs approximately 10 cm. in diameter and held together by rattan or the strong barks of cetain trees. As described by some informants, balay-kaloy constructed by the Alangan living in the lower foothills may have cogon (*Imperata cylindrica*) and checker-woven palm frond shingles for roofs and walls, respectively, with evenly spaced bamboo slats for flooring. House posts and rafters are obtained from the straight boles of *anagan* (*Alstonia macrophylla*), *anuling (Pisonia umbellifera), bangkal (Nauclea junghuhnii), bulala (Glochidion sp.), butur (Syzygium mindorense), do-a (Terminalia foetidissima), kamagong (Diospryros discolor), lauan-puti (Shorea contorta), tangili (Shorea polypsperma), kolop (Ficus sp.), malakape (Fagraea racemosa)*, and *magurilao (Neonauclea puberula)*. Access to the interior of a house is provided by a ladder made of a pair of medium-size posts and having two to four steps made of smaller branches held together by rattan or other strong cordages. The house has only one door, and only

one small window, if any.

Another distinctive feature of the dwelling in Basal is the absence of any partition inside. The unevenly elevated floor is made of smoothened logs. Each family is allocated a space along the sides of the house; a central portion is left unoccupied for communal use. To know how many families are living together, one merely has to count the ever-present mats that can be seen spread over dried fronds of leka (*Dicranopteris linearis*) or laksak (*Asplenium nidus*), and the individual hearths (*boris)* that are kept smoldering all day and all night. In this communal house, privacy is absolutely absent. The housekeeping appears disorderly to the lowlander.

Sinay, Bugnay and Sangilen villages, on the other hand, fall into the second category of villages. Inhabitants no longer live in a *balay-lakoy* dwelling but in individual houses. Leykamm (1979) wrote that the Sangilen people used to live in one big house but later on decided to put up individual houses to show to the Tagalog that they are composed of many families. Although the tree bark may still be used for walling, garasun (*Imperata cylindrica*) is commonly employed for roofing, and bamboo splits for flooring. One marked characteristic of Sinay village is the presence of a house foundation beside almost every occupied house. Repair of damaged houses is not done. Families who realize that their old house can no longer protect them from the rains hastily finish and subsequently transfer to a new house erected over a foundation prepared beforehand.

Those living in Paitan, the Alangan little town, and in Capernaum are more acculturated. Many facets of their culture show evidence of recent acculturation. Concrete houses with roofing of galvanized iron sheets are common.

In addition to their usual dwelling within a village, most Alangan also have a temporary shelter in their swiddens. These are much smaller that their long or individual houses although made of the same light materials. They also construct still more temporary shelters when they go out to hunt or trap animals; the leaves of laksak and various species of bananas (*Musa* spp.) are then commonly used as roofs and walls, and sapling hardwood trees as posts.

Some Alangan use the piled fronds of several fern species, namely *leka, laksak,* and *bangkalayan (Dryopteris spp.*) to serve as bed cushions or pillows. They spread wide strips of *tangili* bark over these fronds and sleep directly on them, or they may spead a mat (*amak*), woven out of rattan splits called uwai amakun (*Calamus* sp.), on top of the bark strips in addition.

Swidden Agriculture

Alangan are primarily horticulturists. Although they roamed the forest in search of food and game in earlier times, they also subsisted on the intermittent cultivation of root cops. Today, each family still cultivates in its own swidden, the size of which usually ranges from one-half to two hectares, depending on household size. Formerly, the Alangan cleared a new field every one to three years, in order to let the old field lay for five to 10 years, as is also common practice among the Tau-buid (Pennoyer 1977). The clearing-fallowing cycle, however, is now seldom practised as their swiddens have become semi-permanent due mainly to increase in population, forest denudation, and government restrictions. Nevertheless, whenever they open up a new swidden, the following age-old stages are observed.

Selection of Site (December-January). Steep forested slopes are usually preferred for swiddening. Before finally deciding to clear a specific area, however, the Alangan first exert effort to find out whether someone has died there in the past. This is usually done by simply asking around the village. It is believed that anyone who clears such an area would meet the same fate as that person. If no death is known to have occurred there, the next step is to insert a hollowed-out bamboo tube about one and a half meters long into the ground and then pull it out again. If soil fills up the tube, the site is considered favorable for farming.

Cutting and Trimming (January-March). As soon as a good site has been found, the hard task of cutting and trimming the vegetation begins. This is the *mag-aagay* process that starts with the cutting of the underbrush and smaller trees. Wild edible fruit-bearing trees are usually spared. Big branches are hacked off (*agsalay*) to hasten the process of drying.

This stage is usually hastened by group labor. Every member in the family who is old enough to help is involved. Cutting of the underbrush and small trees is commonly done by women while men do the felling of big trees. Sometimes, an exchange of labor system (*yakay*, *tagsaknungan*) is brought into operation, wherein five to 10 cultivators work together in one field, then move on to the next field, continuing until all prospected sites of the members are cleared. Bolog and single-bladed axes are the only implements used.

Burning and Re-burning (March-May). When felled trees are finally dry, burning (*agparaot*) of the swidden can begin. The place where the fire is ignited usually depends on the direction of the wind. If the wind blows southward, they first fire the spot located most upwind, so as to burn all the felled trees, if possible. Unburnt rubbish is piled in one place (*agtimbon*) and set on fire once more. This process of clearing the ground (*agdurok*) ensures that pests such as rats are extinguished. Trees meant to be spared from the fire are saved by wrapping banaba fresh leaves and petioles.

Planting and Cultivation (May-October). If a field is merely intended for growing root crops, only women are involved in the planting and cultivation of the field. Men may help occasionally but this is generally regarded as a woman's task. If, however, the cleared area is intended for growing upland rice, as is usually the case, men, women and children are involved. Sometimes, the owner may butcher a pig and offer it to the workers before planting. Planting is done through the *agbakal* or *agbalawang* process, i.e. through the holing of the ground. *Bakal* or *balawang* implements are usually made of the hard trunks of *bunglas* (*Tristania decorticata*), *badbad* (*Aralia sp*.), and *banutun* (*Hopea plagata*).

Perennial plants like fruit-bearing trees are usually planted along the borders where they serve as a field boundary. They are also planted at wide intervals within a swidden wherein rice plants and sweet potatoes are the main crop; they grow to fill up the entire field. The Alangan weed and protect their crops from domesticated animals that may go astray by fencing the periphery of the field. During the long cultivation period, they visit their swiddens regularly.

Aside from several varieties of upland rice and sweet potatoes (*kamuti, Ipomoea batatas*), cassava (*Manihot utilissima*), butig (*Colocasia esculenta*), galyang (*Xanthosoma violaceum*), tangulan (*Dioscorea alata*), corn (*Zea mays*), and banana (*Musa sapientum*) are also considered important food and cash crops. Other cultigens include squash (*Cucurbita maxima*), various species of beans (*Vigna radiata, V. sesquipedalis, Psophocarpus tetragonolobus, Cajanus cajan*), eggplant (*Solanum melongena*), tomatoes (*Lycopersicon esculentum*), okra (*Abelmoschus esculentus*), sugarcane (*Saccharum officinale*), pineapple (*Ananas comosus*), and such fruit trees as jackfruit (*Artocarpus heterophylla*), citrus (*Citrus microcarpa, C. nobilis, C. Maxima, C. reticulata*), avocado (*Persea americana*), rambutan (*Nephelium lappaceum*), lansat (*Lansium domesticum*), coffee (*Coffea robusta, C. arabica*), and coconut (*Cocos nucifera*). Papaya (*Carica papaya*), which abounds in swiddens, is usually not planted but is dispersed by birds.

Harvesting (October-November). Like planting, harvesting is also considered the job of women. Women harvest the crops and men provide the firewood. After the hard task of felling the big trees, men are already relatively free of swidden work. Women attend to the swidden while men wander through the woods, trapping and hunting animals.

Re-cleaning (November-December). Soon after the rice plants have been harvested, all stalks are cut (*aggusad*). Sweet potatoes and other root crops are then planted and remain the major crops for two to three years.

Fallowing. As the Alangan realize the rapid depletion of soil fertility, they do not cultivate the same field for long. The site is abandoned for five to 10 years until secondary vegetation appears, and the place can be opened again for cultivation.

Fishing, Trapping and Hunting

These are well described in Maceda's (1976) account. Some plants, however, are preferred by the Alangan for setting traps and bird blinds. The flowering branches of *baltuntong (Clerodendrum macrostegium*) and *tigaw (Callicarpa candicans)* are best for bird blinds, whereas the fruiting branches of *likso* (*Artabotrys* sp), whose fruits are edible, are best for trapping wild cats. The roots of tubli (*Derris elliptica*), tuba (*Croton tiglium*), sibalao (*Derris heptaphylla*), bayati (*Anamirta cocculus*), and Catuiran Rivers,

particularly during the dry season when waters are low, to poison and stupefy the many fishes, shrimps and eels found there. Now, they seldom set the balatik (spear trap) because wild game has become scarce in the forest. When they do, however, they use saplings of hardwood species bound together by strong cordages. The spear (sibat) is usually made of a strip of bulo (*Gigantochloa laevis*), about 5 cm. in thickness and a meter long. It is sharply pointed at one end and oftentimes dipped in a poisonous substance found in plants. According to Maceda (1967), this technology has been borrowed from the lowland settlers. To supplement their protein requirements, some Alangan in Sinay catch snakes in lowland rice fields with just their bare hands.

Gold Panning

Among residents in Paitan, Sangilen and Capernaum, gold panning in the nearby Dulangan River is a common scene during the dry season. Gold dust is usually sold in Calapan City, some 25 km. away. Maceda (1967) mentioned that there are also Alangan who are engaged in gold panning in the Binaybay River.

Trade in Forest Products

Important tools like bolos, pots and axes are obtained by selling or bartering cash crops. Certain cordage materials such as rattan, *agnaya* (*Stenochlaena palustris*), amlong (*Raphidophora* sp.), and *lambud* (*Lygodium circinnatum*); and decorative orchids, like *Dendrobium* spp, *Phalaenopsis* spp., *Bulbophyllum* spp., *Appendicula* spp., and other epiphytes such as *Asplenium nidus* and *Lycopodium* spp are traded. Some Alangan are engaged in making brooms out of *alinaynay* (*Phragmites vulgaris*), winnowing trays from split bamboo culms, and hammocks and baskets from the different species of rattan. Those living deep in the forest usually only deal with Alangan middlemen who bring their products to market and obtain needed goods for them. The currently active commerce in handicrafts, mostly baskets, and raw forest products has been facilitated by the opening of a cooperative store in Paitan.

Forest Foods

Although several varieties of *kamuti* are regarded as the major food of the Mangyan (*kanin ng Mangyan*), several sources of starch also serve as seasonal staple food. Cassava (two varieties) and *galyang* are usually taken along with *kamuti* during May-June; corn (two varieties) in May-July; *butig* (three varieties) in July-August; rice (20 varieties) in October-November; tangulan (10 varieties) in November-February; and bananas all year round.

To supplement their meals, they forage daily in the forest to gather wild vegetables such as the young fronds of balika (*Athyrium esculentum*) and agnaya, young leaves of barakuay (*Solanum nigrum*), *libas* (*Spondias pinnata*), the aroids mamba (*Schismatoglottis* p.) and *salidang* (*Schismatoglottis calyptra*), and the leaves and fruits of apalya (*Momordica charantia*) and *tibyayong* (*Trichosanthes cucumerina*). These plants grow abundantly along riverbanks and streambanks and on previously cleared areas. Fruits are taken from raspberry or *bulnana* (*Rubus fraxinifolius*), *boybuli (Euphoria didyma), dinggin (Dillenia philippinensis), kabagyo (Passiflora foetida)*, *do-a* (*Terminalia foetidissima*), *uloi (Artocarpus odoratissima*), *bangulo* (*Litsea garciae*), *bugaran (Litsea spp*), *saransok (Melastoma polyanthum), tibalya (Garcinia* sp.), *ikik (Curculigo sp*.), and *parapad (Kolowratia elegans*). In times of famine due to crop failure, the Alangan search the forest for wild sources of starch, such as *namu* or *laga-on* (*Dioscorea hispida*), bantuon (*D. bulbifera*), and labey (*D. divaricata*).

Namu, which only grew wild before, is now a semi-cultivated plant, as the Alangan cut the mature tubers and scatter them along the sides of their swiddens without further cultivation. If one sees a good growth of *namu* in the forest, then the place has likely been cleared before. The poisonous character of the tubers is very well understood by the Alangan from the experience of their ancestors who fell unconscious for hours after eating the yellow tubers even though they are merely boiled. When asked how they learned the right preparation, they would simply say: *Hindi namin alam yan dati pero ganito ang turo sa amin ng aming matatanda* (We did not know that before but this is what our forefathers taught us):

> Namu will be your food in times of famine, as this is not eaten by any animal. Before securing the tubers, prepare first a wooden container (*biyawan*) by hollowing out a large tree trunk. When the tubers have been secured, peel them very well and slice them thinly using a bolo that is firmly

placed on a flat wooden base (*balutak*). Place the sliced tubers in the *biyawan*, add water to the brim then cover with large leaves. When there are already bubbles appearing on the surface and the tubers are no longer brittle, take them out from the biyawan, wash them several times, then soak in fresh water overnight. You can boil it the following day, but before eating, have one among you try it first.

The aerial tubers of *bantuon* are not usually eaten by the Alangan because of their bitter taste. But in times of food scarcity, they are gathered and prepared in the following manner: they peel each tuber, soak it in fresh water overnight before it is boiled. The bitter taste is said to disappear and the taste becomes like that of a potato. Although *labey* provides little bulk food in comparison to the amount of labor expended in its digging, it is still a much sought-after wild yam. Oftentimes, a long tuber is never completely harvested because the lower portion is buried up to three meters under the soil surface.

Stimulants

The Alangan are avid betel nut chewers. Both young and old, men and women, married and unmarried, chew betel nut. They can withstand one whole day without eating, but not without chewing betel. They say that chewing betel makes them feel like they are always full. Leykamm (1979) reported that the Alangan are also pipe smokers but prefer betel nut to the pipe.

Aside from the slaked lime which comes from the shells of numerous land snails, particularly *bayuko* and *lapi,* the other ingredients of the betel chew are the fruits of the palm *bunga (Areca catechu),* and the leaves of *yawid* (*Piper betle)* and *sadiwa (Nicotiana tabacum).* In case *bunga* and *yawid* are not available*,* the bark and young leaves of *taguyutan (Ficus sp.)* and the leaves of *litlit* (*Piper retrofractum)* are used as substitutes. In place of tobacco, they sometimes use the leaves of *palbabuyon (Mussaenda philippica*).

Costume and Personal Ornamentation

Alangan men and women wear the loincloth (*bahag* in Tagalog) as their standard garment. This could be made of synthetic fabric (usually *katsa* or flour sack), or beaten tree bark (*abay, ba-ay or abayon*). Abay is made by extracting, beating, washing and drying the barks of several Moraceae species, such as *anongo (Antiaris toxicaria)*, *tibiyun (Ficus nota), almit (Ficus minahasse), banayan (Ficus magnoliifolia),* and *laolawi (Ficus* sp.). As these plants are confined, they may be secured from the lowlands, or one can buy, barter, or simply ask for the finished abay from other *latag*-Mangyan.

Women wear a rattan skirt to cover their hips and to hold the *abay* in place. They simply insert it into the waistline of the skirt, allowing both ends to hang down from it. The skirt, called *lingob* (*yakis* in Tagalog), is made of braided rattan and nito (*lambud*). The use of the lingob starts with just a few coils around the hips when the girl is about 12 years old. It can measure more than 50 m. when she reaches full womanhood. The lingob also serves as the women's sheath for their bush knives, a manner of carrying that, according to Maceda (1967), has probably given rise to the old belief that the Mangyan in the interior have tails about a span long. To cover the breasts, they utilize the dried, de-spined leaves of *ulango (Pandanus radicans)*, which is held in place by bamboo stick pins. Sometimes, a red kerchief called *limunmun,* obtained from the market is used instead of the *ulango*. It is simply knotted at the back. Some married older woman may wander around freely without any breast cover.

Unmarried men and women wear certain garments to indicate single state. As breast cover, young ladies wear the *ulango*. They also usually wind a braided belt (*ginawang*) made of *lambud* around their waist about 10 times. This covers a core of rattan. The yellow fibers of *kabasan* (*Appendicula* sp.) are inserted to brighten the brand. They also wear a *bugway* (necklace) and *budbud* (bracelet) made from trade beads, which are white in color in most cases. Young men wear the *baklaw* (armband), also made of *lambud* and *kabansan*. A red piece of cloth about 10-15 cm. wide serves as their *bayakos* (waistband), while a small piece of either *abay* or red cloth serves as the *bugkos-ul*o (headband). Whenever they go, a wooden comb (*surod*) is inserted between folds of their *abay*.

Apart from necklaces and bracelets made of the dried seeds of *tigbe* (*Coix lacryma-jobi*), children usually go around naked until they are about 12 years old. Older men and women may wear a necklace with charms, keys and whistles hanging from it, not only as an ornament, but also as a protection against evil spirits. Some reported the use of the dried leaves of *bakunol*, a species of the Annonaceae family, which

are simply crushed and mixed with coconut oil to produce a distinct scent that the Alangan consider as perfume.

In general, the Alangan use very little body adornment in comparison with the Hanunuo, who hand-weave their clothes out of cotton threads, and fashion colorful necklaces, bracelets, armbands, and others out of trade beads. Both Alangan and Batangan, however, wear loincloth or bark cloth as a standard garment regardless of sex. In preparing bark cloth, they employ exactly the same methods, using certain species of the fig family common to their respective localities. These groups wear braided belts and armbands fashioned from the same plant materials. Batangan women, however do not wear the rattan skirt worn by the Alangan women.

Household Articles

Common to all typical Alangan households are mats (*amak)*, hearths (*boris*), hammocks (*yan-yan*), and winnowing trays (*birao*). In addition, other households may have traps (*balatik*), wooden mortars (*lisong*), pestles (*hal-lo*), and wooden pillows (*tukon*). All articles other than these can be accommodated in one or two large baskets. China and tin ware are now common in all the villages visited, but plates and bowls (*sarampak* or *sabaga*) woven out of rattan and *lambud* are still being used, especially in Basal and Bugayan. For their water containers, they use *paldong* made from bamboo joints or the dried hollowed-out fruits of *tabayay* (*Lagenaria siceraria*), each supported by a rattan harness. Glasses and tin mugs are now commonly used as drinking vessels instead of the previously employed coconut shells (*lisap*). A half coconut shell with a wooden handle, however, remains the popular ladle (*luwag*) even among the more acculturated Alangan. Modern cooking and dining wares, along with appliances, may now be found in certain well-off families in Paitan.

Cooking is now done either in clay or aluminum pots and frying pans that they buy or acquire through barter from lowlanders. In earlier days, however, they made kettles out of the bark of the *tibiyun* (*Ficus nota*) which they called *lukuan.* They used them for boiling sweet potatoes and in collecting honey, and were good for three or four uses. Meat and fish were cooked by first wrapping them in banana or taro leaves and placing them inside bamboo internodes called *bakay*. They covered these utensils with leaves of either a*libuta* (*Homalanthus* sp.), *amilig* (*Macaranga bicolor*), *kanongnong* (*M. grandifolia*), *lagan* (*Mallotus* sp.), *salampikaw* (*Leukosyke capitellata*), and *butig* (*Colocasia esculenta*). For plates, they used leaves of different species of banana and aroids like the *butig, mamba* and *salidang.*

The Alangan weave different sizes of baskets out of the mature stems of *lambud* (*Lygodium circinnatum*), *balingway* (*Flagellaria indica*), *banban* (*Donax cannaeformis*), *bikal* (*Schizostachyum diffusum*), *bulo* (*Gigantochloa leavis*), *buho* (*Schizostachyum lumampao*), and a number of rattan species (*Calamus* spp., *Dendrocalamus* spp., *Deamonorops* spp.). Important baskets and containers include *pudpudan,* where small food items of value are placed, such as salt, black pepper, and garlic; *sulpa,* where money and bits of tree bark that have medicinal value are kept; *sukluban,* where ingredients for betel nut chews are contained; *balanan* or *galang,* which are provided with a headstrap (*uban*) and are commonly used by women when traveling through the woods, when moving household articles, or when packing the swidden harvest back to their dwellings; and *tabud*, a multipurpose basket furnished with a cover and usually itself considered a trade item.

Firewood and Fire-Making

Practically any dry wood can serve as firewood but the Alangan prefer firewood that produces little smoke and ash and burns for a long, continuous time. The wood of the following are thus selected: *alibotbot* (*Ervatamia mucronata*), *almaciga* (*Agathis philippinensis*), *amilig* (*Macaranga bicolor*), *anroros* (*Sterculia oblongata*), *anugla* (*Pipturus arborescens*), *asuwete* (*Bixa orellana*), *baltuntong* (*C. macrostegium*), *bayabas* (*Psidium guajava*), *butur* (*S. mindorense*), *kakawati* (*Gliricidium sepium*), *kalingag* (*Cinnamomum mercadoi*), *sarabrab* (*Pittosporum resiniferum*), *sarimbuko* (*Acalypha amentacea*), *saransok* (*M. polyanthum*), and various species of figs (*Ficus* spp.). The trunks of *bangrat* (*Glochidion Ilanosii*) and *alim* (*Melanolepis multiglandulosa*) are never gathered because their smoke is painful to the eyes and can cause skin irritation. Old clearings are commonly the sites for firewood gathering.

As commercial matches are not available in the mountains, they start a fire using the bolo, *mutya* and *kumbad.* They vigorously strike a *mutya* (flint stone) with a bolo, producing a spark that kindles fine

rattan or wood shavings (*kumbad*). They use the resin of *almaciga* (*A. philippinensis*) to keep their fireplaces smoldering, providing light and heat throughout the cold nights of their mountain altitudes.

Cordage Materials

Just as Yen and Gutierrez (1976) found for the Tasaday of Mindanao, the Alangan utilization of plants for trying and binding purposes seems to depend on a plant's proximity to a given activity, rather than its specific suitability. The Alangan do not exert much effort and time to look for plants whose strength has been tested, but simply pry off and twist the bark of the nearest tree or cut the stem of the nearest liana that would serve the purpose. Certainly, however, there are members of the local flora that they regard as the best materials for tying and binding. These include: stems of the different species of rattan (*uwai, bagbaron, banluan, bungawai, kabaybay, tagirata*), *balingaway, amlong* (*Raphidophora* sp.), *agnaya, sibalao* (*Derris heptaphylla*), *gurimut* (*Ichnocarpus ovatifolius*), *iyason* (*Stephania* sp.); the dried petioles of banana, particularly *abaca* (*Musa textilis*); and the barks of *malmag* (*Commersonia bartramia*), *balibago* (*Grewia eriocarpa*), and *salampikaw* (*L. capitellata*).

Plants with Miscellaneous Uses

At least three plants are known to the Alangan to yield drinkable water. These include *bikal* (*Schizostachyum diffusum*), *bakyang* (*Bauhinia cumingiana*), and *anopol* (*Poikilospermum suaveolens*). They observe that water from the young *bikal* internodes is much more abundant after a rain. More water from *bakyang*, on the other hand, can be collected during the early morning and when the cut is made on the stem to the ground. Of the three plants, *anopol* yields the greatest quantity of water for both drinking and rice-cooking purposes.

As Mt.. Halcon is a very wet mountain, with rains pouring almost everyday regardless of the season, the Alangan rely on the native plants to keep their bodies relatively dry when they wander through the woods. The large leaves of any species of banana, certain aroids such as *badiang* (*Alocasia macrorrhiza*), and of the tree *loktob* (*Macaranga grandifolia*) are commonly utilized. In addition, they also make use of the fronds of various fern species, which they pile one atop the other until these are thick enough. These include the *leka*, *bangkalayan,* and *laksak*.

As additional income, some Alangan accept orders for logs from the lowland settlers. Since the terrain is very steep and the logs are heavy, they simply tie them with strong cordage and pull them down through the terrain. To make the hauling easier, the fleshy leaves and stems of *tabtaba* (*Elatostema luzonense*) and *alyoyo* (*Cayratia*) are rubbed onto the logs to make them slippery.

The woody stem of *bukali* (*Entada phaseoloides*) is widely known to the Alangan to be saponaceous. But since they show remarkably little concern for cleanliness and care of the body, utilization of this plant as soap is not common.

Plants as Seasonal Indicators

Some indigenous plants serve as guides for the Alangan in determining the season. For instance, when they observe that *rabrabay* (*Rubus moluccanus*) is already in bloom, they know that swidden time is near. *Rabrabay* flowers only in November, during which time the Alangan start securing or sharpening their bolos and axes in preparation for clearing. Likewise, when they see that *badbad* (*Aralia*), *talakis* (*Weinmannia hutchinsonii*), *mararan* (*Astronia* sp.), and *morawen* (*Vernonia arborea*) are in bloom, they start looking for beehives in the forest. They say that bees produce more honey during these times. A good quantity of nectar is contained in the large paniculate inflorescences of these plants.

For the Alangan, the flowering of *baksilay* (*Cratoxylum sumatranum*) and *rabrabay* (*R. moluccanus*) signal the coming of voluminous rains, while the dry season is usually hailed when *alinaynay* (*Phragmites vuldaris*) starts to bloom. The flowering of *tigbao* (*Saccharum spontaneum*) foretells bad weather.

Other Plant-related Beliefs and Practices

1. Never put up a house on the spot where *bakyang* (*B. cumingiana*) grows, for this will bring bad luck to the family.

2. Young sprouts of a recently planted sweet potato should not be cooked with salt, lest the crop wither or not form fleshy roots at all.
3. While eating, never blow on newly harvested food, whether rice or sweet potato, or else you will get a stomach ache or bloated stomach.
4. If one eats the seed that falls to the ground while it is being roasted, death will come to him while he is away from his own village. If, however, he returns it to the pan or simply ignores it, he will die in his own place.
5. A woman who has newly delivered should neither grind coffee (*mag-ipit ng kape*) nor eat *namu, or* else she will not lactate and cannot breast feed her child.
6. If the fruit of the *balugo* (*Ficus* sp.) is squeezed on the back of a non-lactating mother, she will soon produce milk, but she may not eat any food that has been cooked to dryness.
7. When planting *butig* (*Colocasia esculenta*), never step on it, for this will cause the corn to rot.
8. Chewing leaves of tobacco that is planted near the house can cause coughing.
9. Never touch or point at the young fruits of any gourd, lest they wither or rot.
10. While planting cassava, never step on the spot where it has been planted, for this will cause the plant to form fleshy roots with many cracks.
11. Making noise on the first day of harvesting rice will lessen the yield.
12. Avoid roasting the tubers of sweet potato that is the first to be harvested from a field, for this will cause the other tubers to rot.
13. Never plant tobacco near cassava, for this will make the cassava produce tubers with a bitter taste.
14. A plant with many fireflies at night is the dwelling place of bad spirits.
15. The *balete* (*Ficus benjamina*) tree should be avoided, for it is the dwelling place of evil spirits.
16. Placing salt beneath a mango tree while its fruits are still young will cause the fruit to fall early.
17. Planting yam on steep land will make its tubers big.
18. Placing the stems and leaves of *gulgoy* (*Laportea meyeniana*) on the paths leading to house will prevent evil spirits from coming near.
19. Planting *bukyos* (*Thysanolaena maxima*) in the house yard helps ward off evil spirits from the house.
20. Wearing a necklace with a piece of ginger (*Zingiber officianle*) or *tagibolog* (*Languas pyramidata*) or a bark of *amuyong* (*Goniothalamus amuyon*) or *anroroas* (*Sterculia oblongata*) can frighten the *bukaw* (evil spirits).
21. Planting *bugnaw* (*Justicia gendarussa*) near the rice field can prevent insects from attacking the plants.
22. When planted in the swidden, *tanglad* (*Cymbopogon citratus*) can protect the rice plant from pests, especially stem borers and worms.
23. Placing *parapad* (*Kolowratia elegans*) stems at the center of a swidden before planting will make the rice plant grow healthy and produce more yield.
24. Burning the leaves of *anahaw* (*Livistonia rotundifolia*) during inclement weather can drive away lightning and thunder.
25. Burning a piece of *abay* (*bark cloth*) can protect one from lightning.
26. Placing a trunk of *agutay* (*Musa errans*) and two trunks of *bangrat* (*Glochidion Ilanosii*) in the form of a cross beside a dying person can ward off the evil spirits from him and appease his soul.
27. Binding a corpse with *anopol* (*Poikilospermum suaveolens*) ensures that the soul can no longer return to haunt family and relatives.
28. When someone dies, members of the immediate family, as well as relatives, must not cut trees for a period of four days after, lest someone else in the family dies too.
29. For one year following the death of a spouse, the widow or widower must not touch or point to any plant, lest it wither and die.
30. Burning a piece of rattan matting (*amak*) can help determine whether one who has been away for a long time is still alive. If the piece moves while in flame, that person is still alive; otherwise, he is to be considered dead.

Plants in Song

Music plays an important role in the daily life of the Alangan, not only for entertainment but, more importantly, in contacting the spirit world. *Balaon*, a manner of cutting sickness performed only by the *balaonan* or shaman, utilizes songs and dreams to communicate with the spirits. Fathers and mothers

have songs to rock their babies to sleep. Young men have songs to court their loved ones. There are also songs for relaxation after a day's hard work.

In general, all Alangan songs are termed *banggi.* Most *banggi* are chants of three to six rhyming lines with seven syllables per line. Lullaby songs are called *agbaron* and are sung continuously. In most cases, *agbaron* does not mean anything and the singers could be interpreted as merely humming a tune. Certainly, however, there are also some that convey a though,t as in this example heard from a young girl who tried to pacify her younger sister (the translations below are free translations):

Song I

Lale kangay arian	Oh my sister
Ayaw wa agkasamang	Do not be tiresome
Dapo kay kanta inang	Our mother is not yet here
Ista wa in dumalan	She still has to pass
Ista sa kayangawan	There in the woods.

Songs that recount personal longings and experiences are called *pangisudon*. These are mostly sung during feasts and during relaxation. Many *pangisudon* are sung with two people answering one another, as in the following example:

Song 2

Laki pag-agsangudan	My dear friend
Amba ako pagbigyan	Will you give me
Yawid tangkas kutanan	A bunch of betel pepper plant
Dugay wa agkakulman	That I have longed to chew
Dagun wa piagbilang	For quite a time now
Alay, alay, yakinang	La la la la la la
Laki marawa igang	My dear friend
Ako dapo kuwaan	There's nowhere I can get
In kaymo piagbilang	The thing that you long for
Nguna pag-inurasan	At this very moment
Rabrabay agurungan	I am feeling lonely
Sa balay kapiriyan	And wish to stay home.
Alay, alay, yakinang	La la la la la la
Lalo din kataodaan	Like you
Ako idwa kataodaan	I can't leave also
Ako binabakuran	For I am being hindered
Kanangay butakanan	By my children
Iyay, iyay, yunang	la la la la la la

Some *pangisudon* are very figurative. Of all forms of *banggi*, it is in the *pangisudon* where plants are often mentioned. The following song, which is known to both young and old Alangan, is a good example:

Song 3

Kanangay tugda mamin	My betel pepper plant
Diyalan balungaing	Lasted the storm
Dapo maputi laying	And no leaf fell
Sa Dios manalangin	For to God I prayed
Kanangay tugda luya	My finger plant
Piyangwat bara-bara	Made into small chairs
Pagtugkawan agsimba	For you to sit on in church
Kanangay tugda kusor	My *kusor* plant
Piyangwat buksur-buksor	Made into little hills
Pagtugkawan ag-iskol	For you to sit on in class.

Kanangay tugda kilawen	My banana plant
Diyalan wakay pangiben	Lasted the summer time
Dapo maputi galem	And not a fruit withered.
In yangaw batikuling	The *batikuling* tree
Piyagbantuk-bantok hangin	Hit by a strong wind
Nangalabo in laying	The leaves that scattered
Piyagbaget-baget lawin	Were snatched by a hawk.

Courting songs (*agurokbulo*) are perhaps the most beautiful. These are usually sung to the accompaniment of the *kudyapi*, a nylon- or rattan-strung guitar. *Agurokbulo* are usually short:

Song 4

Si bayaw alilian	My loved one
No kao pasa bayan	When you go to town
Ayaw wakay laonan	Do not stay long
Ako agkaluwayan	For I will miss you
Sa kanta pagtugkawan	At our rendezvous
Sa paydaligan bunwang	Under the *bunwang* tree

Final Remark

Although the old culture of the Alangan Mangyan is gradually being transformed through cultural change, the usefulness of the local flora remains apparent in their daily life. Familiarity with the plants is perceptibly clear from their means of subsistence, clothing, dwellings, household articles, cordage materials and firemaking. The wide range of plant-related beliefs and practices, as well as plant-inspired songs, also provides evidence that a special relationship exists between plants and the Alangan culture. Although the Alangan are generally timid and reserved by nature, there is still much that can be learned from this people, particularly from those living in the forest interior that this study leaves for future research.

4.3.2. Socio-Economic Profile of Local Government Units Covering Mt. Halcon Range (Baco, Naujan and San Teodoro)

For purposes of management planning, the socio-economic profiles of LGUs initially identified to cover Mt. Halcon are presented in this document. These municipalities include Baco, Naujan and San Teodoro. The profiles presented in this section were culled from the CNA conducted by MBCFI.

4.3.2.1. Demagraphic Characteristics

The aggregate population of Baco, San Teodoro and Naujan, as of August 2007 population census of the NSO, is 139,795 individuals. **Table 4.3.2.1.a** shows the population of the three municipalities.

Table 4.3.2.1.a. Population, Land Area, Population Density and Barangays of Baco, Naujan and San Teodoro, 2007

Municipality/Barangay	Population[2]	Land Area[3] (has.)	Population Density (person/ha.)
BACO	**34,127**	**24,171[4]**	**1.4**
Alag	1,154	116.75	9.88
Bangkatan	1,595	216.296	7.37
Burbuli	429	372.536	1.15
Catwiran I	1,232	200.782	6.14
Catwiran II	1,300	636.511	2.04
Dulangan I	3,035	78.523	38.65
Dulangan II	2,338	652.953	3.6
Lumang Bayan	552	286.299	1.92
Malapad	370	163.688	2.26
Mangangan I	2,198	760.951	2.89
Mangangan II	702	980.867	0.72
Mayabig	1,447	4,228.692	0.34
Pambisan	975	117.783	8.28
Pulang-Tubig	819	129.396	6.33
Putican-Cabulo	452	384.005	1.18
San Andres	268	186.061	1.44
San Ignacio (Dulangan III)	1,872	6,512.613	0.29
Santa Cruz	457	252.168	1.81
Santa Rosa I	1,817	232.913	7.80
Santa Rosa II	1,357	326.386	4.16
Tabon-tabon	1,264	270.887	4.67
Tagumpay	1,116	200.742	5.56
Water	1,216	346.212	3.51
Baras (Mangyan Minority)	1,293	2,266.827	0.57
Bayanan	1,386	198.708	6.98
Lantuyang (Mangyan Minority)	766	331.916	2.31
Poblacion	2,717	326.568	8.32
NAUJAN	**90,629**	**52,804.15[5]**	**1.7**
Adrialuna	1,639	619.10	2.65
Antipolo	486	360.54	1.35
Apitong	2,254	1,019.90	2.21
Arangin	944	973.74	0.97
Aurora	3,092	1,208.80	2.56
Bacungan	1,119	430.54	2.6
Bagong Buhay	1,822	857.55	2.12
Bancuro	1,806	230.03	7.85
Barcenaga	3,910	847.67	4.61
Bayani	1,941	292.17	6.64
Buhangin	846	513.45	1.65
Concepcion	918	661.35	1.4
Dao	1,103	422.28	2.61
Del Pilar	1,962	240.85	8.14
Estrella	2,220	167.99	13.21
Evangelista	2,414	1,040.58	2.32

[2] Source: NSO, August 2007 Census of Population
[3] Source: Municipal Socio-Economic Profiles of Baco, San Teodoro and Naujan
[4] There is a discrepancy (473 has.) with what is reflected in the Provincial Physical Framework Plan, which is 24,644 has.
[5] There is a discrepancy (361.85 has.) with what is reflected in the Provincial Physical Framework Plan which is 53,166 has.

Municipality/Barangay	Population[2]	Land Area[3] (has.)	Population Density (person/ha.)
Gamao	772	253.10	3.05
General Esco	1,248	508.19	2.45
Herrera	765	350.93	2.13
Inarawan	1,890	952.33	1.98
Kalinisan	1,262	509.11	2.48
Laguna	1,343	772.69	1.73
Mabini	485	313.22	1.55
Andres Ilagan (Mag-asawang Tubig)	551	249.04	2.21
Mahabang Parang	1,391	1,268.30	1.09
Malaya	884	340.24	2.6
Malinao	1,566	467.50	3.35
Malvar	1,087	2,104.92	0.52
Masagana	829	942.73	0.88
Masaguing	551	820.09	0.67
Melgar A	1,519	399.93	3.8
Melgar B	1,246	705.25	1.77
Metolza	619	596.10	1.04
Montelago	1,863	712.65	2.61
Montemayor	604	1,154.51	0.52
Motoderazo	1,670	886.40	1.88
Mulawin	1,208	411.44	2.94
Nag-iba I	835	546.31	1.53
Nag-iba II	1,368	443.62	3.08
Pagkakaisa	2,232	643.86	3.47
Paniquian	1,557	193.45	8.05
Pinagsabangan I	2,053	635.71	3.23
Pinagsabangan II	2,351	397.41	5.92
Piñahan	1,089	277.73	3.92
Poblacion I (Barangay I)	851	85.01	10.01
Poblacion II (Barangay II)	795	5.30	150
Poblacion III (Barangay III)	779	84.84	9.18
Sampaguita	2,160	936.43	2.31
San Agustin I	1,383	262.45	5.27
San Agustin II	1,307	478.78	2.73
San Andres	694	2,368.99	0.29
San Antonio	465	171.70	2.71
San Carlos	605	717.21	0.84
San Isidro	912	141.16	6.46
San Jose 1	586	67.67	8.66
San Luis	749	621.13	1.21
San Nicolas	932	481.80	1.93
San Pedro	1,016	582.75	1.74
Santa Isabel	1,221	817.33	1.49
Santa Maria	2,785	869.29	3.20
Santiago	1,972	822.62	2.40
Santo Niño	1,468	872.89	1.68
Tagumpay	895	457.48	1.96
Tigkan	778	104.14	7.47
Santa Cruz	1,237	167.88	7.37
Balite	1,016	2,500.00	0.41
Banuton	623	3,004.00	0.21
Caburo	598	2,966.00	0.20
Magtibay	379	2,974.00	0.13

Municipality/Barangay	Population[2]	Land Area[3] (has.)	Population Density (person/ha.)
Paitan	1,109	2,500.00	0.44
SAN TEODORO	**15,039**	**36,910.63[6]**	**0.41**
Bigaan	1,597	13,599.94	0.12
Calangatan	1,640	10,035.04	0.16
Calsapa	1,982	617	3.21
Ilag	1,422	615.225	2.31
Lumangbayan	2,381	565.1668	4.21
Tacligan	2,189	1,288.33	1.67
Poblacion	1,990	548.734	3.63
Caagutayan	1,838	8,565.98	0.21
Aggregate Total/Average (for 3 municipalities)	**139,795**	**113,885.78**	**1.23**

The data above shows that Naujan has the biggest land area and the highest population, thus its population density is also the highest, at 1.7 persons per hectare. This is higher than the provincial record of 1.68 persons per hectare. In terms of number of barangays, Naujan is also highest at 70 barangays. This can be explained by the fact that Naujan is mostly flatland, ideal for settlement and irrigated rice production. On the other hand, San Teodoro's and Baco's respective land areas are largely forestland, characterized by mountainous and rugged terrain, constituting a bigger part of Mt. Halcon Range. Most of the inhabitants within these areas are Mangyans. The narrow flatlands of both municipalities have the concentration of settlement, trade and commerce; therefore, it can be noted that the town centers are the most thickly populated, with notably higher population density.

Population growth rate (NSO Census of Population, May 2000) in Baco is 1.99% (average), Naujan has 2%, and San Teodoro has 1.51%. Average household size for Baco is 5, Naujan is 4.95, and San Teodoro is 5.5. San Teodoro recorded the lowest population in 2005 in the province of Oriental Mindoro. This is attributed to the out-migration and transfer of residents mainly in search of better livelihood opportunities abroad, and in Manila, Calapan and other commercially booming towns in southern Mindoro.

In terms of sex distribution, the three municipalities recorded a higher male population than female. **Table 4.3.2.1.b** shows the distribution of the male and female population:

Table 4.3.2.1.b. Male and Female Population Distribution in Naujan, Baco and San Teodoro, as of May 2000

Municipality	Males	Females	Total
Baco	17,141	16,293	33,434
Naujan	43,322	40,156	83,478
San Teodoro	7,830	7,403	15,233
Total	**68,293**	**63,852**	**132,145**

Most of the people in the three municipalities speak Tagalog and Mangyan. Migrants came from Bicol, Visayas and Ilocos. In terms of religious affiliation, Roman Catholic still has the biggest number of followers, followed by Iglesia ni Kristo, and a

[6] There is a discrepancy (1,129.37 has.) with what is reflected in the Provincial Physical Framework Plan which is 38,040 has.

small population of Born Again Christian, Jehovah's Witnesses, and Seventh Day Adventists. Houses are usually made of concrete, semi-concrete and light materials.

4.3.2.2. Livelihood and Sources of Income

The major sources of income in all three municipalities are farming and fishing. Naujan, being the rice granary of Oriental Mindoro, has an agricultural area of 52,804.15 has., which is 54.94% of its total land area. About 25.78% of this area is devoted to rice farming, with a total production of 52,849.19 metric tons in 1999. Other crops produced in the municipality include corn, coconut, coffee, black pepper, *calamansi*, banana, *rambutan*, *lanzones*, vegetables, and root crops.

Fishing is the second major livelihood in Naujan. Out of 70 barangays, 11 are located in the coastal areas. Brackish water fishponds are also present in Naujan. In 1999, there were 50 reported fishpond operators in this town. *Tilapia, hito* and *dalag* are the common fishes cultured and produced through this aquaculture venture.

Baco depends on agriculture for livelihood. Roughly 11, 166.83 has., or 46.19% of the town's total land area, is classified as agricultural land. Crops produced include rice, banana, corn, vegetables, fruit trees, coconut, and abaca. An estimated 13,333.42 has. (55.16%) of the total land area is classified as forestland, which are areas mostly occupied and claimed as ancestral domain of the Alangan Mangyan and Iraya Mangyan.

San Teodoro's agricultural area, however, is limited to only 14% (5,536.5 has.) of its total land area. This limited area is planted to rice and coconut, is mainly located within the coastal plains of the town. The major crop produced is coconut, followed by fruits, rice and banana. Root crops are basically planted for home consumption. About 86.5% (31,927.15 has.) of the area is classified as forestland. San Teodoro is considered to be the number one gold reservoir of the province. Other mineral resources, such as copper, marble, iron, clay, sand, gravel and boulders, are also present in this municipality.

Fishing activity in San Teodoro is categorized inland and shallow fishing. About 80 has. are used for inland fishing while 1,600 has. are used for shallow fishing. The aggregate average fish production per year for both activities is 17.930 tons. Fishing areas can be found in Barangays Tacligan, Lumang Bayan, Poblacion, Calsapa, and Ilag.

Livestock production, an additional source of livelihood, is also common among the three municipalities. Animals, such as pig, cattle, carabao, goat, horse, poultry and swine are raised in commercial and small scale levels.

Tourism is another source of income for the people and is one of the major industries being promoted by all the three municipalities. Mt. Halcon is presently the most visited (basically by trekkers and mountaineers) area, although the usual entry point is in Lantuyang, Baco, which is an Alangan Mangyan settlement. Each of the three municipalities has identified and promotes their tourism potential areas, as shown in **Table 4.3.2.2.**

Table 4.3.2.2. Some Areas with Tourism Potential in Baco, Naujan and San Teodoro

Baco	Naujan	San Teodoro
Mt. Halcon	Estrella-Lagarian Beach	Punta Beach
Katwiran River	Hafa Adai Beach Resort	Alumisin Beach Resort
Karayrayan River	RGV Beach Resort	Wawa Beach
Bayanan Waterfalls	AAB Beach Resort	Lambingan Falls
Mayabig Core Dam	Seaworld Beach Resort	Tiboy River Resort
Tiboy Rapids	Bacawan Cove	Binaybay Falls
Cueva Sagrada (Bayanan)	Emerald Resort	Aras Cave
Sunken Town (San Andres)	LMR Resort	Saclag Settlement Farm School (Saclag Ecological High School)
Water Beach Area	RM Handog Resort	Caagutayan Mangyan Village
Sayawithean Cultural Performers	Buloc-buloc Beach	Win Ville Beach Resort
	Tuhod Beach Resort	Amor's Beach Resort and Videoke
	Naujan Lake	Punta Baluarte
	Arangin Falls	Saclag Hanging Bridge
	Karacha Falls	Aras Falls
	Arambyaw Falls	
	Taguan Falls	
	Three Islets in Lake Naujan	
	Dome Hill	
	Mt.Naujan	
	Mangyan Reservation	
	Pungao Hot Spring	
	Baluarte (Bell Tower)	
	Simbahang Bato	
	Naujan National Park	
	Naujan Town Plaza	
	Marcos Farmland Resort	
	Ikatlong Puso Retreat Center	

It should be noted that among the municipalities that list potential tourism sites, only Baco promotes Mt. Halcon. This could be attributed to the fact that the most common entry point for trekkers and mountaineers to Halcon is located in Barangay Lantuyang, Baco.

In relation to mountaineering activity in Mt. Halcon, a barangay resolution issued by the Barangay Council of Lantuyang set a moratorium for climbing in the area. This resolution was endorsed by the municipality of Baco and has been in effect since its issuance. On June 8, 2008, however, during the Barangay Council Meeting in Lantuyang, Barangay Resolution #11-2008 was issued, "allowing the Tourism Council of the Municipality of Baco to climb Mt. Halcon to conduct an assessment on the physical status of the area, which they call an "inspection climb." Based on the discussion during the CNA with the LGU and Barangay representatives in Baco on November 11, 2008, climb guiding, portering and homestay for Halcon mountaineers and trekkers are one of Lantuyang residents' source of income. *Sari-sari* stores also experience a boom during climb months (usually in the summer).

4.3.2.3. Land Use Categories

The municipalities of Baco, Naujan and San Teodoro cover an aggregate total land area of **113,885.78** hectares, distributed and categorized with various land uses, as shown in **Table 4.3.2.3**.

Table 4.3.2.3. Land Use Categories in Baco, Naujan and San Teodoro

Land Use	Baco (has.)	Naujan (has.)	San Teodoro (has.)	Total
Built-Up (Residential and Commercial)	325.65	815.42	22.65565	1,163.73
Agricultural	8,937.27	29,797.47	3,821.4298	42,556.17
Mangroves/swamps	1,666.55	450.97	306.6434	2,424.1634
Mangyan Reservation	168.96			168.96
Watershed	200.11			200.11
Forestland/Timberland	12,962.94	13,927.68	15,037.144	41,927.764
Forest Reserve			938	938
Special Uses (Cemetery, Roads, etc.)	2,501.00			2,501
Bushes/Grassland		6,019.91	1,310.87	7,330.78
Marginal areas		1,791.70		1,791.70
Logged Area			4,803.33	4,803.33
Reforestation			9,054.413	9,054.413
Disputed Area			1,533	1,533
Total	**26,762.48**	**52,803.15**	**36,827.49**	**116,393.1204**
Total (based on the Socio-Econ. Profiles)	**24,171** (↓2,591.480)	**52,804.15** (↑1ha.)	**36,910.63** (↑83.14)	**113,885.78** (↓2,507.3404)
Total (based on the PPFP of Oriental Mindoro)	**24,644** (↓2,118.48)	**53,166** (↑362.85)	**38,040** (↑1,212.51)	**115,850** (↓543.1204)

There is a discrepancy in the total aggregate area of the three municipalities of 2,507.344 has., based on the total land areas reflected on their socio-economic profiles and CLUP, and in the specific land use categories from the same documents. The figures are different from what is reflected in the Provincial Physical Framework Plan of Oriental Mindoro.

4.3.2.4. Social Institutions and Services

The LGUs of Baco, Naujan and San Teodoro and different government agencies are the major institutions that deliver basic social services to the people of these municipalities. On the NGO-PO sector, the Mangyan Mission, which assists the Alangan and Iraya Mangyan through their respective organizations called SANAMA and MIPK, are the most noted. The Mindoro Kabuhayan Foundation Inc. (MKFI), which operates province-wide, also has operations in the three municipalities. In Baco, for instance, MKFI is engaged in the commercial production of bottled drinking water, in partnership with San Ignacio Barangay Waterworks Association and the LGU. The project is funded by the Department of Agriculture, InfRES-JFPR, and Asian Development Bank.

To support sustainable agriculture, MKFI is also engaged in the commercial production of organic fertilizer. It is likewise actively involved in providing shelter for

the homeless and calamity victims. It has constructed core housing projects in Barangays Suqui and Wawa in Calapan City, Barangays Tabon-tabon, Putican Cabulo and Pambisan in Baco, and Brgy. Bancuro in Naujan. Thus far, it has provided housing to 420 families affected by typhoons and earthquake that hit Oriental Mindoro. Along with providing shelter, the MKFI constructs potable water systems for Mangyans and depressed barangays with no access to safe drinking water.

MKFI has completed 21 projects that benefit the three municipalities, seven of which are implemented province-wide. Naujan is the beneficiary of nine projects; Baco, eight projects; and San Teodoro, two projects.Funding sources and support groups for MKFI interventions is also wide-ranging, including government agencies programs and the Community Development Fund of Congressman Rodolfo G. Valencia.

However, it is noticeable that most of the projects implemented by MKFI are focused on livelihood, relief assistance, technology transfer, technical assistance, health and sanitation, feeding and nutrition, irrigation systems provision, credit and loan provisions, institutional and personal capability building and development. It offers a wide range of social services, but there is no program for environmental protection and conservation, or for providing support to Mangyans in processing their certificate of ancestral domain title (CADT) applications.

Naujan is also a recipient of the *Pantawid Pamilyang Pilipino Program (4Ps*) of the National Government, through the Department of Social Welfare and Development (DSWD). This five-year program started in 2008, wherein indigent families were given financial support (Php500 per family per month) by the National Government.

Baco and Naujan are the territories of Mangyan Alangan, and San Teodoro is home to the Iraya Mangyan. Just like the Hanunuo of Bulalacao, these groups organized themselves into an IPO (Indigenous Peoples Organization): Samahang Nagkakaisa ng Mangyan Alangan (SANAMA), and Mal-anggatan Iraya Paranawan Kakuyayan, Inc. (MIPK). They have their own set of officers, and follow their indigenous political systems and procedures in running these organizations. The Chairman of SANAMA is Gundoy Calignayan, while MIPK is headed by Abel Lantuyan.

SANAMA and MIPK are the central organizations that transact business and negotiate with other government and non-government organizations on behalf of the Mangyan Alangan and Iraya Mangyan tribes. On matters with broader scale and scope, specifically in regard to their ancestral domain, the two IPOs are affiliated with Kapulungan Para sa Lupaing Ninuno *(*KPLN), the provincial federation of all Mangyan groups in Oriental Mindoro that is the central organization that represents and decides on matters pertaining to Mangyans. The *Pamunuan* (Officers) of each of the groups comprises the General Assembly of the KPLN.

Aside from SANAMA and MIPK, the LGU of San Teodoro organized the Municipal Indigenous Peoples Development and Advocacy Council (MIPDAC), composed of all Mangyans (regardless of the sub-tribe to which they belong) in San Teodoro. The LGU of San Teodoro channels their development assistance and support for the IPs through this organization.

The Halcon Mountaineers is also one of the stakeholders in Mt. Halcon, who spearheaded the closing of the mountain for mountaineering climbs, especially federation climbs that involve hundreds of mountaineers at one time. This is a local group of nature lovers, with at least 11 years of experience in climbing Mindoro's mountains, exploring even still hidden areas in small islands. Members of this group come from different parts of Oriental Mindoro, mostly from Calapan, and is now headed by Mr. Efren E. Garcellano. The Baco Tourism Council has also been active on the issue regarding the moratorium of mountaineering climbs in Halcon.

5. Institutional Arrangements

This section elaborates on some institutional mechanisms that may cover the management of Mt. Halcon Range. These institutional arrangements emanate from various legislations relative to the bio-physical and socio-cultural and economic features of the area. It should be understood that while Mt. Halcon is being claimed as ancestral domains of two Mangyan Tribes, there are other management options that may be considered for the area. As such, this document presents these alternatives as the basis in coming up with institutional arrangements that are most appropriate and effective in managing Mt. Halcon as a conservation area and a cultural site at the same time.

5.1. Ancestral Domain Context

The Indigenous Peoples Rights Act of 1997 (RA No. 8371) governs the management of the Mangyans' ancestral domains in Mt. Halcon, and recognizes the rights of the IPs to their ancestral domain. As mentioned in the preceding section of this document, about 70,000 hectares of Mt. Halcon are the subject of CADT applications by two Mangyan Tribes. As provided in the IPRA, ancestral domain refers to the following:

- Territory or the natural habitat of IPs since time immemorial;
- Lands, waters, and natural resources found in the area, such as inland and marine waters, mangroves, forests, minerals, pasture lands, agricultural lands, residential, hunting grounds, burial and worship area, and air space, among others;
- Lands, which may no longer be exclusively occupied by the IPs, but from which they have traditional access for their subsistence activities. This particularly refers to the home ranges of IPs, who are still nomadic or are shifting cultivators;
- Private but community property that belongs to all generations.

The rights of the IPs to their ancestral domain encompass various aspects of natural resources management, such as the following:

- Manage and conserve natural resources;
- Benefit and share profits from allocation and utilization of natural resources;

- Negotiate the terms and conditions for the exploration of natural resources for the purpose of ensuring ecological and environmental protection, pursuant to national and customary laws;
- Informed and intelligent participation in the formulation and implementation of any project, either by government or private, that will affect ancestral domains, and to receive just and fair compensation for any damages resulting from the project; and
- Effective measures by the government to prevent any interfere with, alienation and encroachment upon these rights.

The IPRA further guarantees the following, as additional rights of the IPs to their ancestral domains:

- Claim ownership over lands and water bodies that are traditionally and actually occupied by IPs, including sacred places, traditional hunting and fishing grounds, and all improvements made by the IPs at any time within the domains;
- Stay in the territory and not be removed from the area. No IPs will be relocated without their free and prior informed consent, nor through any means other than eminent domain;
- In case displacement occurs as a result of natural catastrophes, the state shall endeavor to resettle the displaced IPs in suitable areas, where they can have temporary life support system, provided, that the displaced IPs shall have the right to return to their abandoned lands until such time that the safety of such lands is guaranteed;
- Regulate the entry of migrant settlers and organizations into the domains;
- Provide safe and clean air and water through access to integrated systems for the management of inland waters and air space;
- Claim parts of the ancestral domains, which have been reserved for various purposes, except those reserved and intended for common and public welfare and service; and
- Resolve land conflicts in accordance with the customary laws of the area.

The rights of the IPs to their ancestral domains carry certain responsibilities that are compatible with biodiversity conservation. These responsibilities are the following:

- To preserve, restore, and maintain a balanced ecology in the ancestral domain by protecting the flora and fauna, watershed areas, and other reserves;
- To actively initiate, undertake, and participate in the reforestation of denuded areas and other development programs and projects, subject to just and reasonable remuneration;
- To observe and comply with the provisions of the IPRA and the rules and regulations for its effective implementation.

From the above-mentioned provisions of the IPRA, it is very clear that the two Mangyan Tribes have the exclusive responsibility to manage their ancestral domains within Mt. Halcon. It is, therefore, imperative to engage and mobilize these tribes in

pursuing biodiversity conservation initiatives in the area, in accordance with their traditional and sustainable resource management system. However, the IP tribes may also allow activities that exploit natural resources in ancestral domains, such as mining and logging, provided that Free and Prior Informed Consent is secured from them, which they will negotiate on terms and conditions of benefits for the use of natural resources in their ancestral domains.

The IPRA's provision giving absolute right to the IPs in negotiating the terms and conditions for the exploitation of natural resources in ancestral domains, pursuant to appropriate national and customary laws, provides ambiguity as to who will finally issue the permit or license in resource extraction in ancestral domains. It may be interpreted that while the IPs can issue Free and Prior Informed Consent for resource extraction in the ancestral domain, the exclusive authority to issue permits still lies within the mandate of the DENR. This somehow downplays the rightful ownership of the IPs to natural resources found in the ancestral domain. Nevertheless, this consideration is probably due to the fact that the natural resources ownership in the country is still anchored on the Regalian Doctrine, as enshrined in the 1987 Philippine Constitution. This doctrine adheres to the principle that all natural resources are owned by the state. As dictated in the current Constitution, except for agricultural lands, all other natural resources shall not be alienated. The exploration, development, and utilization of natural resources are under the full control and supervision of the state.

The IPRA further recognizes the inherent right of IPs to self-governance and self-determination, and respects the integrity of their values, practices, and institutions. It upholds the right of IPs to freely pursue their economic, social, and cultural development. The IPRA guarantees the rights of IPs to use their own commonly accepted justice systems, conflict resolution institutions, peace building processes, and other customary laws and practices within their respective communities, and as may be compatible with the national legal system and internationally recognized human rights.

IPs have the right to participate fully, if they so choose, at all levels of decision-making, in matters affecting their rights, lives, and destinies through procedures determined by them. Likewise, they have to right to maintain and develop their own indigenous political structures. Consequently, IPs shall be given mandatory representation in policy-making bodies and local development councils.

IPs have been given the right to determine and decide their own priorities for development affecting their lives, beliefs, institutions, spiritual well-being, and the lands they own, occupy or use. They are encouraged to participate in the formulation, implementation, and evaluation of policies, plans, and programs for national, regional, and local development, which may directly affect them.

IPs living in contiguous areas or communities where they form the predominant population, but which are located in municipalities, provinces or cities where they do not constitute the majority of the population, may constitute a separate barangay, in accordance with the Local Government Code of the Philippines on the creation of tribal barangays.

The rights of the IPs to their ancestral domains in Mt. Halcon are well recognized. However, it is also important to note that the IP communities need the support of other stakeholders in ensuring the protection of their areas from unwanted development. The IP communities should also recognize that the issuance of resource use permits in CADT areas still lies within the authority of the DENR, while local governments are mandated to protect the lives of their constituents and provide necessary basic social and other services. It is therefore imperative that collective measures and efforts be forged to ensure the protection of Mt. Halcon's cultural importance and biodiversity relevance.

5.2. Local Government Perspective and Co-Management

The local governments may participate in the management of ancestral domains, such as Mt. Halcon, by providing support mechanisms in the development and implementation of the Ancestral Domain Sustainable Development and Protection Plan (ADSDPP) of the IPs. If the ancestral domain of the IPs covers a large portion of the forestland of a particular LGU, the ADSDPP may be adopted by the concerned LGU as part of its forestland and comprehensive land use plans. The guideline issued by the NCIP allows the integration of the ADSDPP to local, regional, and national development framework plans, wherein the LGUs are in the position to provide the needed assistance to the different IP tribes.

The Local Government Code of 1991 (RA No. 7160) governs the transfer of authority from national government agencies to local government units, including functions on environment and natural resources management. This particular policy is very important because, despite Mt. Halcon's status as an ancestral domain, the authority of the LGUs over the area could not be understated. The authority of the LGUs, as accorded in the LGC, is still very relevant in Mt. Halcon, relative to the accountability and responsibility of local officials in ensuring the general welfare of their constituents and the delivery of basic services, which may include the IP communities.

It is likely that LGUs covering Mt. Halcon may enter a co-management agreement with the IP Tribes and the DENR for the management of the area. The co-management system between national government, IPs, and local government is currently being considered in environment and natural resources management. Although this approach, emanates from the Local Government Code, it is viewed to address certain limiting authority of the devolved functions from DENR to LGUs. The DENR retains its supervisory and control mechanism authority over its devolved functions to local governments, as provided in the LGC.

The manual of procedures for DENR-DILG-LGU partnership on devolved and other forest management functions, contained in DENR-DILG Joint MC No. 98-01, provides that the DENR, in consultation with LGUs, shall devolve additional functions and responsibilities to local governments, or enter into agreements with them for enlarged forest management and other related functions. It is further supported with another DENR-DILG Joint MC No. 2003-01, which similarly calls for the strengthening of the partnership between the DENR and local governments on various forest management functions.

Under these regulations, the LGUs are required to formulate forestland use plans, which shall be integrated into their Comprehensive Land Use Plans (CLUPs). The FLUP becomes the basis of the LGU to engage a co-management system with the DENR through the execution of a Memorandum of Agreement (MOA). The MOA shall outline and specify the authority, responsibility, and accountability of each of the involved parties.

The MOA shall further introduce a specific management arrangement of the area subject to the co-management, which is usually in a form of a management council, with the head of the concerned LGU and DENR representative sharing chairmanship. The DENR can enter a co-management agreement with LGUs covering evenareas larger than 30,000 hectares of forestlands. Most of the areas covered with existing co-management systems are critical watersheds.

One important provision of the DENR-DILG Joint MC No. 2003-01 is the right of LGUs to be consulted by the DENR when it comes to any tenure applications, including resource extraction permits, in forestlands under the jurisdiction of the affected LGUs. The concerned LGUs are given 15 days to comment on tenure applications; otherwise, it is presumed that they endorse the approval of such applications. The co-management system may be appropriate in forestlands that are outside the scope of the ancestral domain of the Mangyans in Mt. Halcon.

5.3. Community-Based Forest Management Framework

PD 705 or the Revised Forestry Code of the Philippines may still apply in the utilization of forest resources within the ancestral domains in Mt. Halcon, in the event that the DENR issues resource extraction permits in these areas, after the issuance of IPs of the free and prior informed consent on such utilization. This particular assumption is being made because the DENR has, in fact, issued a rattan concession covering the Mangyan's ancestral domain in Mt. Halcon.

One of the important institutional arrangements derived from PD 705 is the Community-Based Forest Management Program (CBFMP), which was officially instituted through Executive Order No. 263 issued on 19 July 1995. It calls for the adoption of community-based forest management as the national strategy to ensure the sustainable development of the country's forestland resources. Consequently, the DENR issued Administrative Order No. 2004-29 to serve as implementing rules and regulations of EO No. 263. This policy framework is important to Mt. Halcon because two Community-Based Forest Management Agreements have been issued by the DENR in San Teodoro, measured at about 1,707 hectares, that possibly traverse Mt. Halcon.

The CBFMP offers land tenure security to qualified forest occupants in managing certain forestlands where they can implement livelihood activities and generate income. The land tenure instrument that shall be issued by the DENR is the Community-Based Forest Management Agreement, covering a 25-year period and renewal for another 25 years. The recipients of this land tenure should be organized as a People's Organization, which shall be responsible for the protection and development of areas covered by a CBFMA. This particular land tenure may also be awarded to IPs if they prefer.

To guide CBFMA holders in the management of their claimed areas, they are required to formulate a Community Resource Management Framework (CRMF) that will provide the basis for balancing forest protection and sustainable use of forest resources. Beneficiaries of the CBFMA may be provided with Resource Use Permits (RUPs) for the utilization of some allowable natural resources, such as rattan and other non-timber forest products.

5.4. Protected Area Management Scheme

The biological and cultural importance of Mt. Halcon is undoubtedly a critical element for its declaration as a protected area under the National Integrated Protect Areas System (NIPAS) Act of the Philippines (RA No. 7586). The DENR has recommended the inclusion of Mt. Halcon under the NIPAS Act but this did not prosper due to vehement opposition from the IP tribes and their supporters. Moreover, since Mt. Halcon is already covered with ancestral domain claims, it would be more feasible to manage the area in accordance with the IPRA.

Nevertheless, it is necessary to present in this document the features of a protected area relative to the NIPAS Act, since it is still a viable option for the management of Mt. Halcon. During the strategic planning workshop, the idea of declaring Mt. Halcon as a protected area also surfaced.

The NIPAS Act of 1992 is the main policy framework for the establishment and management of protected areas in the Philippines. It provides standardized criteria for selection and procedures on how a particular site shall be declared as a component of the NIPAS, including the kind of management arrangement to be introduced in every proclaimed protected area.

The DENR administers the protected areas system of the Philippines. As defined by the NIPAS Act, a protected area *"refers to identified portions of land and water, set aside by reason of their unique physical and biological significance, managed to enhance biological diversity, and protected against destructive human exploitation.*" Depending on management objectives, each declared protected area should have a specific category based on categories enumerated in the NIPAS Act. The category dictates the allowable and prohibited activities, which shall be prescribed in the management plan and zoning scheme of the protected area. If necessary, buffer zones shall be established in the same manner that a protected area is designated.

A buffer zone, as labeled by the NIPAS Act, is *"an identified area outside the boundaries of and immediately adjacent to a designated protected area that needs special development control in order to avoid or minimize harm to the protected area.*" The DENR recently modified the Implementing Rules and Regulations (IRR) of the NIPAS Act, as contained in DENR Administrative Order No. 2008-26, otherwise known as the NIPAS Act Revised Implementing Rules and Regulations.

Under the NIPAS, each protected area shall be managed by the Protected Area Management Board (PAMB), which falls under the control and supervision of the DENR. The DENR Regional Executive Director (RED), with administrative authority over the

protected area, acts as the chairperson of the PAMB. The PAMB shall be composed of the following:

- The Provincial Planning and Development Officer of every province covering the protected area;
- One representative from the municipal/city government with administrative jurisdiction over the protected area;
- One representative from each barangay covering the protected area;
- One representative from each tribal community, if applicable;
- A minimum of three to a maximum of five representatives from NGOs and/or other civil society groups;
- One representative from other national government agencies, if necessary.

The PAMB has the authority to decide the allocation of the budget, approve proposals for funding, and decide matters relating to planning, peripheral protection, and general administration of the protected area, in accordance with the General Management Planning Strategy. The final decision of the PAMB is approved by the majority vote of its members.

The rights of the IPs to their ancestral domain are recognized in protected areas. It is important to note that the NIPAS Act was the first enabling law in the country that officially recognized the ancestral domain rights of the IPs. The awarding of CADTs to the IPs in protected areas shall be in accordance with the IPRA. The DENR and the NCIP have jointly issued a memorandum circular on the management of overlapping areas between the protected area and its buffer zones, and the ancestral domains of the IPs.

The Joint DENR-NCIP MC No. 2007-01 requires that a harmonized management plan be prepared for areas that overlap between the protected area and the ancestral domain of the IPs. The harmonized plan shall be based on a detailed resource assessment. With assistance from the DENR and the NCIP, the concerned IP tribes are tasked to prepare the harmonized management plan. If the protected area general management plan and the ADSDPP of the IPs are both available, they shall be used as input in the formulation of a harmonized management plan, which shall also adhere to the following existing policies:

- The use of natural resources, like wildlife species, shall be based on existing policies, legislations, rules, and regulations;
- Access to natural resources for family use and sustenance shall be based on established customs and traditional practices, as reflected in the ADSDPP of IPs;
- The construction of infrastructure shall be in accordance with the Environmental Impact Assessment System (EIAS);
- Management arrangements and commitments of stakeholders are required;
- Monitoring and evaluation shall be conducted;
- Existing property rights regime shall be recognized.

The Joint DENR-NCIP MC No. 2007-01 mandates that IPs have the primary responsibility in maintaining, developing, protecting, and conserving overlapping areas

between the protected area and the ancestral domain, as also provided in the IPRA. Should the IPs decide to transfer the responsibility over such areas to concerned government agencies, the decision must be put in writing. The PAMB, on the other hand, shall manage portions of the protected area and/or its buffer zone that are outside the ancestral domain.

Moreover, the IPRA provides that ancestral domains or any portion of it found necessary for critical watersheds, mangroves, wildlife sanctuaries, wilderness, protected areas, forest cover, and/or reforestation site shall be maintained, managed, and developed for such purposes. These sites shall be determined by appropriate government agencies, with the full participation of the concerned IP community. The IPs shall be given the responsibility to maintain, develop, protect, and conserve such areas with full and effective assistance from government agencies. In the same manner, the decision should be made in writing, in the event that the IPs decides to transfer the responsibility over such areas to concerned government agencies.

5.5. Critical Habitat Mechanism

The Wildlife Conservation and Protection Act (RA No. 9147) is another piece of legislation relevant to Mt. Halcon because it governs numerous endemic species and habitats found in the area. RA 9147 provides a system of classification for threatened species, and applies to all wildlife resources regardless of their location.

One important provision of RA 9147 is the designation of critical wildlife habitats, further elaborated in DENR Memorandum Circular No. 2007-2. Critical habitats refer to "*areas outside the protected areas under the NIPAS that are known habitats of threatened species and designated as such based on scientific data, taking into consideration species endemicity and/or richness and presence of man-made pressures/threats to the survival of wildlife living in the area, among others*", which shall be declared through issuance of an administrative order by the DENR Secretary.

Local governments may also declare critical habitats through issuances of ordinances, provided that procedures for their establishments, as mandated in DENR MC No. 2007-02, are followed. However, LGUs enacted ordinance declaring critical habitats needs to be endorsed to the DENR Secretary for proper issuance of an administrative order.

The management of critical habitats may involve partnership between the DENR, NGOs, POs, IPs, private sectors, and other interested entities through issuance of MOA between the involved parties. The MOA shall define the responsibility and accountability of each contracting party. A management plan for the declared critical habitats shall also be prepared.

6. Conservation and Management Issues, Concerns, and Challenges

The different issues, concerns, and challenges of Mt. Halcon actually presented by the participants in the planning workshops are provided in **Table 6**.

Table 6. Issues, Concerns and Challenges Identified During the Planning Workshop

Thematic Concern	Specific Issues
Bio-Physical Issues	
Spatial Coverage	• No defined boundary yet for Mt. Halcon;
Natural Resource Uses and Practices	• Mining (large and small scale), quarrying (rock, pebbles, boulders), gold panning, collection of gemstones, quartz; • Illegal logging, cutting, kaingin in critical areas, practice of slash and burn or kaingin-making, shifting cultivation, rampant charcoal-making; • Collection of NTFP (rattan, nito, almaciga resin, tree ferns-driftwood, ornamentals, orchids, mosses, ferns, orchids, herbal/medicinal plants, butterflies & other vines) and illegal hunting;
Natural and Man-Made Disasters	• Landslides/erosions; • Flooding; • Earthquake, typhoon belt; • Forest fire;
Other Issues	• Garbage (local and mountaineers); • Introduction of exotic species (Gmelina, Mahogany); • Insufficient forest rehabilitation activities;
Socio-Economic and Cultural Issues	
Livelihood	• Insufficient livelihood opportunities; • Out of school youth (help parents earn a living); • Lack of technical know-how on farming; • 100% living below the poverty threshold;
Delivery of Basic Social Services	• Increase of population (natural and in-migration); • Poor hygiene and sanitation; • 0-5 years mababa ang timbang (recognized by IPs, but must study IP knowledge and system on health and sanitation);
IP Knowledge, Systems and Practices	• Kakulangan sa pag-galang at pagpapa-halaga sa pangangalaga sa Mt. Halcon; • Hindi nakikita ng mga taga-labas ang pagmamalasakit at pagmamahal ng mga Mangyan sa Halcon; • Kulang sa pang-unawa sa mga karapatan ng mga katutubo bagama't may Batas IPRA na; • Kulang sa pag-galang sa sagradong lugar; • Hindi pa naisama ang KA-PLANO sa programa ng gobyerno; • Wala pang ADSDPP; • Pagkuha ng mga larawan, kuwento, kasaysayan na walang pahintulot; • Acculturation; • Harmful outside influences (alcohol, cigarettes, pedophilia); • Promotion of dependency by "outsiders;" • Pagtuturo ng ibang paraan ng resource use;
Institutional and Management Arrangement Issues	
Policy and Governance	• National laws or tribal laws; • Lack of appropriate regulations; • Kakayahan sa pagpapatupad ng batas; • Unclear decision-making; • Lack of government support for community development; • System for issuing permits (DENR to issue permits, IPs/NCIP to issue FPIC); • Protection (DENR); • Igalang at sundin ang mga proseso sa pagkuha ng permit; • Ilinaw ang mga proseso sa pagkuha ng permit;
Information, Education, Capacity, Planning and	• Iba-ibang pananaw ng mga sector tungkol sa Mt. Halcon; • Lack of information;

Thematic Concern	Specific Issues
Fees	• Walang community consultations; • Maraming plano para sa Halcon (No documented plan except for KA-PLANO); • Iba't-ibang programa na hindi nagkaka-ugnay-ugnay; • Lack of capability building for the stakeholders of Mt. Halcon; • Lack of Users' Fee Sharing Framework/System on the utilization of Halcon's resources (Domestic and Irrigation).

The biological and cultural significance of Mt. Halcon has become highly vulnerable, with various issues, concerns, and challenges that, if left unattended, may result enormously to further erosion of the IP culture, more loss of biologically important resources, and extreme deterioration of the natural environment and ecological services, among others.

The remaining forests of Mt. Halcon, which serve as important habitats and watersheds and offer other ecological services, continues to decline through the years because of timber poaching, charcoal production, conversion of forestlands into other land uses, slash and burn farming, small scale mining, and other destructive and unsustainable resource use practices. Already fragmented, these remaining natural forests are now confined to a much higher elevation. The use of natural resources in Mt. Halcon is not fully regulated. Mt. Halcon has become open access because of the question on who is the real authority in the area to effect protection activities. Actual protection measures and mechanisms need to be in place properly in Mt. Halcon.

As a consequence of habitat destruction and excessive wildlife exploitation, several endemic species in Mt. Halcon and Mindoro, in general, are extremely threatened with extinction in the wild and already listed in the Red List of Threatened Species of the IUCN and DENR. In fact, Mt. Halcon accounts a large number of threatened species, classified as critically endangered, endangered and/or vulnerable to extinction, compared with other priority conservation sites in Mindoro Island.

Along with the deterioration of Mt. Halcon's natural environment and resources, the cultural integrity of the area has also diminished with the influence of lowland practices on the Mangyans. Some Mangyan communities are already acculturated and engaged in resource use practices introduced by non-Mangyan residents. The rights of the Mangyans to their ancestral domains are not yet fully recognized since their CADT applications have not been approved in spite of the fact that they have been awarded CADCs. Moreover, the capacity of the Mangyans to fully govern over and control their ancestral domains is an important consideration since some unsustainable resource use practices remain in the area. The influence of lowland culture on the Mangyans' way of life is also a concern in Mt. Halcon. The appreciation of the lowlanders of the cultural practices of the Mangyan needs to be enhanced.

The depletion and deterioration of natural resources have likewise reduced the food supply of the Mangyans, especially those who are still dependent on forest resources for food and livelihood. Some wild resources consumed for food by the Mangyans are now classified as threatened species, particularly deer and wild pigs. There are Mangyans who collect forest resources for their own use, but with growing demand from the local market, they have started to trade these products commercially

to buy food. Dependency of IP and non-IP communities on the remaining natural resources for subsistence and livelihood is an important conservation concern in Mt. Halcon. With the continuing deterioration of Mt. Halcon's natural environment, its cultural integrity is also affected, with migrants already occupying the original territories of the IPs.

The other critical issue in Mindoro is the government's priority agenda to subject a large area of the island to mining. Several vital biological and cultural areas are covered with at least 92 mining tenements, measuring about 554,676 hectares or 55.25% of the land area of the entire island. These mining tenements are classified into Exploratory Permits, Mineral Production Sharing Agreements, and Financial and Technical Assistance Agreements. There are pending mining applications, particularly in San Teodoro, that may cover certain parts of Mt. Halcon. However, the Sangguniang Panlalawigan of Oriental Mindoro has enacted a resolution declaring a mining moratorium in the entire province.

The awareness of the general public on the biodiversity relevance of Mt. Halcon is relatively low, so there is a need to enhance and strengthen the capacity of local stakeholders on biodiversity conservation. Full and meaningful participation of local stakeholders, particularly the local governments and IP and non-IP communities, have to be mainstreamed and enlisted in the conservation of Mt. Halcon. The enormous challenges in the biodiversity conservation of Mt. Halcon, therefore, necessitate the development and implementation of a clear, integrated, and unified conservation agenda that take into account both the biological and cultural features of the area.

The institutional arrangement for the management of Mt. Halcon is an important concern. Although Mt. Halcon is recognized as an ancestral domain, the capacity of the Mangyans to fully manage the area from destructive activities requires further strengthening and support from other sectors. There is a question, therefore, on how other stakeholders, particularly the LGUs and the DENR, participate in the management of Mt. Halcon as an ancestral domain.

Although Mt. Halcon is well recognized as a biologically important area of the Philippines, no formal institutional arrangement has ever been instituted for its conservation other than its status as an ancestral domain. The DENR has recommended the declaration of Mt. Halcon as a protected area, but no progress has been made because this management scheme is not acceptable to the IPs. The municipal governments bordering Mt. Halcon have no clear management objectives and plans, but they recognize the potential of the area for ecotourism. The provincial government of Oriental Mindoro is now attempting to prepare a tourism management plan for Mt. Halcon.

It should be noted that while no formal institutional mechanisms have been put in place for Mt. Halcon, Barangay Lantuyan in Baco passed a resolution in 2006 declaring a moratorium on mountaineering-related activities because of the findings that certain areas are already degraded due to unregulated entry of mountaineers and destruction created by uncaring visitors. This moratorium was recognized and respected by some local governments and mountaineering groups, and is still in effect

to date. However, the moratorium will soon expire and mechanisms to implement proper systems to regulate mountaineering activities are not yet ready.

In general, the conservation of Mt. Halcon as a biologically and culturally important site still needs to be considered in the development agenda and policy framework of the different national government agencies, local government units, and other sectors with interest over the area. Some interests over Mt. Halcon, particularly mining and other commercial resource extraction, are detrimental to its biodiversity conservation and cultural preservation.

7. The Strategic Plan

This strategic plan for Mt. Halcon covers a 10-year period, beginning in 2012. This plan is the output of the different planning exercises involving the relevant and important stakeholders of Mt. Halcon, as facilitated by the Mindoro Biodiversity Conservation Foundation, Inc. and the provincial government of Oriental Mindoro. This section includes the vision, goals, objectives, programs and strategies in the management of Mt. Halcon.

7.1. Vision of the Plan

The vision of this plan reflects the desired outcomes of stakeholders in managing Mt. Halcon. This was formulated during the strategic planning workshop, which was written in the national language.

Ang Mt. Halcon:

Mayamang samu't saring buhay,
Mayamang kultura,
Mataas na kamalayan at pagpapahalaga sa kultura at kalikasan (pamamahala),
Balanseng nabubuhay tao at kalikasan.

7.2. Goals and Objectives

During the strategic planning workshop, the participants listed key actions to address the identified issues and concerns. These are presented in **Table 7.2.a** the way they were actually formulated.

Table 7.2.a. Goals and Objectives Formulated During Planning Workshop

Bio-Physical	• Malaman ang kabuuan ng samu't saring buhay sa Mt. Halcon; • Magtukoy ng sona/lugar (Strict protected zone/sacred sites, agroforestry/production, rehabilitation/restoration, ecotourism zone, settlements/reservation; • Makatotohanang pagpapatupad ng batas (Bantay Gubat); • Conservation Education (IEC);
Ethno-Cultural	• Pag-aralan at irespeto ng mga di-katutubo ang integridad ng kultura ng mga katutubo; • Panatilihin at palakasin ang tradisyunal na kaugalian; • Maging bahagi ang mga katutubo sa pagpla-plano at pagde-desisyon sa mga usaping nakaka-apekto sa kanilang buhay;

	● Ibigay ang karapatan sa lupaing ninuno;
Socio-Economic	● Makapaglunsad ng mga proyektong pangkabuhayan na may pagsasaalang-alang sa kultura at paniniwala ng pamayanan; ● Makapagbigay ng angkop na serbisyong panlipunan sa mga pamayanan; ● Palakasin ang kakayahan, kaalaman at pagpapahalaga (Capacity Building/ organizing); ● Cultural (Encounter, Interaction, Dialogue);
Governance and Participation	● Makapaglunsad ng mga proyektong pangkabuhayan na may pagsasaalang-alang sa kultura at paniniwala ng pamayanan; ● Makapagbigay ng angkop na serbisyong panlipunan sa mga pamayanan; ● Palakasin ang kakayahan, kaalaman at pagpapahalaga (Capacity building/ organizing); ● Cultural (Encounter, interaction, dialogue);

Based on the table above, the consultant and MBCFI tried to structure the different goals and objectives to present the Mt..Halcon conservation and management plan in a more logical order. In addition, more details are elaborated based on the reporting and plenary discussions during the strategic planning workshop.

The vision of the plan was broken down into several goals. These goals reflect the four elements of the vision. The first one refers to the conservation of Mt. Halcon's biodiversity through protection of species, habitats, and ecosystems. Complimentary to the first goal, the management plan considers the socio-economic and cultural variables affecting the state of Mt. Halcon's biodiversity. As such, the second goal of this management plan hopes to institute socio-economic and cultural conditions that are conducive to the biodiversity conservation of Mt. Halcon.

This management plan further explores the potential of Mt. Halcon for ecological tourism because of its amazing natural features (third goal). This ecotourism potential may boost livelihood opportunities in the area. However, the ecotourism implementation must be culturally and biologically sensitive relative to the status of Mt. Halcon as an ancestral domain and a Key Biodiversity Area of the Philippines. Finally, the fourth goal of this plan relates to the management system of the area, which will attempt to bind the different stakeholders into a collaborative management regime.

The goals of this management plan are further translated into specific objectives, as presented in the **Table 7.2.b**.

Table 7.2.b. Goals and Objectives Adopted in this Management Plan

Goals	Objectives
Bio-Physical Component Mt. Halcon's biodiversity and culturally important species, habitats, and ecosystems secured and protected from destructive activities;	• To determine and update Mt. Halcon's biodiversity status by conducting baseline studies and other ecological researches; • To raise the awareness, consciousness, and appreciation of local officials, IP and non-IP communities, and the general public on the biological and cultural importance of Mt. Halcon and Mindoro, in general; • To formulate effective forestland and other resource use plans that will harmonize the biodiversity conservation and cultural needs of Mt. Halcon with local development priorities, plans, and policies; • To develop and implement effective biodiversity protection, recovery and restoration/rehabilitation measures, and monitoring and evaluation involving key stakeholders of Mt. Halcon;
Ethno-Cultural and Socio-	• To determine socio-cultural and economic variables affecting Mt.

Goals	Objectives
Economic Component Socio-cultural and economic conditions conducive and supportive to the biodiversity conservation of Mt. Halcon instituted and functional;	Halcon's biodiversity; • To enhance the ADSDPP of the IPs so as to reflect the biodiversity conservation needs of Mt. Halcon, and integrate the same to the local development planning and policy framework of LGUs; • To provide technical assistance to IPs in (a) claiming their CADTs; (b) enhancing their capacities to sustain their traditional resource and cultural practices, and (c) safeguarding their ancestral domains from unsustainable and destructive activities; • To design and implement culturally appropriate and sustainable livelihood activities that would mitigate threats to Mt. Halcon's biodiversity; • To facilitate the delivery and access of the basic social service requirements of the communities within and surrounding Mt. Halcon;
Ecotourism Component Potential of Mt. Halcon for culturally and biologically sensitive ecological tourism explored;	• To conduct baseline studies on the potential of Mt. Halcon for ecotourism; • To design and implement culturally and biodiversity appropriate ecotourism products that will also provide livelihood options in the locality; • To come up with measures addressing the moratorium on climbing Mt. Halcon, and install and implement mechanisms for its opening;
Institutional and Management Arrangement Participatory management regime involving capacitated stakeholders established and effectively operational in conserving Mt. Halcon's biological and cultural diversity.	• To enhance the technical and institutional capacities of local officials and employees, IP and non-IP communities, and other relevant stakeholders in biodiversity conservation; • To develop and carry out effective financing measures that will sustain the management of Mt. Halcon; • To establish and carry out effective coordination, partnerships, and other management mechanisms between and among the relevant stakeholders that will advance the conservation and protection of Mt. Halcon; • To develop an appropriate monitoring and evaluation system for the management of Mt. Halcon.

7.3. General Strategies and Directions

The different goals of this management plan are translated into general programs, while the objectives are translated into specific activities to ensure a more structured implementation of the management plan.

7.3.1. Biodiversity Conservation Program

This program component supports the implementation of the first goal of the management plan. The program includes (a) conservation research and studies; (b) conservation awareness and education; (c) forestland use and other resource use planning; and (d) biodiversity protection, habitat restoration, and monitoring. The different program components aim to address issues related to the bio-physical conditions of Mt. Halcon.

Conservation Research and Studies

Conservation research activities may include comprehensive bio-physical profiling, habitat and/or species-focused researches, and studies on ecological services and functions, among others. The possibility of engaging in partnerships with research

and academic institutions and/or other interested and competent organizations in the implementation of this program component shall be explored. This also involves capacity building since local stakeholders shall be trained and involved in designing and implementing various researches and studies. Results of these studies shall be presented to stakeholders for information and appropriate action, and subsequently input in a systematic data base. Required permits shall be secured from concerned institutions and groups before proceeding to actual studies and researches, including FPIC from the Mangyan Tribes. These studies and researches are necessary so that program and policy issuances in Mt. Halcon should be based on sound scientific judgments. As much as possible, results of researches shall be subjected to peer-reviews and published in scientific journals.

Conservation Awareness and Education

The conservation awareness and education component of this management plan is aimed to popularize the biodiversity and cultural significance of Mt. Halcon to gain broader support for its protection and conservation. Various information, education, and communication strategies shall be developed and implemented to increase the conservation awareness of the Mangyans, non-IP communities and other stakeholders, as well as to generate support for the implementation of the management plan of the area. This may include various interpersonal approaches of communication, folk media, and other relevant communication strategies.

The program will also maximize mass media in disseminating information on the biodiversity and cultural importance of Mt. Halcon. The different academic institutions surrounding the area are also the target participants of this program. In order to produce relevant communication materials and determine the level of awareness of target audience, perception surveys shall be conducted.

Forestland Land Use and Other Resource Use Planning

Local governments with territorial jurisdiction over Mt Halcon shall be assisted in the preparation of forestland use plans. The ADSDPPs of the Mangyans are to be adopted in this planning process. The main policy framework that shall be used for this strategy is the Local Government Code and its associated implementing rules and regulations, specifically the Joint DENR-DILG Memorandum Circular Nos. 98-01 and 2003-01.

The final forestland use plan of each LGU shall be integrated to the CLUP of the concerned local government unit through the issuance of a resolution by the Sangguniang Bayan. The forestland use plan shall designate land use categories, including allowable and prohibited activities in every designated category.

In the same manner, holders of Community-Based Forest Management Agreements shall be assisted in developing their Community Resources Management Plans that would consider biodiversity protection while providing measures for sustainable livelihood activities. The resource plans of communities shall be integrated into the short- and long-term plans of local governments.

Biodiversity Protection, Habitat Restoration, and Monitoring

The purpose of this program component is to facilitate the formation of community-based biodiversity protection groups, which shall take the lead in protecting the different ecosystems, habitats, and threatened endemic species of Mt. Halcon. This involves the development and implementation of intensive biodiversity protection and law enforcement to curtail illegal and destructive activities in the area. This strategy is aimed to establish the presence of biodiversity protection mechanisms in Mt Halcon so as to discourage the commission of illegal activities. The target areas for biodiversity protection are the remaining closed canopy and secondary forests, sites that are the subject of restoration, and other important terrestrial habitats in Mt. Halcon. Partnerships with government institutions, such as the Philippine National Police and the Armed Forces of the Philippines, shall be carried out to implement this particular strategy of the management plan. Multi-sectoral protection groups shall be encouraged in every municipality covering Mt. Halcon.

On the other hand, a demonstration area for habitat restoration shall be implemented in Mt. Halcon. The target areas for the habitat restoration component are the denuded and open-areas, sparsely vegetated sites, critical watersheds, and important habitats identified through proper suitability assessments. The main purpose of this component is to showcase the viability of habitat restoration for biodiversity purposes, which means areas that are the subject of rehabilitation shall not be used for production purposes. Local communities, Mangyan Tribes, LGUs and other interested stakeholders are the main partners for the implementation of habitat restoration.

To update the biodiversity status of Mt. Halcon, an effective and participatory biodiversity monitoring and evaluation tool shall be developed and implemented. The monitoring shall focus on the critical habitats of threatened species and areas where biodiversity threats are relatively high.

7.3.2. Socio-Cultural and Economic Assistance Program

This program will implement the second goal of this management plan. This covers the socio-cultural and economic baseline studies, enhancement of the Mangyan's ADSDPP, and livelihood support services. This is primarily intended for the Mangyans living within and surrounding Mt. Halcon. The program will be implemented in partnership with the Mangyan Tribes, local governments and other interested institutions.

Socio-Cultural and Economic Baseline Studies

This program component shall determine socio-cultural and economic variables affecting Mt. Halcon's biodiversity so as to design appropriate socio-cultural and economic interventions in the area. This will involve comprehensive primary and secondary data gathering and profiling of demographic features, social institutions and services available in the area, gender issues, resource use practices and livelihood activities, and development interventions, among others.

The implementation of this particular strategy shall involve Mangyan communities and other interested groups. Partnerships with competent academic and research institutions shall be explored in conducting the socio-cultural and economic baseline studies in Mt. Halcon.

ADSDPP Enhancement and Integration

With free and prior informed consent from the Mangyans and tje concurrence of the NCIP, this management plan explores the possibility of providing technical assistance to the IPs in enhancing their Ancestral Domain Sustainable Development and Protection Plans, relative to the biodiversity conservation of Mt. Halcon. In providing technical assistance in the enhancement of the ADSDPPs, it is necessary to adhere to the guidelines issued by the NCIP for this purpose (NCIP Administrative Order No. 1, Series of 2004). The ADSDPP Primer, prepared jointly by UNDP and NCIP in providing assistance in the development and/or enhancement of the ADSDPPs of the Mangyans, shall be used as guide.

The IPs shall be assisted in working out the integration of their ADSDPPs to the local development plans of LGUs and other concerned government agencies. Moreover, assistance shall be rendered in generating support for the implementation of the ADSDPPs of the Mangyans.

Technical assistance to IPs in (a) claiming their CADTs; (b) enhancing their capacities to sustain their traditional resource and cultural practices and (c) safeguarding their ancestral domains from unsustainable and destructive activities.

This component of the Mt. Halcon Conservation and Management Plan will provide technical assistance to the IPs in claiming their CADTs. This involves provision of assistance in lobbying to the NCIP through meetings and dialogues. Once the CADT is awarded, the IPs will further be supported in the actual delineation of the declared CADTs. Moreover, this management plan envisions to provide capacity building to the IPs to ensure their full control and management over their ancestral domains. The IPs will be further provided with technical assistance for them to sustain their traditional resource and cultural practices. They will be empowered to safeguard their ancestral domains from practices contrary to the traditional belief and practices of the IPs.

Sustainable Livelihood Demonstration

The implementation of sustainable livelihood activities is crucial for the long-term conservation of Mt. Halcon. This will address the dependency of the Mangyans and non-IP communities on the remaining natural resources for subsistence. Partnerships shall be explored with relevant institutions with the necessary technical expertise and resources in the implementation of livelihood activities. Local government units are in the best position to implement this particular component of the program.

Livelihood assessment shall be conducted to determine and develop more appropriate and sustainable livelihood programs that are culturally acceptable to the Mangyans. The assessment shall include a determination of existing livelihood practices

and the impact these livelihood activities have on the surrounding biodiversity. Income-generating activities that are extractive of natural resources shall likewise be surveyed, along with the kind of resources gathered and used. Based on this assessment, non-destructive and sustainable livelihood activities shall be identified and promoted, and a sustainable livelihood framework shall be developed and adopted. This sustainable livelihood framework shall then be the basis for providing IP and non-IP communities technical assistance in developing proposals, and in generating the necessary financial and other resources.

The establishment of the demonstration area for sustainable livelihood in Mt. Halcon shall be implemented as a strategy. The purpose of this demonstration is to showcase the feasibility of sustainable livelihood activities that utilize appropriate and non-destructive technologies. Some livelihood options to be demonstrated may include agro-forestry or sloping agricultural land technologies, bio-intensive gardening, and integrated farming system. As a matter of policy, agricultural development shall make use of organic fertilizers and promote the indigenous species and diversification of crops. The other livelihood option that shall be encouraged is the establishment of commercial tree plantations to provide the timber requirements of local residents.

Livelihood activities may also include the sustainable extraction of non-timber forest products, especially for the Mangyans. However, resource assessment of non-timber forest produces shall first be conducted to determine the viability of their extraction. If determined to be viable, the rate of extraction shall be governed by the natural capacity of non-timber forest products to regenerate. Another livelihood option that may be implemented in areas where NTFP are still available is the processing of raw non-timber forest products into viable commercial products. Ecotourism as a form of livelihood may likewise be explored.

Delivery of Basic Social Service Requirements

This particular strategy will assist communities in accessing basic services from concerned government and non-government institutions. The local government units shall take the lead in implementing this strategy. Communities shall be assisted in identifying their critical social service requirements, include healthcare, education, and support infrastructure, among others. However, the delivery of these social services shall not, in any way, affect the cultural integrity of the IPs, and must be within environmental standards, especially in relation to infrastructure projects.

7.3.3. Biologically and Culturally Sensitive Ecotourism Development Program

This program shall conduct baseline studies on the potential of Mt. Halcon for ecotourism, so that culturally and biodiversity appropriate ecotourism products shall be developed and implemented. These ecotourism products shall be designed to provide sustainable livelihood options in the locality. Another equally important concern that shall be addressed by this program is the moratorium on trekking imposed on Mt. Halcon. It is expected that specific measures and management systems shall have been put in place for the moratorium to be lifted.

The ecotourism program shall be implemented as a partnership between the Mangyans, LGUs and other interested groups. A clear ecotourism framework shall be developed to guide the different activities and pilot sites identified for this purpose. However, the different ecotourism activities shall be carefully designed to avoid negative socio-cultural and economic impacts. If necessary, a cultural and environmental impact assessment shall be carried out prior to the implementation of ecotourism products and activities. Low impact ecotourism activities are to be promoted.

7.3.4. Institutional Strengthening and Partnership Program

This program is designed to implement the fourth goal of the management plan, which is to institute a participatory management regime involving capacitated stakeholders to ensure the conservation of Mt. Halcon's biodiversity and cultural diversity. This involves the provision of technical assistance in enhancing the technical and institutional capacity of local officials and employees, IP and non-IP communities, and other relevant stakeholders in biodiversity conservation.

In order to sustain the effective management of Mt. Halcon, this program will specifically develop financing measures that will ensure the implementation of the different management activities. Various strategies shall be carried out in resource mobilization to tap various funding institutions. Local stakeholders shall be encouraged to develop financing schemes for the area.

It is also the intention of this program to establish and carry out effective coordination, partnerships and other management mechanisms between and among the relevant stakeholders to advance efforts in the conservation and protection of Mt. Halcon, as well as to develop an appropriate monitoring and evaluation system for the management of Mt. Halcon.

The capacity and institutional building strategy is intended for the local government units, the different Mangyan Tribes and non-IP communities, relevant national government agencies, and other concerned institutions. It aims to enhance the individual and institutional capacities of the different stakeholders to develop and implement conservation strategies. In particular, capacity building shall involve strengthening the technical, managerial, and financial capability of stakeholders in the biodiversity conservation of Mt. Halcon. Meanwhile, technical assistance shall be provided in enhancing, strengthening and advancing the individual and organizational capacities of the Mangyans to develop and implement biodiversity conservation measures, and in the management of their ancestral domains, without prejudice to their existing cultural practices and traditional and sustainable resource uses.

7.4. General Work Plan

The general work plan provides guidance to the different stakeholders in identifying the different activities and expected output to deliver the desired goals and objectives of this plan. This will also provide details on how specific strategies shall be actually implemented.

7.4.1. Biodiversity Conservation Program

The strategies of this program component include (a) conservation research and studies; (b) conservation awareness and education; (c) forestland use and other resource use planning; and (d) biodiversity protection, habitat restoration, and monitoring. The different program components aim to address issues related to the bio-physical conditions of Mt. Halcon.

Conservation Research/Studies

Activities	Expected Outputs	Implementation Arrangements
Biological assessment (Updating of baseline information)		
Development of a comprehensive proposal for biological assessment to include (a) habitat characterization; (b) comprehensive faunal survey per habitat type; and (c) floral survey per habitat type at the lower slopes of Mt. Halcon;	Solicited technical and funding support for the conduct of biological assessment on habitats, flora and fauna of Mt. Halcon	Establish partnership with qualified and interested NGO, academic and research institutions for the development of biological assessment proposals
Secure necessary permits and other protocols for the conduct of survey	• FPIC issued by IPs in areas within the ancestral domain for the biological assessment; • LGUs endorsed the proposal; • DENR issued gratitutious and other necessary permits for the biological survey;	• Research proponents shall present and request for the issuance of FPIC by IPs, endorsement from LGUs and necessary permits from DENR • IPs to issue FPIC, LGUs to provide endorsement and DENR to grant GP and other necessary permits
Formation and training of assessment teams to include representatives from LGUs, DENR, NGOs and IPs;	• Organized and provided training to multi-disciplinary and inter-sectoral teams who will be responsible in biological assessment;	• In partnership with LGUs, NGO/Academic/Research Institutions, the DENR and PGENR will take the lead in the formation and training of the assessment teams;
Biologal field assessment (primary and secondary data gathering) and data compilation, organization and analysis	Prepared updated biological/conservation profile of Mt... Halcon	• Multi-disciplinary and inter-agency assessment teams will conduct the biological assessment for Mt.. Halcon
Presentation of survey results to stakeholders	Each group of stakeholder made commitment to implement at least one specific conservation measure based on survey results	• Survey teams will present the assessment results • Stakeholders will identify and implement at least one specific conservaton action, as recommended in the survey results;
Other ecological studies/researches (Species and ecosystem/habitat-focused studies, resource valuation, payment for environment/ecosystems services, resource use options with cost-benefit analysis)		
Assessment and determination of other site specific research needs and requirements;	At least five other thematic researches identified for Mt.. Halcon;	The biological assessment will also include determination of additional and necessary researches/studies that shall be implemented;
Development of research proposals;	Proposals for the identified thematic researches prepared;	Partnership with potential researches shall be carried out;

Secure necessary permits and implement required protocols;	Identified researches provided with required permits;	Concerned agencies and groups will provide permits following presentation of research proponents;
Conduct of at least five thematic researches/studies in Mt.. Halcon;	Additional information gathered, compiled and analyzed to enhance the conservation of Mt.. Halcon;	Research partners will conduct thematic studies;
Study results presented to relevant stakeholders;	Stakeholders affirmed study results and committed to implement corresponding recommends;	Each group of stakeholder to prepare and implement at least specific conservaton measure based on recommendations of the different researches;

Conservation Awareness and Education

Activities	Expected Outputs	Implementation Arrangements
Development and distribution of IEC materials intended for general public;	Produced the following materials depicting the biological and cultural importance of Mt.. Halcon • Two sets (English and Tagalog) of audio-visual presentations • Two sets of brochures (English and Tagalog) • One localized comics designed for communities • One set of exhibit/display materials for mobile presentations in the different communities • Yearly poster-calendar • Two sets of brochures	The provincial government through the PGENRO/PIO will establish partnership with DENR, NGO and academic institutions and other interested groups for the development of IEC materials;
Teachers training for schools surrounding Mt.. Halcon to integrate biodiversity conservation on their teaching modules	• At least two trainings conducted (one for high school and one for elementary teachers) • Localized teaching aids prepared by teachers	• DepEd shall be engaged in the implementation of this activity; • Partership with NGOs and academic institutions shall be forged in implementing the teachers training;
School-based conservation awareness activities in the different schools at the footslopes of Mt.. Halcon;	At least one conservation awareness-related activity implemented yearly in schools proximate to forested areas of Mt.. Halcon;	• Establish partnership with DepEd to request schools located at the footslopes of Mt.. Halcon to launch conservation-awareness related activities; • Participants of the teachers training shall be tapped for the implementation of awareness activities in schools;
Launching of conservation events and declaration of Mt.. Halcon Day during Tamaraw Month	Include themes related to Mt.. Halcon during the following commemoration: • Earth Day • Environment Month	• DENR to coordinate with different stakeholders in launching the different conservation events that would also highlight the importance of Mt.. Halcon

	• Biodiversity Day • Wildlife/Tamaraw Month	• Sangguniang Panlalawigan shall issue a resolution for the declaration of Mt.. Halcon Day;
Promotion of Mt.. Halcon in mainstreamed and social media	• Mt.. Halcon featured in at least two national TV programs and two national papers; • Activities related to Mt.. Halcon published in local papers and aired in local radio stations; • Mt.. Halcon fan page created in Facebook;	• The provincial government through the PGENRO and PIO will coordinate with PIA and media organizations for the implementation of the different activities; • Encourage stakeholders to initiative activities that will promote the conservation of Mt.. Halcon in mainstreamed and social media;

Forestland and Other Resource Use Planning

Activities	Expected Outputs	Implementation Arrangements
Forestland use planning	• Municipal governments covering Mt.. Halcon developed their forestland use plans to include the Mt.. Halcon management plan;	• DENR, PGENRO and concerned NGOs will provide technical assistance to municipal LGUs in developing forestland use plans; • DENR to affirm the FLUP of LGUs
Integration of FLUP and Mt.. Halcon management plan to CLUPs of LGUs covering Mt.. Halcon;	• Annual investement provided by LGUs for the implementation of FLUP and Mt.. Halcon management plan;	• Sangguniang Bayan of LGUs will enact ordinance for the integration of FLUP and Mt.. Halcon management Plan to their respective CLUP; • LGU shall provide allocation for the implementation of FLUP and Mt.. Halcon plan;

Habitat/Forest Protection, Restoration and Monitoring

Activities	Expected Outputs	Implementation Arrangements
Community-based habitat/forest protection system	• Community based forest protection group established, trained and operational in every barangay covering Mt.. Halcon;	• Every barangay covering Mt.. Halcon shall organize protection group; • Municipal LGUs to provide support for the operation of protection groups in the different barangays; • DENR in cooperation with concerned NGOs shall provide capacity building; • DENR to provide deputation orders as ENROs/WEOs;
Municipal forest protection task force	• Municipal forest protection task force formed/reactivated, trained and operational in every municipality within Mt.. Halcon	• Municipal LGU through issuance of Executive Order by the Mayor shall form the forest protection task force and support the operation • DENR shall coordinate the formation, training and operation of the task force;

Habitat restoration	• At least 100 hectares habitat restoration established yearly	• DENR to provide technical assistance to PGENRO and other stakeholders in implementing habitat restoration in line with the National Greening Program;
Biodiversity monitoring	• Biodiversity monitoring system piloted in at least three areas (one per municipality)	• DENR in partnership with concerned NGOs and LGUs shall establish and sustain the biodiversity monitoring stations.

7.4.2. Socio-Cultural and Economic Assistance Program

The components of this program include baseline studies, enhancement of the ADSDPP to integrate biodiversity conservation, livelihood development, and delivery of basic social services.

Socio-Cultural and Economic Baseline Studies

Activities	Expected Outputs	Implementation Arrangements
Updating the current conditions of the IP tribes in Mt. Halcon;	Identified and assessed prevailing issues, concerns and needs of the IP tribes in Mt. Halcon;	NCIP shall develop the tool and facilitate the survey, in partnership with IP groups;
Conduct assessment on the traditional and sustainable resource use practices of the IPs.	Documented traditional resource use practices.	NCIP to take the lead in the assessment, in partnership with IP groups and other concerned and qualified institutions.

Technical Assistance and Capacity Building for IPs

Activities	Expected Outputs	Implementation Arrangements
Lobbying for the awarding of IP CADTs;	CADTs of IPs covering Mt. Halcon awarded;	• IPs to prepare lobbying plan, which shall be supported by other stakeholders; • NCIP to award the CADT;
Capacity enhancement to sustain traditional resource use and cultural practices (capacity building planning and implementation);	Identified capacity building needs of the IPs implemented;	• IPs prepare the capacity building plan, with the support of NCIP; • Other stakeholders will mobilize support for the implementation of the capacity building plan; • IPs participate in the capacity building activities;
Support to IPs in safeguarding their ancestral domains from unsustainable and destructive activities.	IPs are implementing activities that protect their ancestral domains.	• IPs shall identify the different protection activities, with the support of NCIP; • Other stakeholders will mobilize support for the implementation of the protection activities; • IPs implement protection measures.

ADSDPP Enhancement and Integration

Activities	Expected Outputs	Implementation Arrangements
IP workshops to enhance the biodiversity conservation measures in the ADSDPPs;	Biodiversity conservation measures are fully integrated into the ADSDPPs of the IPs in Mt. Halcon;	NCIP, LGU and other concerned groups shall provide technical assistance to IPs in integrating biodiversity conservation in the ADSDPP;
Presentation of enhanced ADSDPPs by IPs to LGUs;	IPs presented the enhanced and updated ADSDPPs to LGUs (municipal and provincial);	NCIP to assist the IPs in the presentation;
Integration of ADSDPPs to local development plans;	LGUs enacted resolutions integrating ADSDPPs to local development plans and allocate funds to support the implementation of ADSDPPs;	LGUs to enact resolutions and allocate budget;
ADSDPPs implementation.	IPs implemented conservation measures.	IPs shall be supported by NCIP, LGUs, DENR and other concerned institutions in the implementation of ADSDPPs.

Sustainable Livelihood Demonstration

Activities	Expected Outputs	Implementation Arrangements
Identification of potential livelihood activities based on the assessment of traditional and sustainable resource use practices of the IPs;	Concept proposal for sustainable livelihood activities developed and funds for implementation secured;	IPs shal prepare the concept proposal and solicit necessary funds, with the support of NCIP, LGUs, and DENR;
Assessment and identification of pilot sites for sustainable livelihood development;	At least one pilot area identified in every municipality;	IPs shall formulate criteria and conduct site assessment and selection, with the support of NCIP, LGUs, and DENR
Implementation of sustainable livelihood activities;	Established demonstration area for sustainable livelihood in Mt. Halcon	The IPs will implement the livelihood activities, duly supported by NCIP, LGUs, DENR and other concerned groups;
Monitoring and evaluation.	Livelihood activities implemented in accordance with the concept.	Joint monitoring shall be undertaken by IPs, NCIP, LGUs and DENR.

Delivery of Basic Social Service Requirements

Activities	Expected Outputs	Implementation Arrangements
Inventory of existing basic social services in barangays covered by Mt. Halcon conducted and additional requirements identified;	Identified additional social services and submitted the same to LGUs for consideration;	IP communities and barangay LGUs shall identify existing basic social services and submit the same to municipal and provincial LGUs;
Provision of basic social services.	Minimum basic social requirements of communities in Mt. Halcon provided.	LGUs will primarily take the lead in the provision of social services, in cooperation with concerned government and non-government institutions.

7.4.3. Biologically and Culturally Sensitive Ecotourism Development Program

The ecotourism program shall maximize the potential of Mt. Halcon for ecotourism with utmost consideration of the biodiversity and cultural values of the

area. As such, proper assessment and development of ecotourism products shall be implemented with the active participation of IP communities.

Activities	Expected Output	Implementation Arrangements
Assessment of potential sites and products for ecotourism	Pilot areas for ecotourism and possible products identified	The PGENRO, in partnership with the Tourism Office and concerned institutions, shall jointly conduct an assessment of potential tourism sites and products
Ecotourism planning	A comprehensive ecotourism plan with social, cultural and environmental impacts formulated	The Provincial Tourism Office shall take the lead in the planning
Ecotourism capacity building and social preparations	Target participants to the ecotourism program identified and provided with necessary orientation and training	The Provincial Tourism Office shall take the lead in developing and implementing capacity building activities and other social preparations
Pilot implementation of ecotourism products	At least three major ecotourism products initially identified and implemented in Mt. Halcon	The Provincial Tourism Office, in cooperation with IP communities, LGUs and concerned groups, shall take the lead in implementing pilot ecotourism activities
Ecotourism promotion and marketing	Ecotourism products and destinations in Mt. Halcon promoted	The Provincial Tourism Office shall take the lead

7.4.4. Institutional Strengthening and Partnership Program

This program will execute activities that are necessary to implement this management plan, and which will enhance the capacity of stakeholders in environment and natural resources management. This is also to ensure the sustainability of conservation initiatives through effective partnerships between and among the different interest groups.

Activities	Expected Output	Implementation Arrangements
Capacity building	• Identified the capacity building requirements of local stakeholders; • Formulated a specific capacity building plan for stakeholders; • Implemented and monitored capacity building activities;	The PGENRO, in cooperation with the DENR, NCIP, IPs and concerned institutions, shall take the lead in developing and implementing capacity building activities;
Financing	• Prepared financing sustainability mechanisms for Mt. Halcon • Generated necessary resources to implement the management plan;	The provincial government shall take the lead in developing and implementing financing mechanisms, in cooperation with concerned groups and institutions;
Partnership building	• Executed partnership agreements between relevant stakeholders to implement this management	PGENRO, NCIP and DENR shall take the lead in negotiation with IP groups for the development of management system in Mt.

	plan; • Partnership agreement forged for the overall management of Mt. Halcon	Halcon

8. Institutional Mechanisms for the Implementation of the Management Plan

The implementation of this management plan requires an institutional mechanism that will oversee, coordinate, monitor, and evaluate the different activities. It should be noted that there are different programs to be carried out, and the involvement of stakeholders is necessary to achieve the outcomes of this management plan.

The management regime that shall be introduced must take into account the context of Mt. Halcon as an ancestral domain, while giving due recognition to the authority of the DENR in issuing resource use permits, and the responsibility of the LGUs to their constituents. It is, therefore, necessary that a collaborative management body be established, such as the Mt. Halcon Management Council.

The Management Council may be composed of the DENR, NCIP and PNP, representing national government agencies, and the provincial and municipal governments bordering Mt. Halcon. The different Mangyan Tribes claiming ancestral domains over Mt. Halcon shall be included as members of the Council, including the provincial organization of the IPs in Oriental Mindoro, as well as concerned non-government organizations that implement conservation initiatives over the area.

The formation of the Management Council can be made possible by forging partnership agreements between the NCIP and IPs, DENR and concerned LGUs. This will then become the basis for the Governor to issue an Executive Order. The possibility of the Sangguniang Panlalawigan issuing a resolution to create the Management Council may likewise be explored.

Each participating institution shall be provided with specific roles, responsibilities, and accountabilities in the implementation of the Mt. Halcon management plan. These provisions shall be included in the partnership agreement that shall be developed and forged between the concerned and relevant institutions. The draft partnership covenant is presented below.

Partnership Covenant
for the Conservation and Management
of the Mt. Halcon Range in Oriental Mindoro

WE, the undersigned stakeholders of the Mt. Halcon Range in Oriental Mindoro province, in cognizance of the following:

- Mt. Halcon is an important life support system because it serves as a critical watershed of Oriental Mindoro, such that its protection will ensure the sustainable development of the province;
- Mt. Halcon is recognized as a biologically important site because of its diverse habitat types, housing numerous endemic species, several of which can only be found in the area and in Mindoro, such that its conservation is of crucial importance as a natural heritage site of Mindoro, and in the overall national and global biodiversity conservation;
- Mt. Halcon is similarly a cultural heritage site, owing to its feature as an ancestral domain of the Mangyans, such that its protection is crucial to the preservation and survival of traditional customs, beliefs and practices of its Indigenous Peoples;

We further recognize the institutional responsibility, obligation and authority of each of the concerned institutions with a stake on Mt. Halcon, as follows:

- The Indigenous Peoples have the sole right and ownership of their ancestral domains;
- The National Council of Indigenous Peoples is the mandated government agency to implement the Indigenous Peoples Rights Act;
- The Local Government Units have the responsibility and obligation to deliver the basic social requirements of their constituents, including the Indigenous Peoples. The LGU is further mandated to share responsibility with national government in ensuring the ecological balance of their respective territorial jurisdictions;
- The DENR is the primary government agency responsible for the protection of the environment and its natural resources, including but not limited to, the issuance of resource use permits even in ancestral domains;
- Whereas civil society groups are likewise provided opportunities to participate in governance, the delivery of basic social requirements, and the promotion of sustainable development, in general.

With the foregoing premises, we, the undersigned stakeholders of Mt. Halcon, hereby agree and affirm the following:

- That we bind ourselves to form the Mt. Halcon Conservation and Management Council to act as the overall oversight and steering body in coordinating, leading and facilitating the different activities in the area. Specifically, this Management Council shall be composed of the following representatives: _____. To further affirm the formation of the Management Council, we hereby request the provincial government of Oriental Mindoro to issue the necessary instrument to effect this purpose;
- That the Management Council shall be chaired by _____ with the _____ serving as the co-chair;
- That the adoption of the Mt. Halcon Conservation and Management Plan will serve as the general framework for the management of the area. Each of the contracting parties of this covenant shall likewise integrate the management plan to their respective development plans through issuance of the appropriate instrument, and thereafter implement relevant programs and activities provided in the said management plan;

9. Five-Year Schedule of Activities and Indicative Budget

Conservation Research/Studies

Activities	Implementation Arrangement	Schedule					Estimated Cost (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Development of a comprehensive proposal for biological assessment to include (a) habitat characterization; (b) comprehensive faunal survey per habitat type; and (c) floral survey per habitat type at the lower slopes of Mt. Halcon;	Establish partnership with qualified and interested NGOs, academic and research institutions for the development of biological assessment proposals;	X	X				10,000.00
Secure necessary permits and other protocols for the conduct of the survey;	• Research proponents shall present and request for the issuance of FPIC by IPs, endorsement from LGUs, and necessary permits from DENR; • IPs to issue FPIC, LGUs to provide endorsement, and DENR to grant GP and other necessary permits;		X				50,000.00
Formation and training of assessment teams to include representatives from LGUs, DENR, NGOs, and IPs;	In partnership with LGUs, NGOs/Academic/Research Institutions, the DENR and PGENR will take the lead in the formation and training of the assessment teams;		X				75,000.00
Biological field assessment (primary and secondary data gathering) and data compilation, organization and analysis;	Multi-disciplinary and inter-agency assessment teams will conduct the biological assessment for Mt. Halcon;		X	X			2,500,000.00
Presentation of survey results to stakeholders;	• Survey teams will present the assessment results; • Stakeholders will identify and implement at least one specific conservation action, as recommended in the survey results;			X			20,000.00
Assessment and determination of other site specific research needs and requirements;	The biological assessment will also include determination of additional and necessary researches/studies that shall be implemented;		X				10,000.00
Development of research proposals;	Partnership with potential researches shall be carried out;		X				50,000.00
Secure necessary	Concerned agencies and groups						25,000.00

permits and implement required protocols;	will provide permits following presentation of research proponents;						
Conduct at least five thematic researches/studies in Mt. Halcon;	Research partners will conduct thematic studies;			X	X	X	2,500,000.00
Study results presented to relevant stakeholders.	Each group of stakeholders to prepare and implement at least one specific conservation measure based on recommendations of the different researches.			X	X	X	150,000.00

Conservation Awareness and Education

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Development and distribution of IEC materials intended for the general public: • Two sets (English and Tagalog) of audio-visual presentations; • Two sets of brochures (English and Tagalog); • One localized comics designed for communities; • One set of exhibit/display materials for mobile presentations in the different communities; • Yearly poster-calendar; • Two sets of brochures	The provincial government, through the PGENRO/PIO, will establish a partnership with the DENR, NGOs and academic institutions, and other interested groups for the development of IEC materials;	X	X	X	X	X	5,000,000.00
Teachers training for schools surrounding Mt. Halcon to integrate biodiversity conservation in their teaching modules: • At least two trainings conducted (one for high school and one for elementary teachers); • Localized teaching	• Engage the DepEd in the implementation of this activity; • Forge parterships with NGOs and academic institutions in implementing the teachers training;		X	X			300,000.00

aids prepared by teachers;							
School-based conservation awareness-related activities in the different schools located at the footslopes of Mt. Halcon: • At least one conservation awareness-related activity implemented yearly in schools proximate to forested areas of Mt. Halcon;	• Establish partnerships with DepEd to request schools located at the footslopes of Mt. Halcon to launch conservation awareness-related activities; • Engage participants of the teachers training in the implementation of conservation awareness-related activities in schools;	X	X	X	X	X	2,500,000.00
Launching of conservation events and declaration of Mt. Halcon Day during Tamaraw Month: • Earth Day; • Environment Month; • Biodiversity Day; • Wildlife/Tamaraw Month;	• DENR to coordinate with different stakeholders in launching the different conservation events that will also highlight the importance of Mt. Halcon; • Sangguniang Panlalawigan shall issue a resolution regarding the declaration of Mt. Halcon Day;	X	X	X	X	X	2,000,000.00
Promotion of Mt. Halcon in mainstream and social media: • Mt. Halcon featured in at least two national TV programs and two national papers; • Activities related to the conservation Mt. Halcon published in local papers and aired in local radio stations; • Mt. Halcon fan page created on Facebook;	• The provincial government, through the PGENRO and PIO, will coordinate with PIA and media organizations for the implementation of the different activities; • Encourage stakeholders to initiate activities that will promote the conservation of Mt. Halcon in mainstream and social media;	X	X	X	X	X	500,000.00

Forest and Other Resource Use Planning

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Forestland use planning: • Municipal governments covering Mt.	• DENR, PGENRO and concerned NGOs will provide technical assistance to municipal LGUs in developing forestland use plans; • DENR to affirm the FLUP of LGUs;	X	X	X			600,000.00

Halcon to develop their forestland use plans to include the Mt. Halcon management plan;							
Integration of FLUP and Mt. Halcon management plan to CLUPs of LGUs covering Mt. Halcon; • Annual investment provided by LGUs for the implementation of FLUP and Mt. Halcon management plan;	• Sangguniang Bayan of LGUs will enact ordinance for the integration of FLUP and Mt. Halcon management plan to their respective CLUPs; • LGU shall provide allocation for the implementation of FLUP and Mt. Halcon management plan;	X	X	X			100,000.00

Habitat/Forest Protection, Restoration and Monitoring

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Community-based habitat/forest protection system: • Community-based forest protection groups established, trained and operational in every barangay covering Mt. Halcon;	• Every barangay covering Mt. Halcon shall organize protection groups; • Municipal LGUs to provide support for the operation of protection groups in the different barangays; • DENR, in cooperation with concerned NGOs, shall provide capacity building; • DENR to provide deputation orders as ENROs/WEOs;	X	X	X	X	X	5,000,000.00
Municipal forest protection task force: • Municipal forest protection task force formed/reactivated, trained and operational in every	• Municipal LGUs, through the issuance of an Executive Order by the Mayor, shall form the forest protection task force and support the operation; • DENR shall coordinate the formation, training and operation of the task force;	X	X	X	X	X	2,500,000.00

municipality within Mt. Halcon;							
Habitat restoration: • At least 100 has. habitat restoration established yearly;	• DENR to provide technical assistance to PGENRO and other stakeholders in implementing habitat restoration in line with the National Greening Program;	X	X	X	X	X	15,000,000.00
Biodiversity monitoring: • Biodiversity monitoring system piloted in at least three areas (one per municipality) .	• DENR, in partnership with concerned NGOs and LGUs, shall establish and sustain the biodiversity monitoring stations.		X	X	X	X	2,000,000.00

Socio-Cultural and Economic Baseline Studies

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Updating the current conditions of the IP tribes in Mt. Halcon: • Identified and assessed prevailing issues, concerns and needs of the IP tribes in Mt. Halcon;	NCIP shall develop the tool and facilitate the survey, in partnership with IP groups;	X	X				50,000.00
Conduct assessment on the traditional and sustainable resource use practices of IPs: • Documented traditional resource use practices.	NCIP to take the lead in the assessment, in partnership with IP groups and other concerned and qualified institutions.		X	X			300,000.00

Technical Assistance and Capacity Building for IPs

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Lobbying for the	• IPs to prepare lobbying plan, which						

awarding of IP CADTs;	shall be supported by other stakeholders; • NCIP to award the CADT;	X	X	X			500,000.00
Capacity enhancement to sustain traditional resource and cultural practices (capacity building planning and implementation);	• IPs prepare the capacity building plan, with the support of NCIP; • Other stakeholders will mobilize support for the implementation of the capacity building plan; • IPs participate in the capacity building activities;	X	X	X	X	X	2,000,000
Support to IPs in safeguarding their ancestral domains from unsustainable and destructive activities.	• IPs shall identify the different protection activities, with the support of NCIP; • Other stakeholders will mobilize support for the implementation of the protection activities; • IPs implement protection measures.	X	X	X	X	X	2,000,000.

ADSDPP Enhancement and Integration

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
IP workshops to enhance the biodiversity conservation measures in the ADSDPPs: • Biodiversity conservation measures are fully integrated into the ADSDPPs of the IPs in Mt. Halcon;	NCIP, LGU and other concerned groups shall provide technical assistance to IPs in integrating biodiversity conservation in the ADSDPP;	X	X	X			500,000.00
Presentation of enhanced ADSDPPs by IPs to LGUs: • IPs present the enhanced and updated ADSDPPs to LGUs (municipal and provincial);	NCIP to assist the IPs in the presentation;	X	X	X			200,000.00
Integration of ADSDPPs to local development	LGUs to enact resolutions and allocate budget;	X	X	X			50,000.00

plans: • LGUs enact resolutions integrating ADSDPPs to local development plans and allocate funds to support the implementation of ADSDPPs;							
ADSDPPs implementation: • IPs implement conservation measures.	IPs shall be supported by NCIP, LGUs, DENR and other concerned institutions in the implementation of ADSDPPs.	X	X	X	X	X	5,000,000.00

Sustainable Livelihood Demonstration

Activities	Implementation Arrangements	Schedule					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Identification of potential livelihood programs based on the assessment of traditional and sustainable resource use practices of the IPs: • Concept proposal for sustainable livelihood developed programs developed and funds for implementation secured;	IPs prepare the concept proposal and solicit necessary funds, with the support of NCIP, LGUs, DENR;	X	X				200,000.00
Assessment and identification of pilot sites for sustainable livelihood development: • At least one pilot area identified in every municipality;	IPs shall formulate criteria and conduct site assessment and selection, with the support of NCIP, LGUs and DENR;	X	X				100,000.00
Implementation	The IPs will implement the livelihood		X	X	X	X	3,000,000.00

of sustainable livelihood activities: • Established demonstration area for sustainable livelihood programs in Mt. Halcon;	programs, duly supported by NCIP, LGUs, DENR and other concerned groups;						
Monitoring and evaluation: • Livelihood activities implemented in accordance with the concept.	Joint monitoring shall be undertaken by IPs, NCIP, LGUs and DENR.		X	X	X	X	200,000.00

Delivery of Basic Social Service Requirements

Activities	Implementation Arrangements	Schedules					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Inventory of existing basic social services in barangays covered by Mt. Halcon and identified additional requirements: • Identified additional social services and submitted the same to LGUs for consideration;	IP communities and barangay LGUs shall identify existing basic social services and submit the same to municipal and provincial LGUs;	X	X	X	X	X	No budget since the activities in this program are already covered by regular mandates and services of concerned government agencies
Provision of basic social services: • Minimum basic social requirements of communities in Mt. Halcon provided.	LGUs will primarily take the lead in the provision of social services in cooperation with concerned government and non-government institutions.	X	X	X	X	X	

Ecotourism Development

Activities	Implementation Arrangements	Schedules					Indicative Budget (in Php)
		Y 1	Y 2	Y 3	Y 4	Y 5	
Assessment of potential sites and products for ecotourism: • Pilot areas for ecotourism and possible products identified;	The PGENRO, in partnership with the Tourism Office and concerned institutions, shall jointly conduct assessment of potential tourism sites and products;	X	X				500,000.00
Ecotourism planning: • A comprehensive ecotourism plan with social, cultural and environmental impacts	Provincial Tourism Office shall take the lead in the planning;	X	X				300,000.00

formulated;							
Ecotourism capacity building and social preparations: • Target participants to the ecotourism program identified and provided with necessary orientation and training;	Provincial Tourism Office shall take the lead in developing and implementing capacity building activities and other social preparations;	X	X	X			250,000.00
Pilot implementation of ecotourism products: • At least three major ecotourism products initially identified and implemented in Mt. Halcon	Provincial Tourism Office, in cooperation with IP communities, LGUs and concerned groups, take the lead in implementing pilot ecotourism activities;		X	X	X	X	6,000,000.00
Ecotourism promotion and marketing: • Ecotourism products and destinations in Mt. Halcon promoted.	Provincial Tourism Office to take the lead.		X	X	X	X	3,000,000.00

Institutional Strengthening and Partnership Development

Activities	**Implementation Arrangements**	**Schedules**					**Indicative Budget (in Php)**
		Y 1	**Y 2**	**Y 3**	**Y 4**	**Y 5**	
Capacity building: • Identified the capacity building requirements of local stakeholders; • Formulated specific capacity building plan for stakeholders; • Implemented and monitored capacity building activities;	The PGENRO, in cooperation with the DENR, NCIP, IPs and concerned institutions, shall take the lead in developing and implementing capacity building activities;	X	X	X	X	X	3,000,000.00
Financing: • Prepared financing sustainability mechanisms for Mt. Halcon; • Generated necessary resources to implement the management plan;	The provincial government shall take the lead in developing and implementing financing mechanisms, in cooperation with concerned groups and institutions.	X	X	X	X	X	1,000,000.00
Partnership building: • Executed partnership agreement between relevant stakeholders to implement this management plan; • Partnership agreement forged for the overall management of Mt.. Halcon	PGENRO, NCIP and DENR shall take the lead in negotiations with IP groups for the development of a management system in Mt.. Halcon.	X	X	X	X	X	500,000.00

10. Monitoring and Evaluation

The proposed Mt. Halcon Management Council shall ensure the implementation of this management plan by its participating institutions. Each member organization shall prepare annual work and financial plans based on this management plan, to be presented to the Management Council for consideration and approval. In turn, each member institution of the

Management Council shall endeavor to generate funds to execute its own activities in the course of implementing this management plan.

The Management Council shall likewise conduct a yearly assessment of the work plan to serve as basis in determining the subsequent annual work plan of each participating institution. At the end of two and a half years in the implementation of this management plan, a comprehensive evaluation shall be undertaken to assess the progress being made in Mt. Halcon. The results of such evaluation shall serve as basis for planning activities in the remaining period covered by the five-year work plan.

At the end of the five-year period, another comprehensive evaluation shall be undertaken to assess the progress in implementing this plan, which will become the basis for developing another five-year work plan. At the end of the 10 years, this management plan shall be evaluated and updated, or a new plan for Mt. Halcon shall be formulated, depending on the actual conditions at that time.