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Mindoro Biodiversity Conservation Foundation Inc.

Manila Office
22F Asian Star Building, ASEAN Drive
Filinvest Corporate City, Alabang,
Muntilupa City, 1780
Philippines
Telephone: +63 2 8502188
Fax: +63 2 8099447

E-mail: info@mbcfi.org.ph
Website: www.mbcfi.org.ph

Provincial Office
Gozar Street, Barangay Camilmil,
Calapan City, Oriental Mindoro, 5200
Philippines
Telephone/Fax: +63 43 2882326

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Acronyms and Abbreviations

BMB	Biodiversity Management Bureau (formerly known as PAWB – Protected Areas and Wildlife Bureau
CENRO	Community Environment and Natural Resources Office
cf.	Latin: *confer*; in binomial nomenclature (scientific name writing) denotes unconfirmed species identification but very similar to species indicated
CR	Critically Endangered
DA	Department of Agriculture
dbh	diameter at breast height
DENR	Department of Environment and Natural Resources
DD	Data Deficient
DTI	Department of Trade and Industry
EN	Endangered
ER	Encounter Rate
FGD	Focus Group Discussion
GEF	Global Environment Facility
GIS	Geographic Information System
GA	Government Agencies
GPS	Global Positioning System
IBA	Important Bird Area
IEC	Information, Education and Communication
IP	Indigenous People
IPRA	Indigenous People's Rights Act
ISSG	Invasive Species Specialist Group
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
LGU	Local Government Unit
MBCFI	Mindoro Biodiversity Conservation Foundation, Inc.
MENRO	Municipal Environment and Natural Resources Office
NA	Not Applicable
NGO	Non-Government Organization
NIPAS	National Integrated Protected Area System
NT	Near Threatened
PASu	Protected Area Superintendent
PAWCZMS	Protected Areas, Wildlife and Coastal Zone Management Services
PENRO	Provincial Environment and Natural Resources Office
RA	Republic Act
sp.	In binomial nomenclature (scientific name writing) denotes an unidentified species
spp.	In binomial nomenclature (scientific name writing) denotes more than one species under the genus
VU	Vulnerable

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1 Introduction

The National Integrated Protected Areas System (NIPAS) Act of 1992, otherwise known as RA 7586, was enacted in response to an urgent need to protect the biodiversity of the Philippine ecosystems, which resulted to the establishment of "Protected Areas" (PA) system. *Protected Areas* are identified portions of land and/or water set aside by reason of their unique physical and biological significance managed to enhance biological diversity and protected against destructive human exploration.

Apo Reef is one of the major natural areas in the Philippines endowed with significant marine resources and biodiversity. The Apo atoll-like reef complex is the largest of its type in the Philippines. The core area covers some 15,792 hectares, and the entire protected area (including the buffer zone) is 27,469 ha. The geographical features of ARNP are submerged except for 3 islands - Apo Island, Apo Menor Island (Binanggaan) and Cayos del Bajo (Tinangkapan) rising a few meters above sea level. The largest is Apo Island which harbors mangroves and beach vegetation. Binanggaan is a rocky limestone island with little vegetation; and Cayos del Bajo is a flat coralline rock formation with no vegetation[1].

Figure 1. Three islands of Apo Reef Natural Park – Apo Island, Apo Menor and Cayos del Bajo.

[1] Draft Comprehensive Land and Water Use Plan 2014-2024 (unpublished), Municipal Planning and Development Office (MPDO)

Apo Reef Natural Park (ARNP) is managed by the Protected Area Management Board (PAMB) composed of local and national stakeholders and organized by the Department of Environment and Natural Resources (DENR). The implementer of the management is the Protected Area Supervising Unit based in the town proper of the municipality of Sablayan, Mindoro Occidental. A ranger station is also established in the main island of Apo Reef name Apo Island (not to be confused with Apo Island in Negros Oriental province).

Anchored on the framework set by the NIPAS Act, active participation of local communities and other stakeholders is an essential element in the effective protected area management and sustainable resource utilization in the Natural Park. To achieve ARNP's resource management and conservation objectives, it is therefore crucial for the PA managers to gain better appreciation and understanding of the diversity of stakeholders, their livelihood activities, resource use practices, and their dependence on the natural resources in ARNP. Hence, a rapid site assessment and profile updating of the socio-economic and cultural characteristics of the stakeholder communities and the institutional framework in the Apo Reef Natural Park (ARNP) was carried out from April to May 2014.

The biodiversity assessments in the ARNP were also conducted on April 2014 to establish and update the database on the biodiversity and health status of marine and terrestrial flora and fauna. The combination of biodiversity, socio-economic, cultural and institutional assessments will contribute to inform the development of the ARNP's Ecotourism Management Plan.

This report presents key findings on the physical, biological, social, economic, cultural, and institutional sectors of ARNP. The main objective of the assessment is to update and enrich knowledge and understanding about ARNP features in order to improve the management of the protected area, and thus increase chances of achieving sustainable resource use.

2 RSA Objectives, Scope and Limitations

The Mindoro Biodiversity Conservation Foundation, Inc. (MBCFI) organized a multi-disciplinary team, comprising of terrestrial wildlife and marine biologists, foresters and socio-economic, cultural and governance specialist, to implement a Rapid Site Assessment at Apo Reef Natural Park (ARNP). The team was supported by ARNP staff, rangers and Task Force MARLEN members as field research assistants in primary and secondary data collection. The 1st phase of the RSA involved gathering and analysis of secondary information to determine the availability of data characterizing the project site. Based on the gathered information, the team identified data gaps and prepared primary data gathering tools and methods. The next phase of the RSA proceeded with the field survey at the project site. Secondary and primary data collected are collated, analyzed and presented in this Technical Report of the RSA.

2.1 Objectives

The main purpose of this assessment is to provide up-to-date information pertaining to the biodiversity and other features of ARNP as a protected area and determine possible conservation initiatives as well ecotourism opportunities for the park. Specific objectives of this project include the following:

- To generate up to date information on the bio-physical characteristics, socio-cultural and economic conditions, and institutional arrangement or governance of the protected area;
- To compare results of the inventory to any available information and to determine changes and modifications on the state of the protected area's environmental, socio-cultural and economic and governance situation;
- To provide science-backed recommendations to enhance and strengthen the management of the protected area, particularly in developing the ecotourism management plan and other conservation interventions that shall be proposed in the area.

2.2 Approach, Scope and Limitations

Components and scopes of this engagement included the profiling of the project site in terms of the following:

- Physical and geo-political characteristics
- Terrestrial and marine biological resources
- Socio-cultural and economic conditions
- Institutional arrangements and governance

Prior to the conduct of primary data collection, information from published and unpublished literature was reviewed to understand the extent of information needed as well as the practicality of

collecting the information. Gathering of primary data was conducted during the months of April and May 2014. Generally, the approaches and scope for this RSA include the following:

- Off-site and on-site secondary data gathering;
- Review of available secondary information, evaluation of data in terms of requirements of this project, and identification of information gaps;
- Development of specific tools and methodologies for primary data gathering;
- Field surveys
- Secondary and primary data consolidation and analysis;
- Preparation of draft report
- Presentation and validation of the report with relevant stakeholders
- Preparation of final report

2.3 Data Collection Methods

The RSA used both scientific and participatory approaches in data collection. Appropriate standard tools and methodologies for data gathering and analysis were used based on the requirements of the RSA.

Geo-Physical Characteristics

The profiling of geo-physical characteristics included spatial analysis of the physical attributes of the protected area, including the preparation of maps. Specific data sets required for this component are the following

- **Location and Area**. Showing the relative location of ARNP, its boundaries with respect to administrative and political units. The barangays and municipality covering the protected area shall be identified, particularly their estimated area of coverage.
- **Slope and Topography.** The general topography of the area, which will include the slope, slope aspect and elevation.
- **Geology.** Covering the major geological structures and land formations that indicate the slope stability, landslide potential, hazard potential and areas within or along fault lines.
- **Climate.** This section will show the climatic conditions of the area including parameters, like rainfall and temperatures.
- **Land Classification**. Land classification shall be based on the legal definition as provided in the 1987 Constitution.
- **Land Cover**. Existing land cover and uses, including the extent of coverage will also be reflected in a map.
- **Geohazards**. Details on natural hazards, but not limited to volcanic activities and fault lines, landslide, flashfloods and flooding prone areas.
- **Habitat types**. Different habitat types in the area, including but not limited to beach forest, mangrove forest, coral reef areas, etc will also be shown in a map.

Biological Resources

Three major habitat types in ARNP – Beach Forest, Mangrove Forest and Coral Reefs were selected and surveyed for this RSA.

Habitats and Ecosystems

The biological resources at the terrestrial level of the project were determined through the identification and description of the different terrestrial habitat types, including estimated area of coverage and translated into a habitat map. It also involved identification of different vegetation types and critical habitats. The survey included quantitative and qualitative description of vegetation, based on the following:

- Characterize the different habitat types e.g. dominant trees, emergent trees, canopy trees, canopy coverage, dominant understory plants, epiphytes
- Species richness and diversity
- Relative abundance
- Species composition and community structure

Flora

The survey listed plant species found in the project site, including identification of useful plants (in terms of ecological, medicinal and economic parameters, among others), endemism and conservation values (using the latest IUCN and DENR classification of threatened species), and alien and exotic plant species (and how they are impacting the vegetation of the project site). Based on available information, two types of forest ecosystems were identified: mangrove and beach forest. Within island the following method were used:

- 10 quadrats of 10x10m size were laid out;
- All plant species found in each quadrat were identified. Parameters, such as diameter at breast height (dbh) and number of individuals per species were recorded. From these parameters, the relative density (RD), relative frequency (RF) and relative dominance (RDom) were calculated. The importance value (IV) of each species was calculated by summing up the three mentioned parameters;
- Other parameters recorded/ noted are the economic significance of the plant species and the conservation status.

In addition, a sub-plot was established for each quadrat to determine seedling & sapling density:

- At one section of each quadrat, a 1x1 m sub-plot was laid out;
- All saplings (between 1 – 4 m in height) and seedlings (below 1m in height) found in the quadrat will be identified per species and counted.

Fauna

Birds

For each habitat type, birds were surveyed using line transects (500 meters and 1-kilometer) randomly walked by trained observers within the period from 5:30AM to 9:00AM and at 3:00PM to 5:00PM. Bird observations continued throughout the day targeting threatened endemic species. The species accumulation curve was used in determining sampling efforts. Mist-netting across different habitat types (beach forest, and mangrove forest) was also conducted. Netting efforts target understory skulking species, fruit-eating birds as well as ground-dwelling birds.

Presence or absence of the following restricted-range species across different habitat types was determined: Mantanani Scops-Owl *Otus mantananensis*; Pied Imperial Pigeon *Ducula bicolor*, Philippine Megapode *Megapodius cumingii*, and Nicobar Pigeon *Caloenas nicobarica.*

Mammals

To assess presence of volant mammal (bat) species on ARNP, mist-nets were used following standardized methodologies described in Barlow (1999) and slightly modified to suit local conditions. Mist nets of 6-meter and 12-meter lengths were set at varying heights to capture both fruit-eating and insectivorous bats. Net lines were opened just before dusk and checked regularly throughout the night.

For small non-volant mammals (rodents), cage traps baited with roasted coconut meat & peanut butter were positioned at least within 5 to 10-meter intervals and monitored regularly following standardized methodologies described in Barnett and Dutton (1995) and slightly modified to suit local conditions.

Opportunistic observations of large mammals were also recorded. Abundance estimates and behavioral observations were also noted whenever possible.

Species discovery curves were used whenever possible to determine sufficient level of sampling effort. Biometrical measurements of captured bats and rodents were also taken and species were identified. Species were identified using the *Key to the Bats of the Philippine Islands* by Ingle and Heaney (1992), *A Guide to the Mammals of Borneo* by Payne and Francis (2005), the *Bats of Krau Wildlife Reserve* by Kingston *et al* (2006), *A Field Guide to the Whales and Dolphins of the Philippines* by Tan (1995) and *Synopsis of Philippine Mammals* by Heaney *et al* (2010). Collection of voucher specimens was not conducted since no unidentified species were captured.

Amphibians and Reptiles

The sampling sites selected were in beach forest and mangrove and mangrove forest. In each site, two transect lines with approximately 1km each were established. Transects were marked at 100-meter intervals and were sampled during day and night for a minimum of 5days per site (Bennett, 1999). Opportunistic sampling using hand capture, searching microhabitat such as rotten logs, leaf litter, tree holes, burrow and small ponds was also performed (Bennett, 1999; Diesmos *et al.,* 2003). Body measurements of captured species were taken. Photographs of captured specimens were taken for documentation prior to release back to their original habitat (Ledesma, *unpublished;* Brown, 2000). Seen and heard species (uncaptured) were also recorded.

Habitats and microhabitats where the species were taken were also described. Four different habitat and microhabitats were sampled during the survey: (1) Rocks / boulders / rock crevices; (2) Leaf litter; (3) Soil; and (4) Tree branches.

The species diversity and abundance in different sites were compared whenever possible using the following computations:

- **Relative Density**= Number of individual for a species
  Total number of individuals for all species
- **Shannon-Weiner Index of Diversity**
  $H= -\Sigma p_i (\ln p_i)$
  Where $p_{i=}$ proportion of total sample belonging to the species

Marine Resources

Coral reef surveys from 1994 to 2006 employed the Line Intercept Transect (LIT) method discussed in English *et al.* (1997). The phototransect method was used in more recent coral reef surveys on ARNP (Samaniego *et al.* 2009; Samaniego *et al.* 2011). The current survey also used the phototransect survey as it provides researchers the ability to gather data over a shorter period of time compared to LIT while maintaining good correspondence with data gathered using LIT (Vergara and Licuanan 2007, Leujak and Ormond 2007).

Fifteen (15) permanent stations were previously established at ARNP and marked with cement blocks and located through GPS coordinates. At the 15 surveyed stations, only five found to have cement blocks (i.e., Stations, 4, 6, 8, 12 and 13). Cement blocks at the other 10 sites were possibly displaced by strong wave and current action. For the stations without permanent blocks, transects were laid as close as possible to the previously recorded GPS coordinates.

One 50 meter transect was laid at a uniform depth contour at each station. Digital photographs were taken at one meter intervals using a digital still camera with an underwater housing. For consistency an aluminium distance bar mounted to the camera was used at a distance of 75 centimeters between the substrate and camera. The camera was set at full wide angle to capture the largest possible area of the substrate. The photographs were then processed and analysed using the Coral Point Count with Excel extensions (CPCe V4.1), a free and open source software developed by Kohler and Gill (2006) (**Figure 2**). Ten random scoring points were selected and overlaid over each photograph. All lifeforms directly underneath the cross-mark point were identified. For hard corals, these were identified to the genera level using the Coral Finder: Indo-Pacific underwater field guide (Kelley 2009) and the three volumes of Corals of the World (Veron 2000). The number of scored points of each lifeform was used to estimate mean percent cover for all stations.

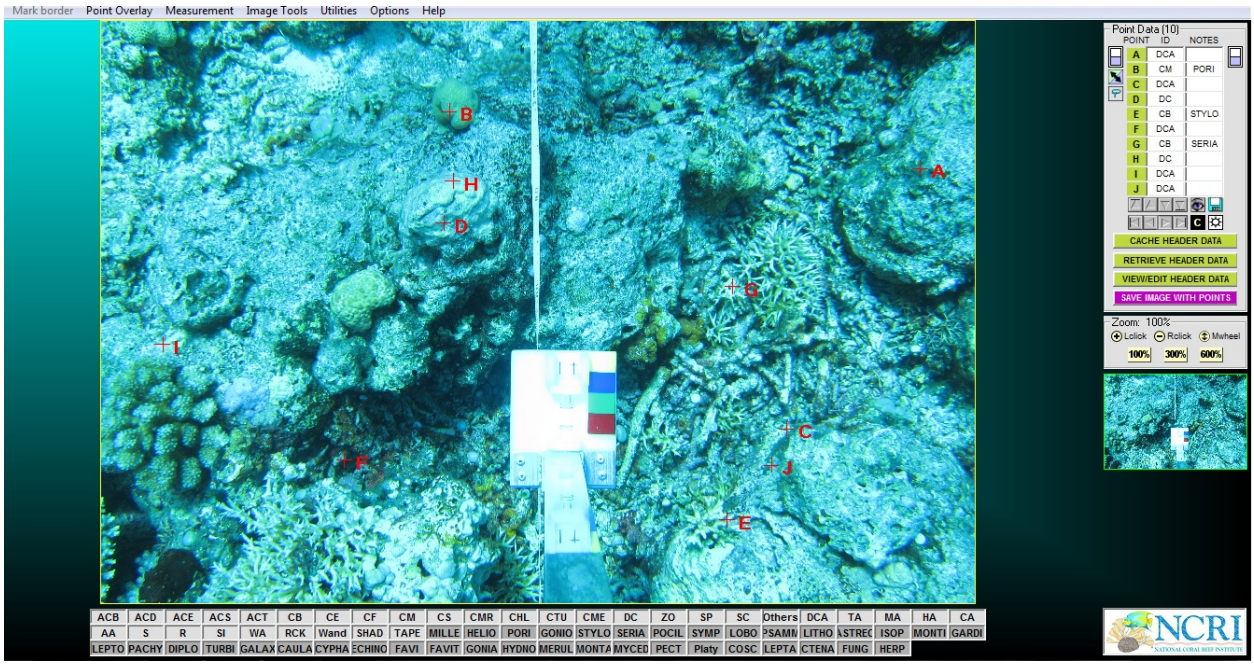


Figure 2. Photoquadrat frames overlaid with 10 random point in the Coral Point Count with Excel Extensions (CPCe).

The fish visual census technique described by English *et al*. (1997) using a 50 meter line transect. All fishes observed within 5 meter across and above the transect line were recorded on an underwater slate, including estimated size and abundance. The fishes were identified to species level whenever possible and their total lengths estimated to the nearest centimetre. Identification was based on the guides of Kuiter and Debelius (1997), Lieske and Myers (2001), Allen *et al*. (2003). The abundance of fish was estimated by actual counts. To avoid recounting of fish, data were recorded every 5 meter section. For schooling or aggregating species counts were estimated in clusters. This involved counting the number of individuals within a cluster and extrapolating this to the size of the school or aggregation. Fish biomass was determined by the formula: $\mathbf{W = aL^{b}}$, where **W** is the weight in grams, **L** is the total length estimated in cm, and ***a*** and ***b*** are unique constants derived from species-specific length-weight relationships (Kulbicki *et al*., 1993; Letourneur, 1998; Letourneur *et al*., 1998; Gonzales *et al*., 2000; and those listed in FishBase 2004). For fish species with no known ***a*** and ***b*** values, the constants of related species with the closest body shape were used as a surrogate.

Socio-Cultural and Economic Characteristics

The assessment was carried out through desk review and stakeholder workshops, including:

- review of pertinent secondary data / literature specific to ARNP and protected areas;
- discussions with technical personnel at DENR and Protected Areas Office;
- discussions with stakeholder representatives in ARNP communities through a workshop process; and
- discussions with representatives of the Local Government Unit and Protected Area Management Board (PAMB) Members

Participatory tools and techniques (focus group discussions, key informant interviews, informal interviews) and review of related literature and secondary data were used to provide both qualitative and quantitative data.

- An extensive review of critical information in key documents and conventional literature searches were carried out at the DENR Region IV-B, particularly through its Protected Area Office (PAO) and Community Environment and Natural Resource Office (CENRO), and at some local government offices including the Municipal Planning and Development Office (MPDO) that provided relevant documents such as the Comprehensive Land use Plan and Barangay Profiles. Various People's Organizations (POs) and Non-governmental Organizations (NGOs) such as the World Wildlife Fund (WWF), were also consulted to identify potential relevant sources of grey literature and other unpublished information.

- A stakeholder workshop / consultation for socio-economic assessment of Apo Reef Natural Park, which was held on May 6, 2014 in Sablayan Municipal Hall, was attended by 29 representatives from various stakeholder groups to solicit inputs on the socio-economic status, cultural profiles, institutional framework, and resource use practices in ARNP. A Stakeholder Analysis was also conducted to gain better understanding on the social and institutional context of ARNP. Its findings shall provide early and essential information about who will be affected by the project (positively or negatively); who could influence the project; which individuals, groups, or agencies need to be involved in the project, and how; and whose capacity needs to be built to enable them to participate.

- Focus Group Discussions (FGD) and mapping workshops were the main source of information for the study of resource use patterns. Key informant interviews and informal interviews were also used to cross check specific information. FGDs were also conducted to identify the strengths, weaknesses, opportunities and threats (SWOT Analysis) on various sectors (Socio-cultural, economic, and institutional).

3 Protected Area Profile

3.1 Geo-Physical Characteristics

The Apo Reef Natural Park (ARNP) is located in 30 kilometers west of the municipality of Sablayan, Occidental Mindoro, in the Sulu Sea Biogeographic Region (Aliño and Gomez 1995) (**Figure 1**). It lies between the island of Mindoro and Busuanga Island in the province of Palawan. The ARNP is considered a conservation priority site for birds, reef fish and corals (Ong *et al*. 2000; Mallari *et al*. 2001; CI-Philippines *et al*. 2007). The ARNP is an atoll-like complex with three islands: Apo Island, Apo Menor Island (Binanggaan) and Cajos del Bajo (Tinangkapan). It is a sub-triangular atoll formation approximately 26 kilometers from north to south and 20 kilometers from east to west. Apo Island is the largest with 22 hectares with mangrove and beach forests; Binanggaan is a rocky limestone island; and Cayos del Bajo is a flat coralline rock formation with no vegetation (Apo Reef Natural Park Management Plan, 2001).

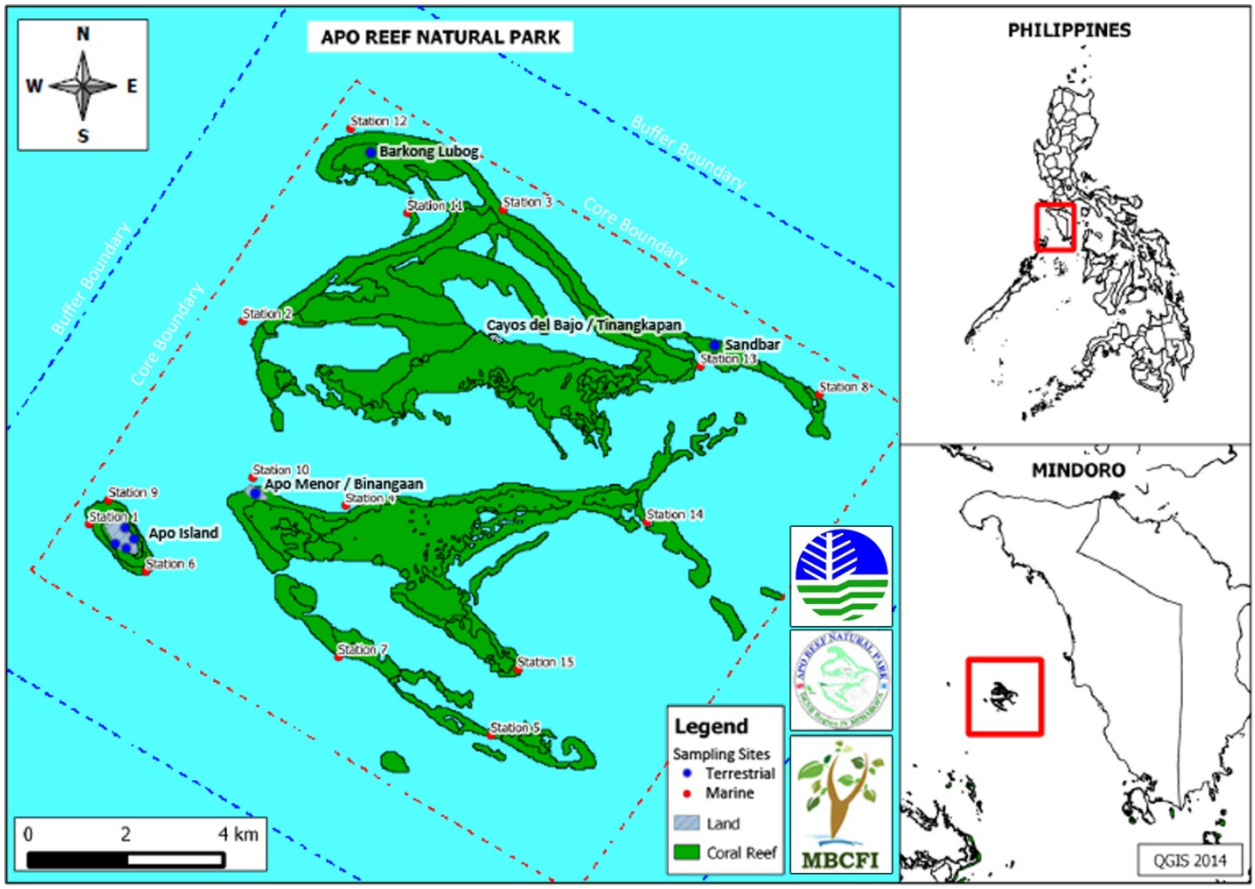


Figure 3. Location map of the Apo Reef Natural Park, Sablayan, Occidental Mindoro.

The ARNP is under the municipal water jurisdiction of Sablayan. It was declared as a protected area on September 1996 through Presidential Proclamation No. 868 in accordance with Republic Act 7567 or the National Protected Areas System (NIPAS) Act of 1992. It has a total area of 27,469 hectares: the core zone covers 15,792 hectares and the buffer zone covers 11,677 hectares.

3.2. Terrestrial Biodiversity

Flora

The terrestrial ecosystem of ARNP is composed of 2 main vegetation types: mangrove forest and beach forest vegetation (Figure 4) most of which are found on Apo Island with several trees on Binanggaan and none on Tinangkapan. Thirty three (33) species of terrestrial plants from 21 families were recorded. Table 1 provides a list of floral species recorded.

Mangrove forest. An old-growth mangrove stand dominated by *Rhizophora* and *Sonneratia* species that spans about 10 ha is located surrounding a central lagoon of Apo Island. Other dominant mangrove species found are *Xylocarphus* and *Pemphis* spp which can be found in the sandy parts of Apo Island, mixing with the beach forest vegetation. Smaller stands of *Rhizophora* and *Sonneratia* are also found on Binanggaan. The central lagoon of the main island serves home to several species of fish, stingrays, sharks, marine plants and organisms. It also serves as the nursery and nutrient production area for fishes and other aquatic animals. The mangrove forest also serves as habitat for several species of birds.

Beach forests. Beach type forest borders the island particularly in the south, southeast and east parts of the Apo Island. The sandy shores are relatively dominated by trees such as Banasi (*Pouteria obovata),* Kalumpang (*Sterculia foetida),* Pandan-dagat (*Pandanus tectorius)* and Balibago (*Talipariti tiliaceum)* . The island's beach forest is also a habitat to several bird species and other organisms.

Table 1. Summary of floral species recorded within 10mx10m quadrats on Apo Island (April 2014).

Species	No. of indivs	Species basal area	Frequency	Relative density	Relative dominance	Relative frequency	IV (Ni)
Bruguiera cylindrica	15	0.096	2	8.98	1.90	6.90	17.78
Cordia subcordata	3	0.123	1	1.80	2.43	3.45	7.67
Diospyros maritima	3	0.014	2	1.80	0.27	6.90	8.96
Erythrina variegata	1	0.045	1	0.60	0.89	3.45	4.93
Guettarda speciosa	3	0.041	1	1.80	0.81	3.45	6.05
Pandanus tectorius	12	0.104	2	7.19	2.05	6.90	16.14
Pemphis acidula	4	0.090	1	2.40	1.77	3.45	7.61
Pouteria obovata	9	0.544	2	5.39	10.76	6.90	23.05
Rhizophora apiculata	30	0.678	2	17.96	13.41	6.90	38.27
Rhizophora mucronata	34	0.319	4	20.36	6.30	13.79	40.45
Sonneratia alba	7	1.616	2	4.19	31.96	6.90	43.05
Sterculia foetida	4	0.728	1	2.40	14.39	3.45	20.24
Talipariti tiliaceum	8	0.183	3	4.79	3.61	10.34	18.75
Thespesia populnea	1	0.010	1	0.60	0.19	3.45	4.24
Xylocarphus moluccensis	3	0.003	1	1.80	0.07	3.45	5.31
Xylocarphus rumphii	30	0.464	3	17.96	9.18	10.34	37.49
	167	5.056	29				300.00

Table 2. Summary of floral species recorded on Apo Reef Natural Park.

FAMILY / Scientific Name	Common Name	Residency Status	Conservation Status
AIZOACEAE			
Sesuvium portulacastrum	Dampalit	Native	Not yet assessed
ARECACEAE			
Corypha utan	Buri	Native	Least Concern
ASPARAGACEAE			
Agave sp	Century Plant	Introduced	Least Concern
ASTERACEAE			
Chromolaena odorata	Hagonoy	Introduced	Least Concern
BORAGINACEAE			
Cordia subcordata	Banalo	Native	Least Concern
Heliotropium foertherianium	Octopus Bush	Native	Least Concern
CELASTRACEAE			
Salacia chinensis	Matang-ulang	Native	Not yet assessed
COMBRETACAE			
Terminalia catappa	Talisay, Beach Almond	Native	Least Concern
CONVOLVULACEAE			
Ipomea pes-caprae	Beach morning glory, katang-katang, lagayray	Native	Not yet assessed
EBENACEAE			
Diospyros maritima	Sea persimon	Native	Least Concern
FABACEAE			
Abrus precatorius	Saga-saga	Native	Least Concern
Erythrina variegata	Dapdap	Native	Least Concern
Leucaena leucocephala	Ipil-ipil	Introduced	Least Concern
Milletia pinnata	Bani	Native	Not yet assessed
FLAGELLARIACEAE			
Flagellaria indica	Huag, Baling-uai	Native	Not yet assessed
LAURACEAE			
Cassytha filiformes	Malabuhok, Kawad-kawad	Native	Not yet assessed
LYTHRACEAE			
Pemphis acidula	Bantigi	Native	Least Concern
Sonneratia alba	Pagatpat	Native	Least Concern
MALVACEAE			
Sterculia foetida	Kalumpang	Native	Not yet assessed
Talipariti tiliaceum	Balibago	Native	Least Concern
Thespesia populnea	Banago	Native	Least Concern
MELIACEAE			
Xylocarpus moluccensis	Piagao	Native	Least Concern
Xylocarpus rumphii	Pigau	Native	Least Concern
PANDANACEAE			

Pandanus tectorius	Pandan-dagat	Native	Not yet assessed
POACEAE			
Spinifex littoreus	Tumble weed, Pagulong	Native	Not yet assessed
RHIZOPHORACEAE			
Bruguiera cylindrica	Pototan, Busain	Native	Least Concern
Rhizophora apiculata	Bakawan lalake	Native	Least Concern
Rhizophora mucronata	Bakawan babae	Native	Least Concern
RUBIACEAE			
Guettarda speciosa	Tabon-tabon	Native	Not yet assessed
SAPOTACEAE			
Pouteria obovata	Banasi	Native	Least Concern
VERBENACEAE			
Premna odorata	Alagao	Native	Not yet assessed
Vitex parviflora	Molave / Molawin	Native	Vulnerable
Vitex trifolia	Lagundi	Native	Least Concern

Birds

Thirty four (34) species of birds from 25 families were recorded during this survey at ARNP. Fourteen of the 34 species are migratory species while the rest are resident to the Philippines. None of the bird species are country endemic while two species – Nicobar Pigeon (*Caleonas nicobarica*) and Mantanani Scops-owl (*Otus mantananensis*) are classified as Near Threatened species following the IUCN threatened species categories. Both Near Threatened species are small island specialists. Two species – Eurasian Tree Sparrow (*Passer montanus*) and Barred Rail (*Gallirallus torquatus*) are also reported as introduced species with naturalized (resident) population on ARNP. Eleven (11) of the 34 species recorded during this survey are new records to ARNP, bringing the total birds species recorded in ARNP to 64 species. A comprehensive list of bird species recorded on ARNP is presented in Appendix 5.2 and accounts of notable bird species are presented in Appendix 5.3.

Table 3. Bird species recorded on Apo Reef Natural Park (April 2014).

FAMILY / Scientific Name	Common Name	Residency Status	Conservation Status
ARDEIDAE			
Egretta sacra	Eastern Reef Egret	R	Least Concern
*Egretta garzetta**	Little Egret	R	Least Concern
Bubulcus ibis	Cattle Egret	R	Least Concern
ACCIPITRIDAE			
*Butastur indicus**	Grey-faced Buzzard	M	Least Concern
FALCONIDAE			
*Falco peregrinus**	Peregrine Falcon	M	Least Concern
PHASIANIDAE			
Megapodius cumingii	Tabon Scrubfowl	R	Least Concern
RALLIDAE			
Gallirallus torquatus	Barred Rail	R / Int	Least Concern
SCOLOPACIDAE			
*Gallinago stenura**	Pintail Snipe	M	Least Concern

*Phalaropus lobatus**	Red-necked Phalarope	M	Least Concern
GLAREOLIDAE			
Glareola maldivarum	Oriental Pratincole	M	Least Concern
RECURVIROSTRIDAE			
*Himantopus himantopus**	Black-winged Stilt	M	Least Concern
LARIDAE			
Sterna sumatrana	Black-naped Tern	R	Least Concern
Sterna bergii	Great Crested Tern	R	Least Concern
Sterna fuscata	Sooty Tern	M	Least Concern
*Anous minutus**	Black Noddy	R	Least Concern
COLUMBIDAE			
Ducula bicolor	Pied Imperial Pigeon	R	Least Concern
Caloenas nicobarica	Nicobar Pigeon	R	Near Threatened
STRIGIDAE			
Otus mantananensis	Mantanani Scops-Owl	R	Near Threatened
APODIDAE			
Collocalia cf *amelis*	Swift	R	Least Concern
ALCEDINIDAE			
Alcedo atthis	Common Kingfisher	M	Least Concern
Halcyon chloris	White-collared Kingfisher	R	Least Concern
MEROPIDAE			
*Merops philippinus**	Blue-tailed Bee-eater	R	Least Concern
HIRUNDINIDAE			
Hirundo rustica	Barn Swallow	M	Least Concern
CAMPEPHAGIDAE			
Lalage nigra	Pied Triller	R	Least Concern
ORIOLIDAE			
Oriolus chinensis	Black-naped Oriole	R	Least Concern
CORVIDAE			
*Corvus macrorhynchus**	Large-billed Crow	R	Least Concern
TURDIDAE			
*Monticola solitarius**	Blue Rock-thrush	M	Least Concern
MUSCICAPIDAE			
Rhipidura javanica	Pied Fantail	R	Least Concern
MOTACILLIDAE			
Motacilla flava	Yellow Wagtail	M	Least Concern
*Motacilla cinerea**	Grey Wagtail	M	Least Concern
LANIDAE			
Lanius cristatus	Brown Shrike	M	Least Concern
STURNIDAE			
Sturnus philippensis	Chestnut-cheeked Starling	M	Least Concern
NECTARINIDAE			
Nectarinia jugularis	Olive-backed Sunbird	R	Least Concern

PLOCEIDAE			
Passer montanus	Eurasian Tree Sparrow	R / Int	Least Concern

Note: R – Resident; M – Migrant; Int – Introduced; * - New Record on ARNP

Mammals

Only one terrestrial mammal species was recorded during this survey. Sixteen individuals of the alien invasive Oriental House Rat (*Rattus tanezumi*) were captured using cage traps. Many others were observed scurrying in dense brush during night transects.

Three species of marine mammals were also observed during the survey. Pods of Melon-headed Whales (*Peponocephala electra*), Spinner Dolphins (*Stenella longirostris*) and Common Bottlenose Dolphins (*Tursiops truncatus*) were sighted 200 - 300 meters off the beach at the southern end of Apo Island. They appeared curious of the ARNP speedboat and stayed around the craft for several minutes. Melon-headed Whales and Common Bottlenose Dolphins were observed doing spy-hops while Spinner Dolphins were observed doing full surface breaches. A smaller pod of Common Bottlenose Dolphins were also observed along Apo East Pass.

To date, ten (10) mammal species have been recorded in ARNP including 1 fruit bat, 2 invasive rodent species, 2 feral domestics (cat & dog), and 5 dolphins. A complete list of species is presented in Appendix 5.3.

Table 4. Mammal species recorded on Apo Reef Natural Park (April 2014).

FAMILY / Scientific Name	Common Name	Residency Status	Conservation Status
MURIDAE			
Rattus tanezumi	Oriental House Rat	Introduced	Least Concern
DEPHINIDAE			
Peponocephala electra	Melon-headed Whale	Native	Least Concern
Stenella longirostris	Spinner Dolphin	Native	Data Deficient
Tursiops truncatus	Common Bottlenose Dolphin	Native	Least Concern

Herpetofauna

Five terrestrial reptile species were observed during the survey – 2 gecko (Family Gekkonidae), 2 skink (Family Scincidae) and 1 tree snake (Family Colubridae). No amphibian species were observed throughout the survey period. This distribution is possibly influenced by the limited availability of freshwater on ARNP. The adaptations by reptilian species allow them to inhabit drier environments while amphibians generally require more moist environments.

In addition, 2 marine reptiles were also observed during coral reef surveys at the same period – Green Sea Turtle (*Chelonia* mydas) and Hawksbill Sea Turtle (*Eretmochelys imbricata)*. Both sea turtle species are considered globally threatened in the IUCN and have been reported to nest on the beaches of Apo Island.

Table 5. Reptile species recorded on Apo Reef Natural Park (April 2014).

FAMILY / Scientific Name	Common Name	Residency Status	Conservation Status
GEKKONIDAE			
Gekko gecko	Tocay gecko	Native	Not Assessed
Hemidactylus frenatus	Common House Gecko	Native	Least Concern
SCINCIDAE			
Eutropis cf *multicarinata*	Many-keeled Skink	Native	Not Assessed
Emoia atrocostata	Mangrove Skink	Native	Not Assessed
COLUBRIDAE			
Dendrelaphis sp.	Bronzeback tree snake	-	-
CHELONIIDAE			
Chelonia mydas	Green Sea Turtle	Native	Endangered
Eretmochelys imbricata	Hawksbill Sea Turtle	Native	Critically Endangered

3.3. Marine Biodiversity

Coral Reef Communities

There were 28 coral genera belonging to 12 families. *Porites* sp. had the highest mean cover with 8.91% while *Leptoseris* sp. had the lowest mean cover with 0.03%. The overall coral reef status of the ARNP was poor with an overall mean live coral cover of 24.88% (**Figure 4**). The status is similar to the 2009 and 2011 surveys. The live coral cover was dominated by branching (9.01%) and massive corals (8.84%). Algae still has the highest cover with an overall mean cover of 45.39%. Algal cover was dominated by dead coral with algae with a mean percentage cover of 41.77%. The Other Fauna category had an overall mean cover of 12.53%. It was dominated by sponges (5.33%) and soft corals (6.29%). The Abiotic category had an overall mean cover of 6.59%. It was mainly dominated by sand with a mean cover of 3.68%. Dead coral cover had an overall mean cover of 10.60%.

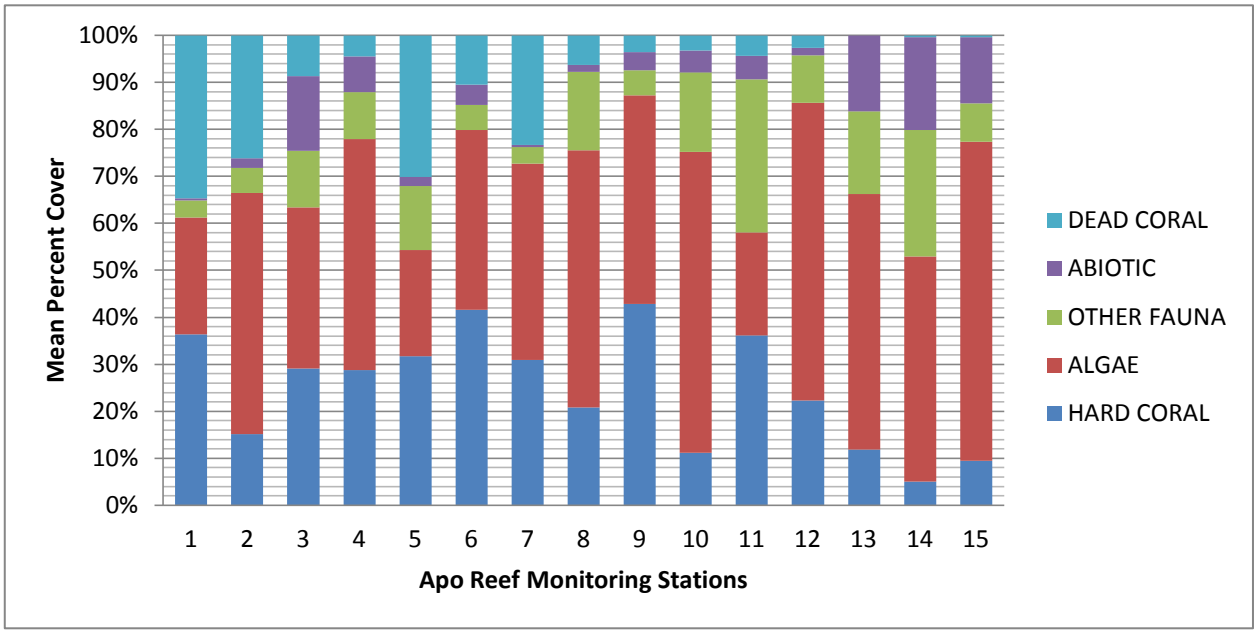


Figure 4. Mean percent composition of the major benthic categories of reefs across the 15 monitoring stations at ARNP, Sablayan, Occidental Mindoro (April 2014).

Seven of the 15 stations had poor coral cover ranging from (**Figure 5**). The other eight stations had fair cover. Station 9 had the highest mean live coral cover with 42.80% while Station 14 had the lowest mean cover with 5.07%. For the algal cover, 11 of the 15 stations surveyed were dominated by algae. Station 10 had the highest mean cover with 64.05% while Station 11 had the lowest mean cover with 21.85%. Station 11 and 14 had the highest sponge and soft coral cover with a mean cover of 26.93% and 32.57%, respectively. Stations 14 had the highest mean abiotic cover with 19.67% while Station 7 had the lowest mean cover with 0.40%. Station 1 had the highest dead coral cover with 34.68% while Station 13 had the lowest, with no dead coral cover at all.

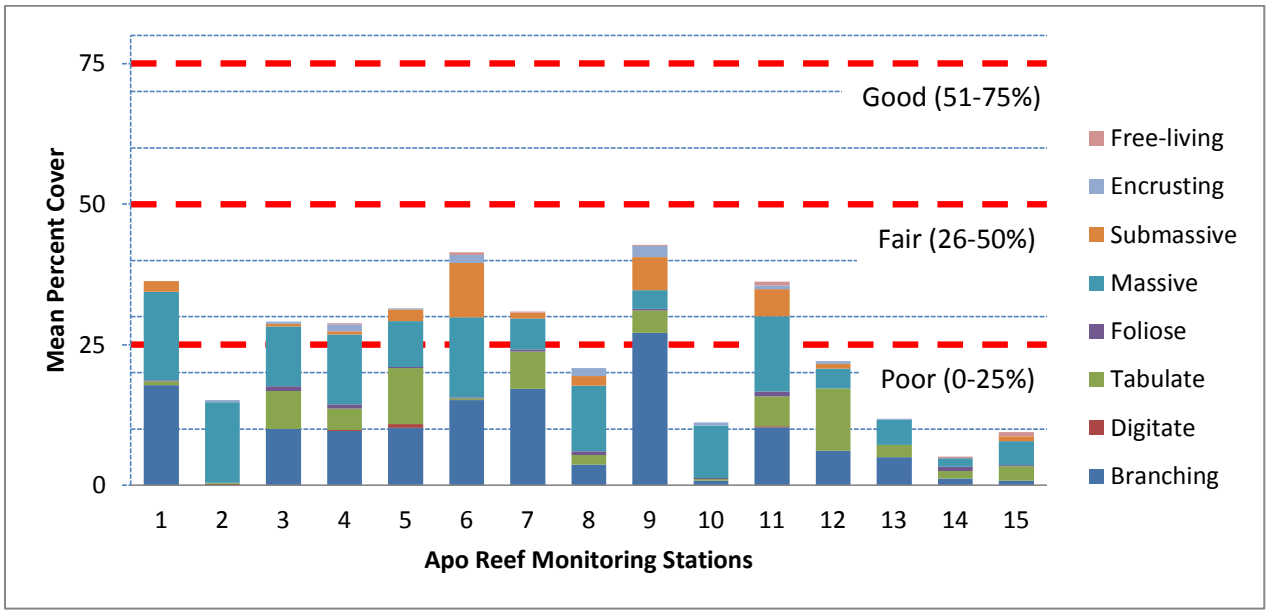


Figure 5. Coral cover of the reefs across the 15 monitoring stations at ARNP, Sablayan, Occidental Mindoro (April 2014).

Reef Fish Communities

Estimated Fish Abundance

Overall, there were 190 reef fish species belonging to 32 families that were recorded during the survey. The combined total estimated fish abundance from all 15 stations was 14,283 individuals with an overall mean of 952 individuals/250m^2. The top three most abundant species across the 15 stations were *Pomacentrus alexandrae* (310 individuals/250m^2), *Chromis ternatensis* (240 individuals/250m^2) and *Pseudanthias tuka* (179 individuals/250m^2) (**Figure 6**).

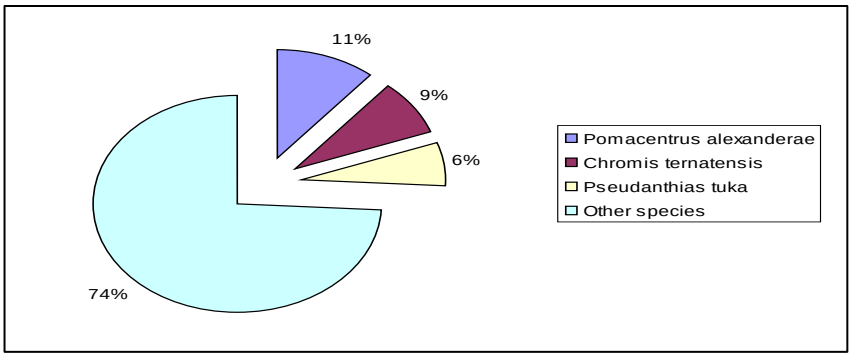


Figure 6. Mean abundance composition (individuals) of the reef fish species at the ARNP, Sablayan, Occidental Mindoro (April 2014).

The top three most abundant fish families across the 15 stations were Pomacentridae (398 individuals/250m^2), Acanthuridae (165 individuals/250m^2) and Plotosidae (130 individuals/250m^2) (**Figure 7**).

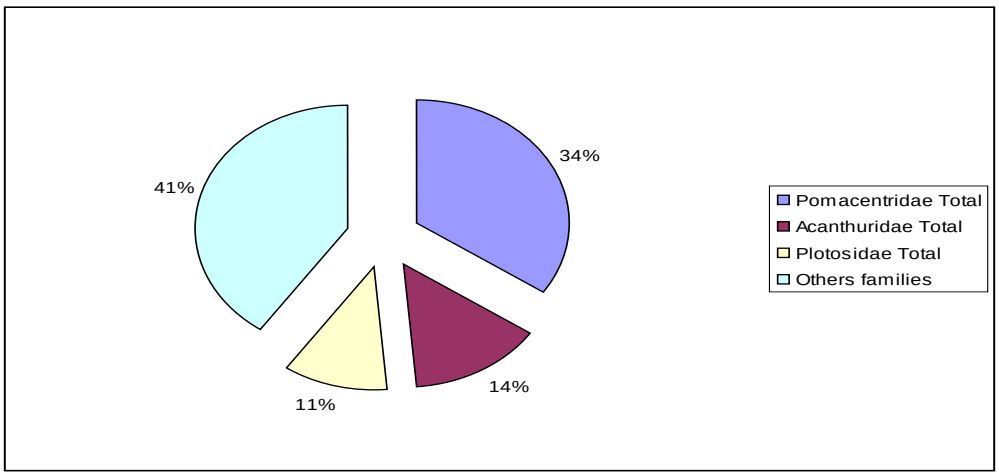


Figure 7. Mean abundance composition (individuals) of the reef fish families at the ARNP, Sablayan, Occidental Mindoro (April 2014).

Estimated Fish Biomass

The top three species with the highest biomass were *Triaenodon obesus* (88 kg/250 m^2), *Pterocaesio tile* (16 kg/250 m^2) and *Odonus niger* (15 kg/250 m^2). The top three fish families with the highest biomass were Carcharhinidae (88 kg/250 m^2), Caesionidae (18 kg/250 m^2) and Acanthuridae (11 kg/250 m^2).

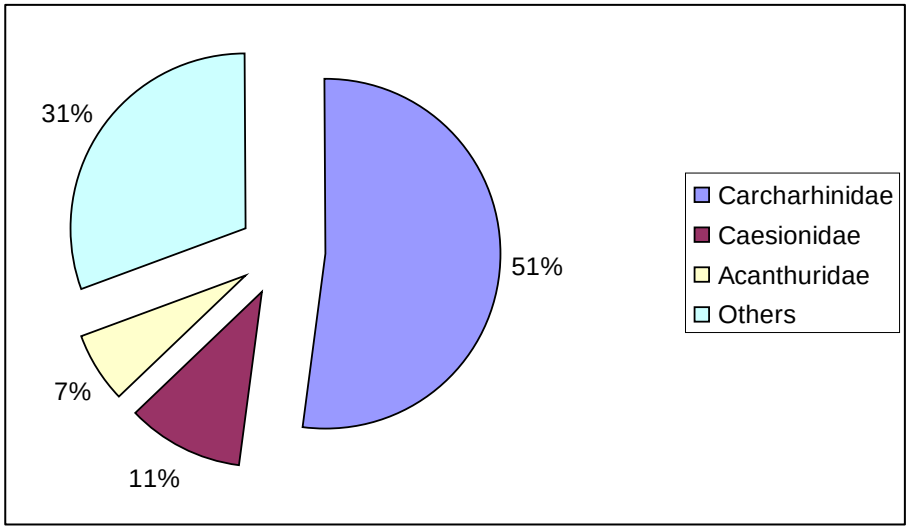


Figure 8. Mean biomass of the different fish families at the ARNP, Sablayan, Occidental Mindoro (April 2014).

3.4. Socio-Cultural and Economic Profile

Demography and Settlements

The islands comprising the ARNP are uninhabited. However, the Apo Island is temporarily inhabited by rangers who are tasked to protect and monitor the condition of ARNP. A total of 20 rangers were authorized to live in Apo Island forming a ten (10) man-team per weekly shifting. These rangers are field officers from DENR (7), LGU (7), PNP (2), and ARMY (4). Figure 3 shows the boundaries of Apo Reef including the peripheral waters, serving as buffer zone. The figure below also shows the location of the island s in ARNP. More than 30 fishing boats with an average of 15 crews that belong to 3 to 5 families per boat are seen within the area.

Although there are no permanent settlements in ARNP, transient fishermen from the coastal barangays of Sablayan and neighboring municipalities of Mindoro, Palawan and Bohol used to camp in the reef for about a week during fishing season. Fishermen coming from Romblon, Batangas, Cavite, Quezon, Zambales, Lapu-Lapu City, Cebu and Antique likewise visit areas surrounding ARNP. Indigenous Tagbanuas from Tara Island also used to frequent in the island during summer months to fish and gather ornamental shells.

Population Size and Growth Rate of ARNP Stakeholder Communities

Sablayan, which has jurisdiction over the ARNP has the second largest population share (approximately 20%) in the province of Occidental Mindoro. Based on 2010 NSO Census of Population and Housing, the total population of Sablayan is 76,153 while the total number of households is 16,284 with an average household size of 5. Meanwhile, the 2012 CBMS survey has recorded a total population of 80,152 with an average household size of 4.57. Males predominate the municipality's population posting 40,958 or 51.10%.

The population of Sablayan grows at 2.60% since year 2010. This is much greater than the 1.46% municipal annual growth rate during the immediately preceding censal year. This annual growth rate is higher than that of the province and the region by a small fraction but significantly more than that of the national growth rate.

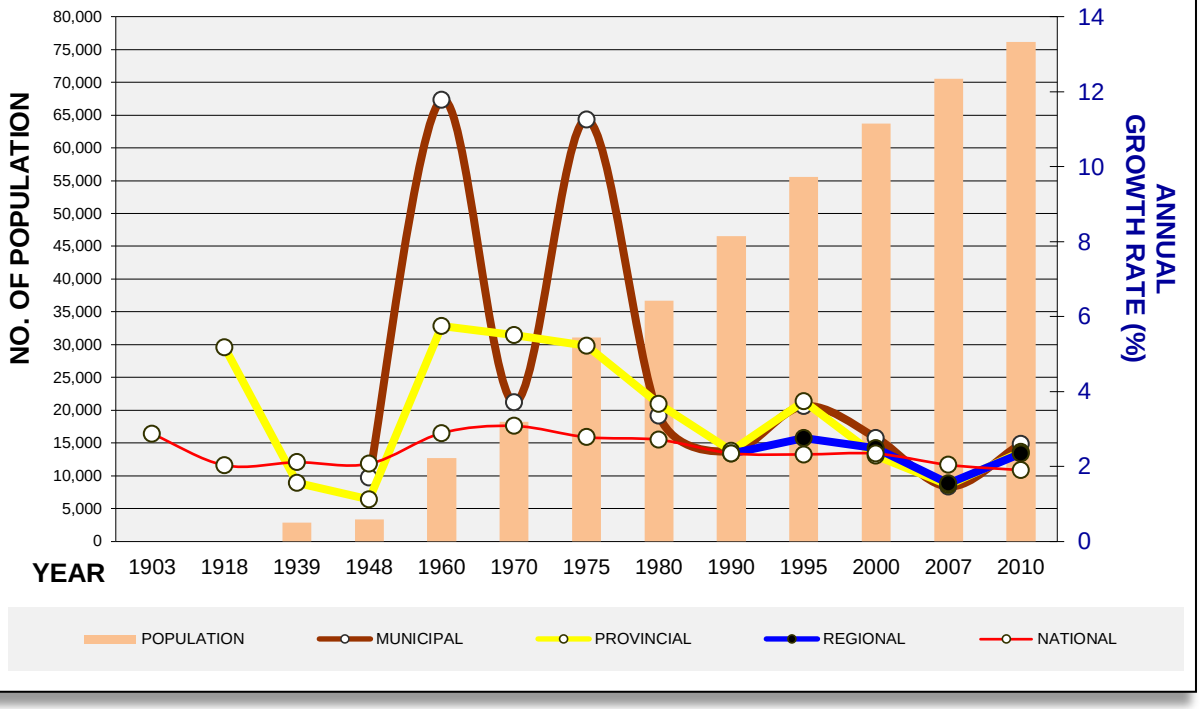
Table 6: Historical Annual Growth Rate of Sablayan

Year	Population	Increase / Decrease	Annual Growth Rate (%)			
			Municipal	Provincial	Regional	National
1903						2.87
1918				5.18		2.03
1939	2,861	2,861		1.56		2.11
1948	3,332	471	1.71	1.12		2.07
1960	12,685	9,353	11.78	5.74		2.89
1970	18,256	5,571	3.71	5.50		3.08
1975	31,117	12,861	11.25	5.22		2.78
1980	36,699	5,582	3.35	3.67		2.71
1990	46,546	9,847	2.41	2.42	2.34	2.35
1995	55,573	9,027	3.61	3.74	2.76	2.32
2000	63,685	8,112	2.76	2.29	2.49	2.34
2007	70,506	6,821	1.46	1.50	1.55	2.04
2010	76,153	5,647	2.60	2.39	2.35	1.90

Source: MPDO (NSO Census of Population)

The significant increase is due to natural growth coupled with in-migration brought about by the establishment of two (2) state colleges in the municipality: OMSC and PUP. Population growth rate beginning 1939 to present indicated unnatural increases particularly in years 1960 and 1975. Historically, these are the periods when migrants from Luzon and other provinces started to move into the town of Sablayan[2].

Figure 9. Historical Growth of Population



Source: MPDO, Sablayan

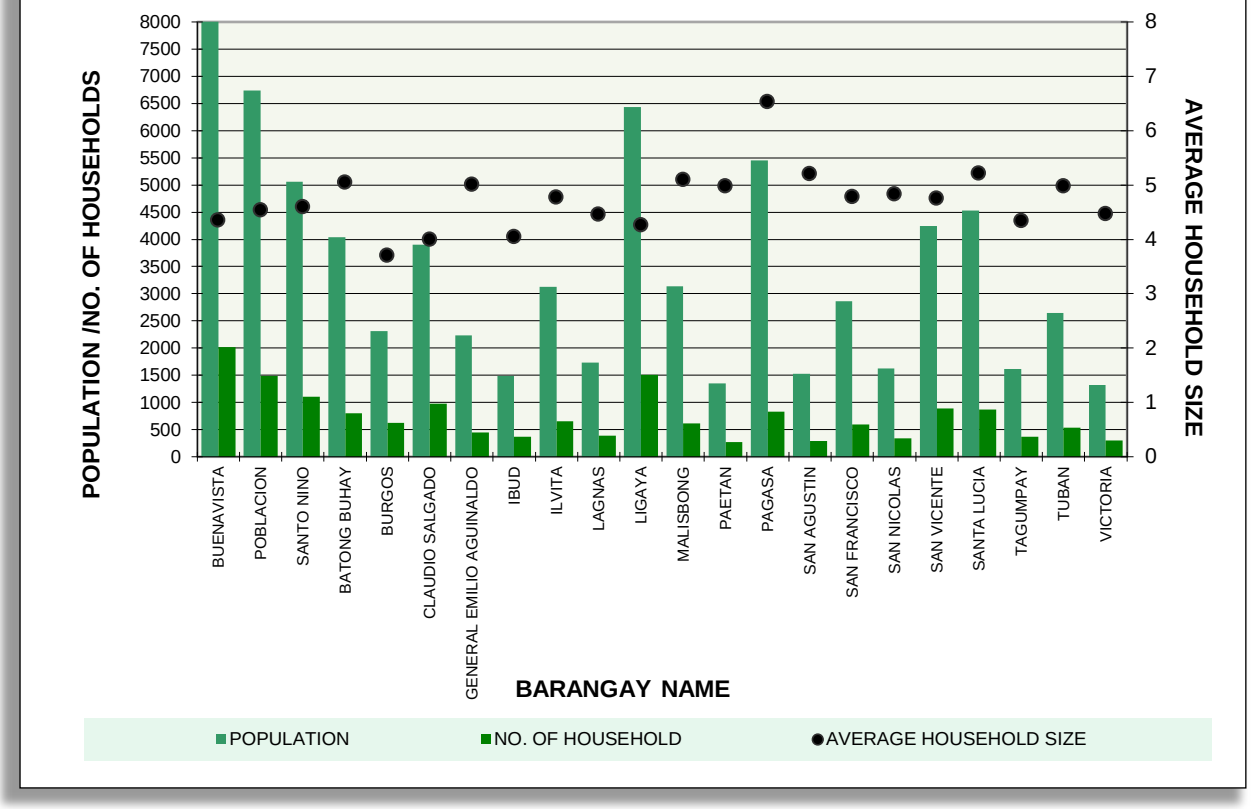
Population Distribution of ARNP Stakeholder Communities

Sablayan is a first class municipality with a total land area of 2,188.80 km^2. It has twenty two barangays, three (3) of which are classified as urban and nineteen (19) are rural barangays. Barangays Buenavista and Poblacion (Lumang Bayan) registered the most number of people residing in the municipality with 8,758 and 6,741 representing 11.50% and 8.85% of the municipality's total, respectively. Barangay Victoria has the least number of people residing with 1,323 representing 1.73% of the municipality's total (2010 NSO Census).

In 2010, Sablayan recorded an aggregate urban population of 20,563. This is almost 30% of the total number of population residing in the municipality. The rest reside in the rural areas. Most of people who chose to reside in the urban areas do so due to proximity to the various services such as health, institutional, commerce and trade.

[2] Draft Comprehensive Land and Water Use Plan 2014-2024 (unpublished), MPDO

Figure 10. Household and Population by Urban and Rural Barangay and Average Household Size, Year 2010



Source: MPDO, Sablayan

Among the 22 barangays, ten (10) are located along the coastline and classified as “coastal”. Barangays Burgos, Ligaya, San Nicolas, General Emilio Aguinaldo, Sta. Lucia, Poblacion, Buenavista, Sto. Niño, Ibud, and Claudio Salgado are coastal barangays of the Municipality of Sablayan and are considered as major stakeholders and local marine resource users in ARNP. It is therefore imperative for the ARNP stakeholder communities to be part of the planning processes of ARNP to achieve effective protected area management and sustainable resource use.

Table 7. Population Size of ARNP Stakeholder Communities in Sablayan.

Coastal Barangay	YEAR 2009				YEAR 2010	
	Population Size (a)			Number of Households (a)	Population Size (b)	Number of Households (b)
	Total	*Male*	*Female*			
1. Buenavista	8065	*4054*	*4011*	1821	8,758	2,013
2. Claudio Salgado	3758	*1959*	*1799*	817	3,899	975
3. General Emilio Aguinaldo (GEA)	2131	*1083*	*1048*	408	2,229	445
4. Ibud	1867	*974*	*893*	391	1,488	368
5. Ligaya	6800	*3,535*	*3,265*	1421	6,435	1,510
6. Poblacion	5927	*3,008*	*2,919*	1305	6,741	1,486
7. San Nicolas	1681	*890*	*791*	299	1,624	336
8. Sta. Lucia	3821	*1,981*	*1,840*	787	4,528	868
9. Sto. Niño	5493	*2791*	*2702*	1229	5,064	1,103
10. Burgos	2269	*1164*	*1105*	493	2,316	625
TOTAL	**41,812**	*21,439*	*20,373*	**8,971**	**43,082**	**9,729**

Source: (a) Barangay Development Plans of the 10 Coastal Barangays (CBMS, 2009)
(b) NSO Census of Population and Housing (2010)

The coastal barangays comprise almost 57% of the total population of Sablayan. Out of the ten, Buenavista and Poblacion are the coastal barangays with largest population size from 2009-2010.

Population Projection of ARNP Stakeholder Communities

The total number of population by the year 2024 is projected to be 109,162 when allowed to grow at 2.60% annually beginning 2010. The table below shows more specific population projections for the ten coastal barangays in Sablayan.

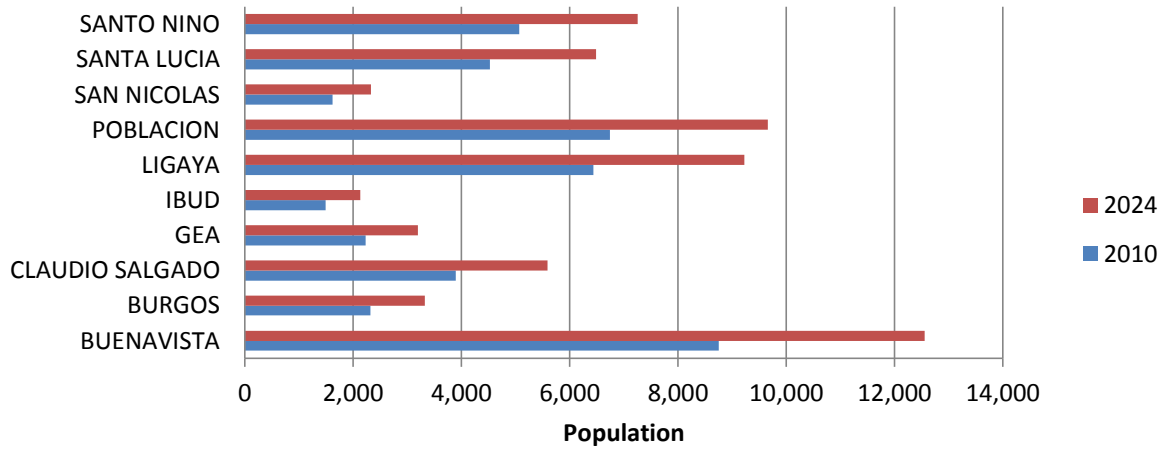
Table 8. Population Projection of ARNP Stakeholder Communities in Sablayan, 2015-2024

Barangay	2010 (Base)	Population									
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Buenavista	8,758	9,965	10,224	10,490	10,762	11,042	11,329	11,624	11,926	12,236	12,554
Burgos	2,316	2,635	2,704	2,774	2,846	2,920	2,996	3,074	3,154	3,236	3,320
Claudio Salgado	3,899	4,436	4,552	4,670	4,791	4,916	5,044	5,175	5,309	5,447	5,589
GEA	2,229	2,536	2,602	2,670	2,739	2,810	2,883	2,958	3,035	3,114	3,195
Ibud	1,488	1,693	1,737	1,782	1,829	1,876	1,925	1,975	2,026	2,079	2,133
Ligaya	6,435	7,322	7,512	7,707	7,908	8,113	8,324	8,541	8,763	8,990	9,224
Poblacion	6,741	7,670	7,869	8,074	8,284	8,499	8,720	8,948	9,179	9,418	9,663
San Nicolas	1,624	1,848	1,896	1,945	1,996	2,048	2,101	2,155	2,211	2,269	2,328
Santa Lucia	4,528	5,152	5,286	5,423	5,564	5,709	5,857	6,010	6,166	6,325	6,491
Santo Nino	5,064	5,762	5,912	6,065	6,223	6,385	6,551	6,721	6,896	7,075	7,259
Sub-Total	76,153	86,645	88,898	91,209	93,581	96,014	98,510	101,071	103,699	106,395	109,162

Source: NSO Census of Population and Housing (2010)

Rapid increase in population implies more demand and pressure on the environment and its natural resources. The figure below illustrates the projected increase in population of the ARNP communities for the next ten years.

Figure 11. Population Projection of Coastal Barangays



Population Density/Residential Density in ARNP Communities

Since Sablayan has very large mostly forest and agricultural areas that are sparsely populated, it is not surprising that the population density recorded during the 2012 CBMS Survey is 0.37 persons per hectare[3]. Meanwhile the table below about the population density in the ARNP stakeholder communities was computed using the 2010 NSO Census data, shows that Buenavista is the most dense among the 22 barangays in the municipality with a gross density of 12 persons per hectare followed by Barangay Poblacion at 5 persons per hectare.

Furthermore, the urban density is computed at 5 persons per hectare and the built-up density is 107 persons per hectare. The densest area is Barangay Malisbong with 333 persons per hectare followed by Barangay San Francisco with 268 persons per hectare then by Barangay San Agustin with 225 persons per hectare. The least dense among these areas is Barangay Victoria with only 53 persons per hectare. See succeeding table and graphical presentations for more information.

Table 9. Population Density and Built-up Density of Coastal Communities in Sablayan, 2010

Coastal Barangay	Area in Hectares	Population Density	Built-up Area in Has	Built-up Density
URBAN				
Buenavista	747.40	12	79.5000	110
Poblacion	1,242.00	5	59.0200	114
Santo Nino	1,996.20	3	54.9000	92
RURAL				
Burgos	19,330.00	0	18.3909	126

[3] Capacity Development Executive Legislative Agenda 2014-2016, (MPDO)

Claudio Salgado	3,741.60	1	25.2720	154
General Emilio Aguinaldo	1,006.40	2	39.0005	57
Ibud	1,278.00	1	21.7271	68
Ligaya	6,435.00	0	66.9555	96
San Nicolas	822.00	2	19.1475	85
Santa Lucia	3,646.60	1	32.8909	138
TOTAL	**218,880.00**		**713.80**	**107**

Source: MPDO - Sablayan

Settlement Patterns in ARNP Communities

The proliferation of informal settlements in Sablayan implies the influx of people migrating to the town. The population of these informal settlements is generally into fishing, which is their major source of income. Types of structures are generally made of indigenous materials, and a number of which are not in good physical state. A less significant number of houses, on the other hand, are made of concrete or permanent materials[4].

Moreover, it is noted that the informal settlement families, which are concentrated within the urban core barangays of Sablayan, with houses commonly made of light materials were built along the coastal and low lying areas of Sitio Tabuk or at the mouth of Sabang rivers in Brgy Buenavista, and Sitio Katunggan and Pondohan in Brgy Poblacion. Meanwhile, the coastal communities in Ligaya and Sta. Lucia were recorded to have the highest number of informal settlers among the rural barangays. The coastline of Sablayan is the most prevalent dwelling areas for informal settlement families because it is where they can find food and livelihood (i.e. fishing). Hence, rapid growth in population coupled by the increase in the number of informal settlement families in the coastal barangays indicates upsurge in demand and competition for food, employment, and the like. Thus, the presence of informal settlers is anticipated to intensify environmental challenges such as unregulated resource extraction and unsustainable resource utilization.

Difficulty in accessing safe and potable water is an issue to many residents as revealed by CBMS 2012 with 1,674 households without access to potable water. The Level III water supply is served to the three (3) urban barangays and 2 rural barangays namely, Brgy. San Vicente and Brgy. Ligaya while Level II water systems are established in Brgy. Pag-asa and Brgy. Burgos. In terms of power supply, it is noted that the municipality has provided electricity but its supply is unreliable. On the other hand, the municipality faces the problem of lack of roads connecting the remote areas, and poor condition of roads and bridges[5].

Indigenous Communities

Mindoro Island is the ancestral domain of the Mangyans. In 1987, the Mangyan population was estimated at 122, 101 persons or 15 % of the 1990 total population of the Mindoro BZ. At present, Mindoro province is a home to Tagalogs, Ilocanos, Visayans, Bicolanos, Pampangos, and other ethnic groups. Among the eight tribes--Alangan, Bangon, Buhid, Hanunuo, Iraya, Ratagnon, Tadyawan and Tau-Buid --occupying Mindoro Island, Alangans and Tau-Buid inhabit Sablayan, a town in the mid-

[4] Comprehensive Land Use Plan of Sablayan 2001-2010

[5] Capacity Development Executive Legislative Agenda 2014-2016, MPDO

western portion of the island. The Alangan and Tau-Buid tribes of the Mangyan people are the original inhabitants of Sablayan. Their population posted 6,697 (CBMS 2009) or 9% of the total population of the municipality. They are nomadic in nature and are highly dependent on forest resources for subsistence. Means of livelihood are agriculture, fishing, hunting and handicraft. Their methods are still crude but some are now trying to employ modern techniques to improve their crafts. Housing pattern is nucleated and each nucleus represents a tribe. Homes are made of light materials and are usually small; communal houses which could accommodate about 10 families are common to the more indigent tribes in the north[6].

Mother Tongue / Ethnicity

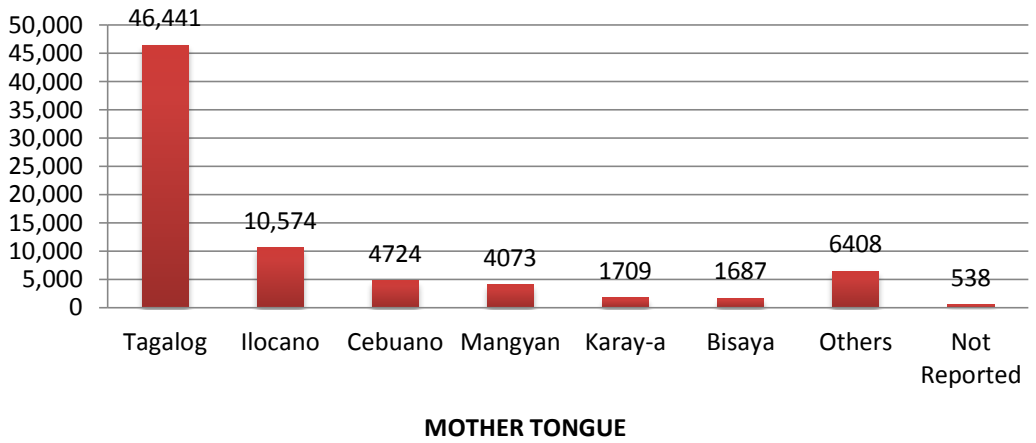
The municipality is dominantly a Tagalog speaking locale. The next dominant dialect is Ilocano, followed by Cebuano and Mangyan. The latter is a language belonging to the indigenous people of Mindoro Island.

Table 10. Household Population By Mother Tongue, 2010

Mother Tongue	Household Number	% of Total Households
Tagalog	46,441	61
Ilocano	10,574	14
Cebuano	4,724	6
Mangyan	4,073	5
Karay-a	1,709	2
Bisaya	1,687	2
Others	6,408	8
Not Reported	538	1
TOTAL	**76,154**	**100**

Source: MPDO (Extrapolated from 2000 NSO Census of Population)

Figure 12. Household Population By Mother Tongue, 2010



[6] Draft Comprehensive Land and Water Use Plan 2014-2024 (unpublished), MPDO

Religious Affiliation

The results presented in this section are another extrapolation of NSO results from the 2000 Census of Population. Sablayeños are dominantly Roman Catholic believers. Refer to the succeeding table and graph for more information.

Table 11. Household Population by Religious Affiliation, 2010

RELIGIOUS AFFILIATION	NO. OF PEOPLE	% OF TOTAL POPULATION
Catholics	54,229	71.21%
Iglesia ni Cristo	5,186	6.81%
Evangelicals	4,911	6.45%
Seventh Day Adventist	3,623	4.76%
Tribal Religion	1,437	1.89%
Lutheran Church in the Philippines	1,090	1.43%
Other Protestants	720	0.95%
Jehovaah's Witnesses	651	0.85%
United Church of Christ in the Philippines	633	0.83%
United Methodist Church	551	0.72%
Philippine Benevolent Missionaries Association	143	0.19%
Philippine Episcopal Church	109	0.14%
Other Methodist	68	0.09%
Others	2,802	3.68%
TOTAL	**76,153**	**100.00%**

Source: MPDO (Extrapolated from 2000 NSO Census of Population)

Economic Characteristics and Poverty Levels

Sablayan is traditionally an agriculture surplus area. It supplies the consumption requirements of neighboring Visayan Region and Metro Manila. Fishing follows owing to the favorable location of the town. Most of the people or majority of the labor force is either farmers or fishermen. The municipal waters covering 753 square kilometers are a haven of more than 4,820 fishermen of the town[7]. Inland resources of swamp lands, fresh water and brackish and lakes and reservoirs are evidence of municipality's vastness of fishery resources.

The municipality being a coastal town has high potential for fishery given the necessary support facilities especially in marketing. The coastal areas of the municipality of Sablayan have considerable ecological and economic importance. The municipal waters, with its fish and other aquatic resources, are considered important elements in the livelihood and food security of the municipal population. The coral reefs especially those in the Apo Reef Natural Park (ARNP) provide habitat and food for wide variety of sea organisms and contribute to a large extent of fish propagation. The Municipal Resolution No. 1108 declared a Tourist Zone and Marine Reserve in 1983 in recognition of ARNP's importance to Sablayan.

[7] Comprehensive Land Use Plan of Sablayan (2001-2010), MPDO

On the other hand, the tourism sector remains to be one of the top contributors in the municipality's revenue. Based on statistical data from the tourism office, there is a 300% increase in tourist arrivals in 2011 and continued an upward trend in the previous year. Apo Reef National Park remains to be the premier tourist destination in the municipality, being one of the top driving destinations of the country drawing around 2,349 visitors annually and contributing PhP 1,910,913.23 in the local coffers[8]. Locals and foreigners visit the ARNP for SCUBA diving, snorkeling, research, photography, bird watching and other recreational activities.

The objective of understanding the economic characteristics and poverty levels of ARNP stakeholder communities is to gain a deeper understanding on the local economic base, occupational structure, and income sources which constitute the ARNP communities' complex livelihood systems, and establish what their dependence on marine resources is, as well as identifying zones of potential high impact (threats) on marine resources.

Fisheries

Fishing is one of the prime means of livelihood (next to farming) in Sablayan. The local government has adopted an ordinance identifying fish sanctuaries in the municipal waters that covers an area of 750 square kilometers to protect spawning grounds of marine habitat. Table 12 shows the volume and value of fisheries production in Sablayan.

Table 12. Existing Fishing Grounds and Aquaculture Production, 2013

Fishing Grounds	Barangay	Production		Product Market	
		Volume (MT)	Value	Local	Export/ Other Market
MUNICIPAL WATERS	Buenavista	3,444.40	344,440,000	Manila Batangas Cavite	Japan Europe
	Poblacion	2,323.66	232,366,000		
	Ligaya	912.30	91,230,000		
	Sta. Lucia	242.20	24,220,000		
	Burgos	87.00	8,700,000		
	Sto. Niño	598.50	59,850,000		
	Claudio Salgado	43.80	4,380,000		
	GE Aguinaldo	56.30	5,630,000		
	San Nicolas	59.20	5,920,000		
Sub-Total		**7,767.36**	**776,736,000**		
FISH PONDS	San Vicente	10.80	1,080,000	Sablayan Sta. Cruz Mamburao	
	Paetan	1.20	120,000		
	Tagumpay	0.92	92,000		
	Pagasa	0.77	77,000		
	Sto. Niño	1.30	130,000		
	Poblacion	0.24	24,000		

[8] Capacity Development Executive Legislative Agenda 2014-2016, MPDO

	Ibud	3.12	63,900		
	Burgos	2.50	250,000		
	San Francisco	1.35	135,000		
	Buenavista	0.27	27,000		
	GE Aguinaldo	0.35	35,000		
	Malisbong	0.71	71,000		
Sub-Total		**23.53**	**2,104,900**		
LAKES	Tuban	4.20	420,000	Sablayan	
	San Agustin	1.80	126,000		
	Sta. Lucia	1.08	75,600		
Sub-Total		**6.48**	**453,600**		
TOTAL		**1,885.10**			

Source: Office of the Municipal Agriculture

Meanwhile, there is a separate program for Apo Reef by the National Government through the DENR Protective Services for rehabilitation and protection of the protected area. Although Apo Reef is also protected by national laws and local ordinances, the protected are is still facing serious problems on fishing which might be attributed to inadequacy in manpower and patrol equipment and gears to cover its very vast water jurisdiction against illegal activities of transient fishermen.

Tourism

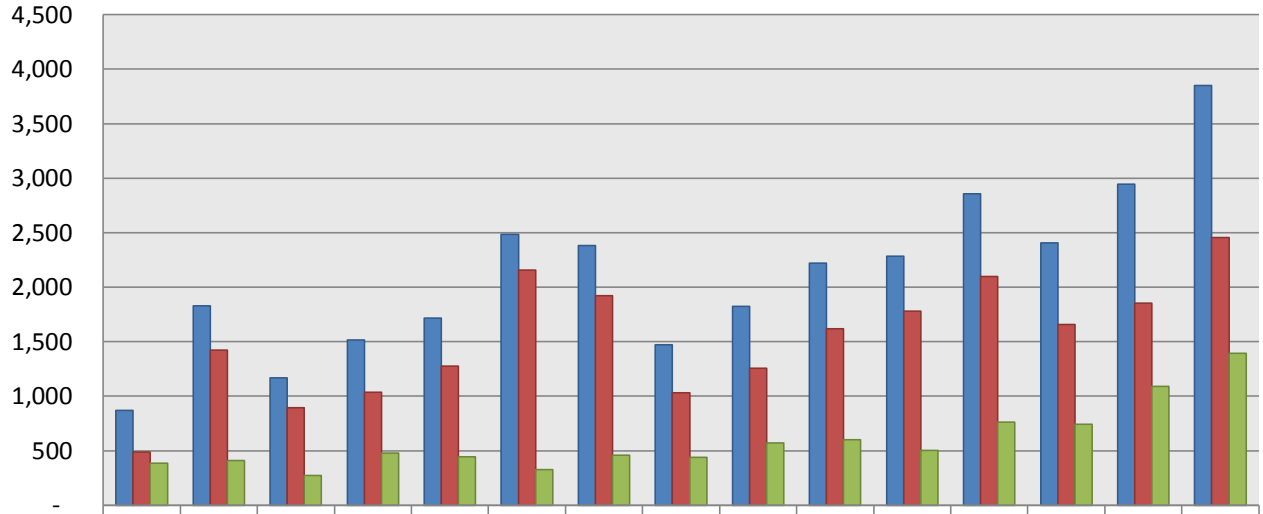
The Apo Reef Natural Park (ARNP) is the largest and best preserved atoll-like reef in the Philippines. ARNP's atoll-like reef system is the largest in Asia and included in the Sulu-Sulawesi Marine Eco-region, the center of marine biodiversity in the world. Because of its rich coral and fish population, it is also one of the top dive sites in the world. Hence aside from its importance as habitat to marine species of biodiversity and economic importance, it is also the top-ecotourism destination in the province, providing jobs and businesses to the local coastal communities and revenue to the local government of Sablayan.

Apo Reef has three islands namely Apo Island, Apo Menor (Binanggaan Island) and Cayos del Bajo. The white beaches and the physical attributes of these islands offer tourists a wholesome place for rest and recreation. The islands are accessible by motorized banca. Other resorts are in Calintaan, a town adjacent to Sablayan, owns the Apo Reef Club also provides tourist services in ARNP. Most tourism establishments are found in Barangay Buenavista and Poblacion. Four boat owners or Apo Reef transport service providers are from Buenavista, while two boat owners are from Poblacion. There is a wide diversity on the tourists of Apo Reef which came from Coron, Puerto Galera, Boracay, Cebu, and many more.

It is clear that scuba diving or at least one segment of the activity which is the live aboard diving program, has firmly established itself as a major tourism user of ARNP. This seemingly exclusive market segment that dominates the area is brought about by the isolation of ARNP from any mainland area which requires a minimum of two hours travel time from the nearest take off point, which is the Sablayan town proper. Other potential ecotourism activities are not keenly practiced in the area. Some of these are birdwatching and recreational swimming.

Based on the statistics generated by the DENR IV B - Protected Area Office, tourism in ARNP has seen impressive growth. The figure below shows that from 1999 to 2013, the total number of visitors is highest in 2013, with more foreign tourists coming than local visitors.

Figure 13. Total Number of Visitors (1999-2013)



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	871	1,831	1,166	1,514	1,717	2,485	2,381	1,471	1,825	2,221	2,283	2,859	2,404	2,945	3,850
Foreigners	486	1,421	892	1,038	1,274	2,159	1,923	1,031	1,255	1,619	1,779	2,098	1,660	1,855	2,455
Locals	385	410	274	476	443	326	458	440	570	602	504	761	744	1,090	1,395

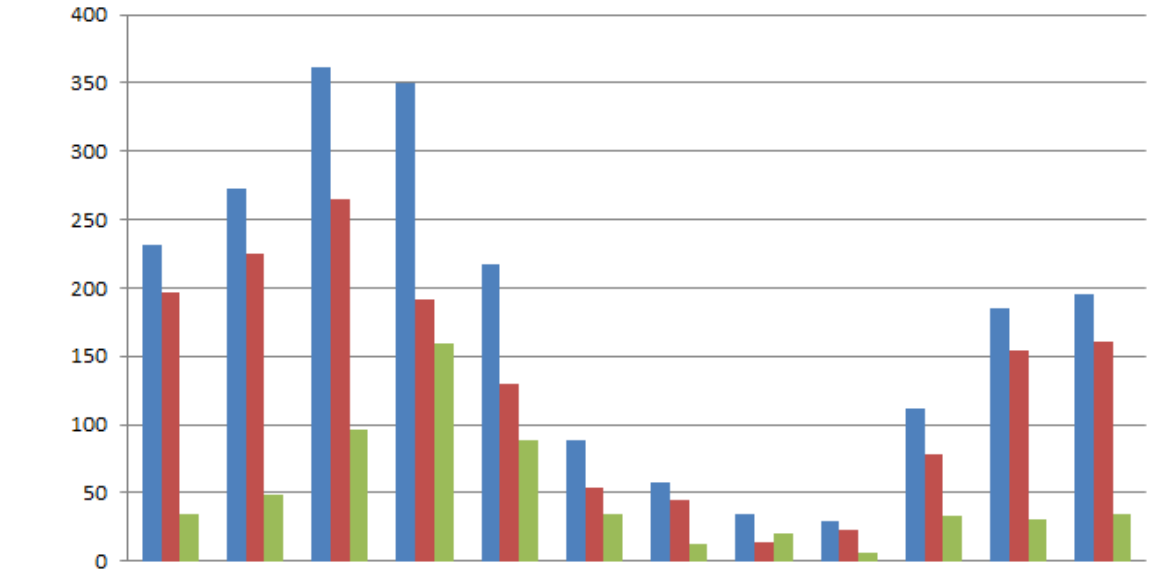
Source: DENR – Apo Reef Natural Park Protected Area Office

In 2013, a total of 3,850 tourist visitors are recorded, 2,455 of which are foreign tourists while 1,395 are local tourists. Tourists had visited the protected area mainly for SCUBA Diving and Snorkeling followed by Swimming and Island Hopping. Most of the visitors are scuba divers availing of the live-aboard tour packages offered by Manila-based tour operators.

Most of the tourists availing of live-aboard diving packages use Batangas City or Puerto Galera as their base or jump-off point. It should also be noted that majority of visitors are foreigners who can easily avail of such package. There is one Sablayan-based, foreign operated resort that caters to mostly European divers which also brings in visitors via Sablayan. It is also noted that the number of visitors for five years (2009 to 2013) has an average increase of 16% yearly.

Meanwhile, the figure below shows the average number of visitors coming to ARNP per month from year 1999 to 2013. More visitors are coming during the first 5 months every year (January – May). The growth however is not significant from June to September (rainy season) as the numbers of visitors are declining due to changes in weather patterns.

Figure 14. Average Number of Visitors per month (1999 - 2013)



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Total	231	273	361	350	217	89	58	34	29	111	185	195
Foreigners	197	225	265	191	129	54	45	14	23	78	154	161
Locals	34	48	96	159	88	35	13	20	6	33	31	34

Source: DENR – Apo Reef Natural Park Protected Area Office

Employment

Agriculture, fishing, tourism, commerce and industry are the main sources of income for Sablayan. The table below shows the list of livelihood activities in Sablayan generated through focus group discussions and key informant interviews.

Table 13. Livelihood Activities and Resource Use Practices in Sablayan

Fisheries and Tourism **(Direct Dependence on Coastal / Marine resources)**	**Others** **(Agriculture, Trade and Services)**
• Fishing • Trading fish (fresh, dried, octopus, prawns) • Shell fishing (food) • Net menders • Boat builders • Water transport provider • Smoke Fish Making • Hotel and Resort Business • Mariculture • Aquaculture	• Crop Production: rice, corn, banana, coconut, cash crops, legumes, root crops, etc. • Upland Rice Farming • Animal husbandry and hog raising (chicken, goats, sheep, cows) • Charcoal making and trading • Bagoong Manufacturing/ Processing • Nipa shingles Weaving and Weaving mats • Copra Making

• Tour guide	• Bigasan (rice supplier) • Handicraft • Lending • Wood cutting, wood trading and carving • Small businesses (bakery, food and restaurants, dry goods, sari-sari store) • Hair dresser and Tailor • Black smith and Masons • Carpenters and Builders • Bicycle menders • Trading general goods (mobile) & clothes • Village representatives / Government-employed (teachers, nurses, police, day care workers, health workers) • Employed in private sector (Traditional Doctors)

The occupational structure showed that a wide variety of activities are carried out in the Sablayan. The first column shows the livelihood activities associated with marine resource use (they depend at least partly on marine resources for their livelihood) through fishing and trading (fish, crustaceans, holothurians, cephalopods and shells) and tourism-related activities.

The labor force population in Sablayan comprise the most number of individuals with 44,636 or 59% of the total population of the municipality followed by those dependents counting 34,302 or 45% while the school going age has a total number of 33,521 or 44%. Furthermore, it is projected that by the year 2024 those in the labor force accounts to 63,984[9]. The table below shows the total number of population in the labor force and their employment status in the ten coastal barangays of Sablayan identified as ARNP stakeholder communities.

Table 14. Labor Force (15-59 yrs old) of ARNP Stakeholder Communities in Sablayan, 2009 [10]

Coastal Barangay	Labor Force Population			No. of Employed			No. of Unemployed		
	Total	*Male*	*Female*	**Total**	*Male*	*Female*	**Total**	*Male*	*Female*
1. Buenavista	2645	*1748*	*897*	2561	*1703*	*858*	84	*45*	*39*
2. Claudio Salgado	1160	*900*	*260*	1154	*895*	*259*	6	*5*	*1*
3. GEA	310	*234*	*76*	220	*183*	*37*	90	*51*	*39*
4. Ibud	695	*466*	*229*	688	*462*	*226*	7	*4*	*3*
5. Ligaya	1,727	*1,337*	*389*	1,711	*1,332*	*379*	16	*5*	*10*
6. Poblacion	1,926	*1,289*	*637*	1,879	*1,263*	*616*	47	*26*	*21*
7. San Nicolas	567	*435*	*132*	561	*430*	*131*	6	*5*	*1*
8. Sta. Lucia	1,100	*835*	*265*	1,084	*829*	*255*	16	*6*	*10*
9. Sto. Niño	1797	*1213*	*584*	1776	*1205*	*571*	21	*8*	*13*

[9] Computed based on the latest NSO data on Household population by Age-group, MPDO

[10] Barangay Development Plans of the 10 Coastal Barangays and Focus Group Discussions

10. Burgos	1212	*639*	*573*	-	-	-	-	-	-
TOTAL	**13,139**	9,096	4,042	**11,634***	8,302*	3,332*	**293***	*155**	*137**

**total excluding Burgos (no available data)*

In terms of labor force population, it is noted that Buenavista (2,645), Poblacion (1,926), Sto. Niño (1797) and Ligaya (1,727) remains to be at the top of the list. In general, there are more men than women in the labor force population. Needless to say, records show that in all coastal barangays, there are more employed men than employed women, which are manifested in the occupational structure and major economic base of Sablayan - agriculture (crop production) followed by fisheries, and tourism – that produces work for famers, fishermen, boatmen, tour guides, and the like.

Poverty Levels

The impacts of demographic, economic and geographic factors were reflected on households' socio-economic status. Based on focus group discussion conducted during stakeholder workshops in Sablayan, households in the ten coastal barangays are mainly dependent on fishing as their most important source of income. Moreover, the rural barangays along the coast of Sablayan are the poorest of the 'marine dependent households'.

Table 15. Social Status and Poverty Incidence in the ARNP Stakeholder Communities in Sablayan[11]

Coastal Barangay	Number of Households	Households with Income below Poverty Threshold	
		Magnitude	Proportion
Buenavista	1821	880	48.33%
Claudio Salgado	817	(571)	~70%
GEA	408	375	91.91%
Ibud	391	142	36.32%
Ligaya	1421	1138	80.08%
Poblacion	1305	406	31.11%
San Nicolas	1681	245	81.94%
Sta. Lucia	3821	546	76.70%
Sto. Niño	5493	409	34.11%
Burgos	2269	(1475)	~65%
TOTAL	**19,427**	**6,187***	

**Estimate (without exact values from Claudio Salgado and Burgos)*

The Table 15 shows that in terms of socio-economic status and poverty incidence rate of the ARNP stakeholders in the coastal communities, Barangay General Emilio Aguinaldo (91.91%), San Nicolas (81.94%), Ligaya (80.08%) and Sta. Lucia (76.70%), respectively, are four rural barangays that recorded the most number of households with income below poverty threshold. This can be an indicator to the kind of livelihood activities and degree of marine resource utilization and extraction that may take place in the identified coastal areas.

[11] Barangay Development Plans of the 10 Coastal Barangays and Focus Group Discussions

In 2013, a total of 23 fishermen were apprehended for their illegal entry in ARNP and fishing without permit. They also used a total of 12 motorized boats without permit. Almost all of the fishermen are from Sitio Tabuk in Barangay Buenavista while few of them are from Barangay Poblacion. It is interesting to note that most of the apprehended fishermen are from Sitio Tabuk, Buenavista, is a known dwelling place of poor informal settlement families who are struggling to make a living.

On the other hand, it is noted that boat ownership and the type of boat reflects the wealth of fishing households. A total of only six boats are registered in Sablayan, four of which are from Buenavista and two are from Poblacion, which are two urban barangays in the municipality. Therefore, it is safe to conclude that the socio-economic status is positively linked to the diversity of the households' portfolio of livelihood activities. The most vulnerable households were found to be households dependent solely on one activity for their livelihood, and the most vulnerable of all are those who depend solely on marine resources for their livelihood.

RESOURCE USE PRACTICES

Apparently, the Apo Reef Natural Park is a major asset in Sablayan and its municipal population. Countless socio-economic values and benefits are being experienced with the presence and proper management strategies in the protected area. The foremost benefit is the conservation of biodiversity especially that the protected area serves as a habitat for rare, endangered or endemic species. Not only is it responsible for the increasing income and revenue generation in Sablayan through providing direct and indirect ecotourism services, but also for opening doors for more employment opportunities on the tourism sector. It may also provide major sources of livelihood for local people as managers, rangers, divers/ surveyors for biodiversity monitoring, tourist guides, and transport service providers such as boat operators. Such employment can also sometimes provide additional education opportunities.

Furthermore, protected areas such as ARNP are increasingly being recognized as important places to promote physical and mental health and also as major recreational resources. It can be used to develop knowledge and education through formal and informal dissemination of information and by providing sites for ecological research and monitoring.

In terms of Climate Change Adaptation and Mitigation (CCAM) and Disaster Risk Reduction and Management (DRRM), although there are still a need for further studies on the vulnerability and risk assessment of ARNP, it is clear that Apo Reef as a protected area can play a role in both sequestering carbon and ameliorating local climate change impacts.

In July 2007 Apo Reef was closed to any and all forms of fishing activity by virtue of the Protected Areas Management Board (PAMB) Resolution No. 05, Series of 2007 and reiterated through PAMB Resolution No. 009, Series of 2010. These resolutions effectively declared the total closure of Apo Reef Natural Park to any fishing activity (no-take-zone policy). However, it is noted that prior to the implementation said policy, Barangays Buenavista and Ligaya are among the coastal communities and are dependent mainly on fishing at Apo Reef for their subsistence and income.

The resolution was complemented by the rules of implementation, under PAMB Ordinance No. 001, Series of 2007, which declared the "temporary suspension of the issuance of permits to undertake

fishing and fishery related activities at the sustainable-use zone of the Apo Reef Natural Park", as amended through PAMB Ordinance No. AR07-001-1, Series of 2011, "declaring the banning of any fishing or fishery related activities in ARNP". The declaration of the entire Apo Reef complex as a no-take zone entails a greater level of effort in terms of patrolling and management.

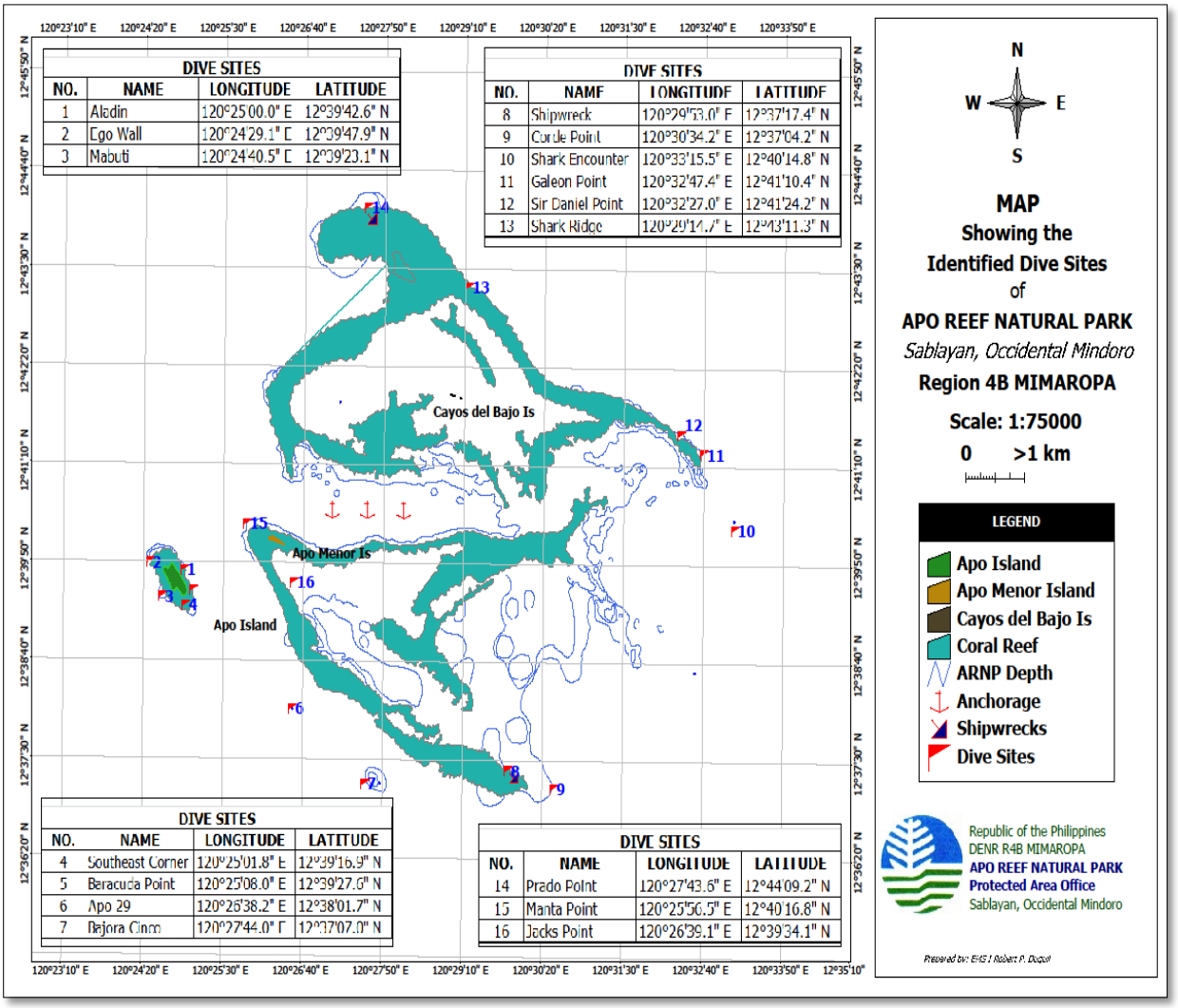
ALLOWED ACTIVITIES	CONTROLLED ACTIVITIES	RESTRICTED ACTIVITIES
• Recreational swimming • Scuba Diving • Snorkeling • Sightseeing • Sun bathing • Photography • Glass bottom boat • Kayaking • Birdwatching • Dolphin watching	• Nesting Turtle watching	• "No-Take-Zone Policy" Implemented since 2007

Marine Activities in Apo Reef Natural Park

Scuba Diving

SCUBA diving is becoming popular in ARNP. However, Due to the distance of the Apo Reef from the mainland of Sablayan, live aboard dive boats do not have to make a call to the mainland area for protocol purposes. Communication and the presence of park rangers in area should be able to compensate for such protocol. Specific anchoring sites were also identified to prevent environmental and safety hazards. The figure below shows the diving sites in Apo Reef Natural Park.

Figure 15. Location of Identified Diving Sites in Apo Reef Natural Park



Source: DENR – Apo Reef Natural Park Protected Area Office

Snorkeling

Uncontrolled snorkeling activities could create damage to coral reefs in ARNP. However, snorkeling can be done in the area provided that enough protection and safety measures are implemented. Some of the existing measures include: (a) Before snorkelers are allowed into any snorkeling site, they should be determined first whether they are doing the activity for the first time; (b) First-time snorkelers should be advised to practice first in a sandy bottom area then proceed to hard coral area (to be identified by PAMB/PASu); (c) There should be anchoring buoys in boat-based snorkeling sites. Snorkeling sites shall be identified and evaluated for different types of users. First-time snorkelers shall be given access only to areas with very little chance of damage from users. Anchoring buoys shall also be established in snorkeling sites.

Island Activities and in Apo Reef Natural Park

Birdwatching

ARNP serves as a major bird shelter in the area. The presence of impressive migratory and resident birds in Apo Island makes the area an ideal birdwatching site. Areas ideal for birdwatching are the lagoon site, the ranger station, karst area, and the first level of the lighthouse.

Exploration and Sightseeing

Due to its size, Apo Island offers limited activities to the tourists. Exploration and sightseeing sites shall include the lagoon area, the ranger station, and the lighthouse.

Picnic Area in Apo Island

All visitors to ARNP may opt to visit Apo Island for rest and more recreation. The existing picnic area serves as the main activity area where tourists can swim in the nearby waters, play beach activities, eat their meals, and rest underneath the shade of trees.

Resource Mapping

Based on focus group discussions and key informant interviews, there are two main resource uses that affect the Apo Reef Natural Park. Tourism activities are considered as direct resource use while fishing of fisher folks from coastal barangays is an indirect resource use caused by spill-over effect of marine resources in Apo Reef.

Direct and Indirect Resource Uses in Apo Reef Natural Park and Coast of Sablayan

The resource use patterns investigation focused on the primary stakeholders: fisher folks and tourists of Apo Reef Natural Park. Key findings from FGDs, informal interviews, and literature reviews, also identified four coastal barangays (Buenavista, Poblacion, Ligaya, and Sta. Lucia) as the most dependent villages on marine resources (highest number of fishers, and/or highest proportion of households involved in marine resource and tourism-associated activities).

Based on focus group discussions and literature review, fishing came out as one of the most important source of livelihood and income for the sea front villages. Temporal pattern in overall fishing effort in Sablayan municipal waters is highest between March and May. Furthermore, the peak in fishing effort coincides with the inter-monsoonal period during the summer.

Resource Use Practices & Livelihood Activities	Particulars (Who, When, Where, How)
Fisheries in Sablayan (for Coastal Villages)	
Longline Fishing	
Sailing PSGR Vessel	Princess KC in Apo Reef
Giant Squid, Flying Fish, and Bagnet Fishing	
Aquaculture and Mariculture	
Tuna Fishing	-Municipal/ Commercial Fisherfolk -Marginalized Fisherfolk & Pangulong Owner
Fishing in Payao's	Payao's "fish aggregating device"
Hook & Line Fishing	Marginalized Fisher Folks
Tourism in Apo Reef Natural Park	
Diving	Local & International Tourists; All Year Round Filming in Pandan Island & Apo Reef
Bird Watching	
Trekking	Discovery / Ligaya Reef
Snorkeling	Oct- June thru Tourism Office & DENR
Island Hopping Camping	
Picnicking/ Rafting/ Swimming	
Sunset Viewing	During Summer time in Apo Reef & Parola Park
Dolphin & Whale Watching	Jan-May and Sept-Dec in Apo Reef

Source: Focus Group Discussions and Key Informant Interviews

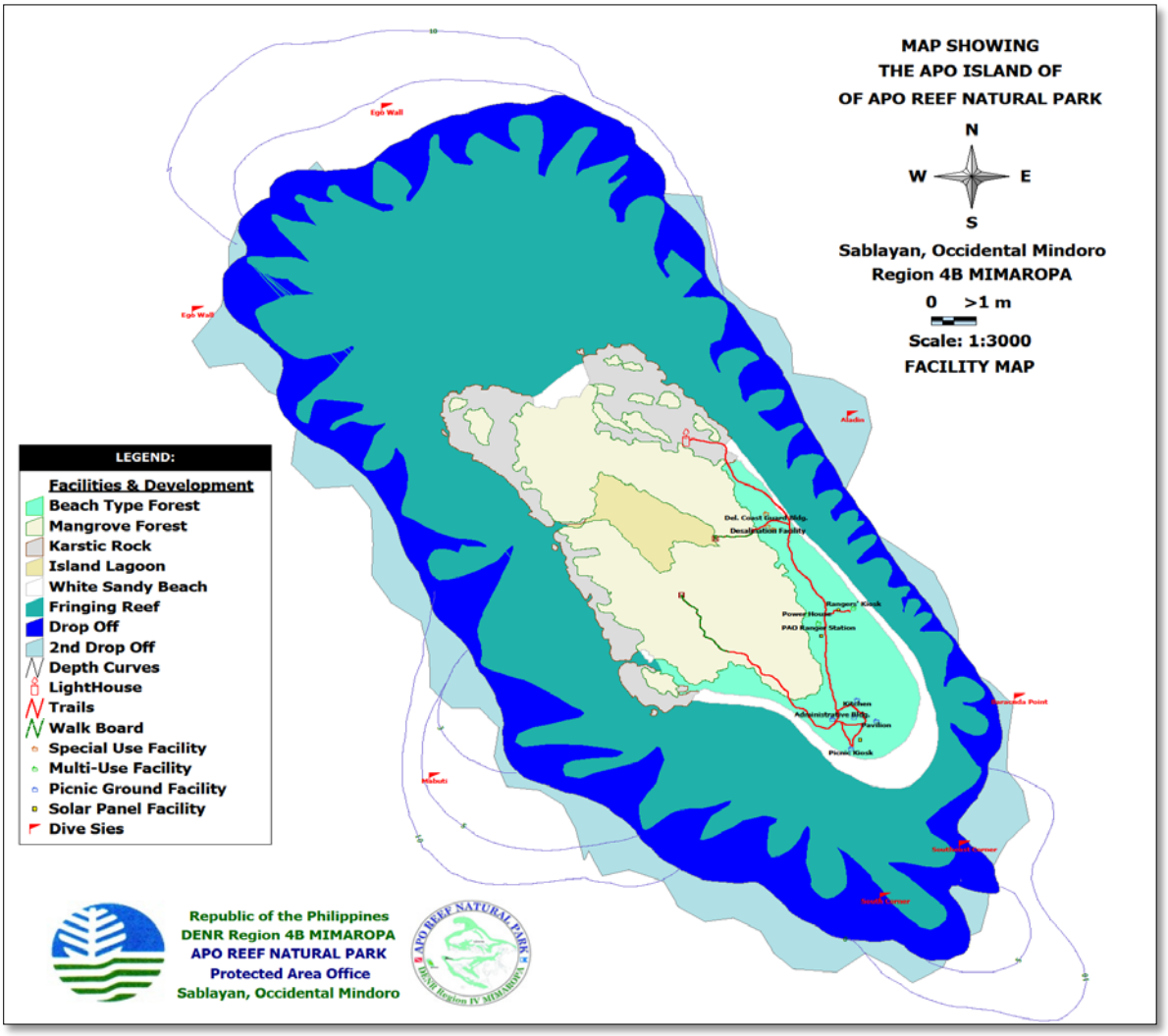
There are positive and negative Impacts of these identified resource use practices. The positive impacts include increased employment and revenue generation for Sablayan, which is also a source of funding for the maintenance and operations in the Apo Reef Natural Park. Meanwhile, some of the negative impacts include overfishing, improper waste disposal particularly by shipping vessels passing thru Apo Reef, exposure to possible contagious diseases both from local and/or international tourists, and possible disturbance of biodiversity.

Basic Services and Facilities

The high environmental sensitivity of the area did not allow the introduction of medium to large-scale tourist facilities in the area. Even the 22-hectare Apo Island would not be able to absorb medium development. Compounding the concern is the great distance of the protected area (approximately 33 km) from any mainland and the lack of freshwater in Apo Island.

The tourist facilities in ARNP are located in Apo Island which has a picnic area, toilet, boardwalk leading to the lagoon, and the ranger station (DENR Building). There are no utilities like water and electricity that can service large numbers of visitors. Thus, no overnight facilities were established in the area to prevent any environmental and tourism operational setbacks that may happen. Visitors that spend the night in the area were making use of their boats (whether live-aboard boats or big bancas) or bring their own tents and necessary provisions. The only tourist facilities that were being maintained and or developed are the rest rooms, the water pump, the picnic facilities, mangrove boardwalk, souvenir shack, and a scuba diving concession.

Figure 16: Facility Map of Apo Island in ARNP



Source: DENR – Apo Reef Natural Park Protected Area Office

Infrastructure

A lighthouse complex built in 1906 is among the structures present in ARNP. The lighthouse complex has five-room building (old PCG Bldg.), three kitchens, and equipment and generator shed (dilapidated), a steel lighthouse which towers all other structures at 250 ft above-sea-level and a cistern with a 250-ton capacity. The 250-ft (asl) tower lighthouse built in 1906 had already been demolished in 1998, which replaced by a 261-ft (asl) new tower lighthouse constructed in 1998-1999.

-

Ranger Station

The Apo Reef CPPA Project through the Protected Area Office had constructed the 100 m² two-storey ARNP-CPPAP Building in 1996. This building houses all site-based personnel and project staff since early 1997 who had also been held an office at the old coast guard building in early 1995 to early 1997. The PA Office had also constructed the Look Out Tower and Ranger Station at Binanggaan Island in 1997, Powerhouse beside the CPPAP Building in 1998, and a Nipa Hut in the recreational zone at Apo Island in 1999.

In 2010-2012, construction of Administration Building was undertaken by the PTA, through the Prismodial Construction, at Apo Reef Island, under the Phase 2 projects, in the improvement of tourism facilities of the Grand Apo Reef Natural Park, Sablayan, Occidental Mindoro. The current construction/improvement of tourism facilities at Apo Reef Island constrained the PAMB to enact a policy, under PAMB Resolution No. 007, Series of 2010, declaring that no other additional permanent structures shall be constructed after the construction of the Phase II project of the PTA except for the repair and rehabilitation of the existing permanent structures in the protected area. The declaration of such policy is to avoid further disturbance to the fragile ecosystems of ARNP.

Power Supply

The only available electricity in the island is the solar panels which is used to charge the radar and communication equipment used for monitoring and patrolling the area.

Water Supply

Difficulty in access to potable water is being experienced in Apo Island. There is a groundwater pump in the picnic area, freshwater is often mixed with saltwater after several days of intermittent extraction. To help the park rangers cope with the lack of freshwater, rainwater is collected and stored in a tank near the ranger station. Park rangers usually bring in their supply of freshwater from the mainland when visiting the area.

In 2009-2010, the Philippine Tourism Authority (PTA), as implemented by the Department of Public Works and Highways (DPWH), had constructed and installed desalination facilities composed of mechanism house, overhead tank and water source well at Apo Reef Island, under Phase 1, as the priority projects in the improvement of tourism facilities of the Grand Apo Reef Natural Park, Sablayan, Occidental Mindoro. Desalination is a process of removing salt and other minerals from saline water in order to produce fresh water suitable for human consumption. The desalination plant present in Apo Island is currently non-operational.

Construction and Installation of Desalination Facilities implemented by PTA through the DPWH
(Not Operational)

Health and Sanitation

The lack of potable sources of water as well as the presence of menacing insects is among the main problems in the ARNP. The island has six (6) comfort rooms (toilets) for the rangers and the tourists, four (4) of which needs renovation / rehabilitation.

Waste Management

Maintaining a pristine beach and clean island will greatly enhance and promote the success of the ecotourism operations in the area. Consequently, managing waste and water use is the most challenging and critical priorities in the island. A zero-waste policy was established in the protected area. Each visiting boat shall be equipped with a trash receptacle, which will be used by visitors to dispose of any trash generated while at sea or on the island. Even biodegradable trash shall not be left on the island to prevent unwanted benefits to feral animals such as rats and cats. Further, the beaches and the picnic area shall be kept clean of non-natural debris.

Communication and Transportation Services

Apo Reef is readily accessible from the west through Occidental Mindoro. It takes a 45-minute flight from Manila to San Jose and another two to three hours by passenger jeep or bus to Sablayan. By land, buses ply the route from Manila to the Batangas City Pier. Ferries then bring in travelers from Batangas City to the town of Abra de Ilog in Mindoro Occ. Buses and jeepneys service the 3 – 3.5 hour route between Abra de Ilog and Sablayan. From Sablayan Poblacion, Apo Reef can be reached by motorized boat within two to three hours, depending on the speed of the vessel and sea conditions. Communication can be done using the radio stationed in the DENR Bldg.

Furthermore, two (2) high speed boats were acquired by DENR for transportation to and from ARNP. These are also used for regular patrolling and monitoring operations. According to one deputized ranger in the island, patrolling is being conducted once or twice a week.

Despite the improvement and development in the facilities and services in the island, the issue on inadequate equipment and facilities for the regular operations and maintenance for the protection and conservation of Apo Reef Natural Park remains true. The table below contains the list of the existing and the proposed facilities and equipment that needs to be secured in the island in order to achieve effective management and protection of ARNP.

Table 16. Summary of Existing and Proposed Facilities and Equipment in Apo Island

EXISTING	No.	PROPOSED	No.
1) PAO Building (For Renovation)	1	1) Glass Bottom Flatboat	1
2) Power House	1	2) Snorkeling Equipment	20
3) Comfort Rooms	6*	3) Life Jackets	50
4) Kiosks (For Repair)	2	4) Tourist Boats	1
5) Lighthouse Complex		5) Tents	10
- Coast Guard Bldg. (dilapidated subject for Demolition)	1	6) Multi-Media (Laptop, LCD, PAS & other accessories)	2
- Lighthouse	1	7) Additional Binoculars	5
- Cistern (For Repair)	2	8) Floating Raft	1
6) Solar Panel	5	9) Additional Moorings	5
7) Charge Controller (for replacement)	1	10) Navigational Equipment (Compass, GPS, etc)	3
8) Inverter (for replacement)	1	11) Mobile Radios VHF	4
9) Patrol Boat	2	12) Air Compressor for SCUBA	1
10) VHF Mobile Radios	2	13) Additional SCUBA Gears	5
11) Handheld Radios	3	14) Digital Camera with Casing	1
12) Binoculars	2	15) Digital Video Camera with Casing	1
13) SCUBA Gears (for repair)	5	16) Chase/Speed Boat	1

EXISTING	No.	PROPOSED	No.
14) Mooring Buoys (For enhancement & replacement of its lines, buoys & other accessories)	10	17) Fiberglass Paddle Boat (10 pax)	1
		18) Kayak (Double)	4
		19) Kayak (Single)	4

**Updated*

Source: ARNP Management Plan (2001)

INSTITUTIONAL ARRANGEMENT AND GOVERNANCE

History and Legal Basis

1905	• American Forces constructed a lighthouse and the old Coast Guard Building • The Old Coast Guard Building and Cisterns (already been dilapidated, subject for replacement).
1914	• 1.34 hectare of the Apo Island where the lighthouse is presently located was designated as reservation area through Executive Order No. 118
1980	• Apo Reef was designated as Marine Reserve (Presidential Proclamation No. 1801)
1983	• Apo Reef was declared a Tourist Zone and Marine Reserve (Municipal Resolution No. 1108)
1990	• ARNP was chosen to be among the 10 priority sites of the Integrated Protected Areas System
1992	• Apo Reef was included in the initial listing of IPAS sites all over the country pursuant to RA7586, also known as the National Integrated Protected Areas System (NIPAS) Act
1994	• Apo Reef became part of the Conservation of Priority Protected Areas Project (CPPAP). The CPPAP officially ended on June 30, 2002
1996	• Apo Reef was declared as a Protected Area under the category of Natural Park (Presidential Proclamation 868) and its surrounding waters as Buffer Zone pursuant to RA 7586. • The DENR Protected Area Office Building was constructed in Apo Island (in need of repair)
1997	• The DENR Ranger Station was constructed in Apo Menor Island (already been dilapidated).
1998	• The old lighthouse was demolished and a new one was constructed (DOTC)
2001	• In October 18, 2001, a Memorandum of Agreement (MOA) by and between the DENR (Region IV) and the Municipality of Sablayan (LGU) was made and entered, wherein the LGU of Sablayan is tasked to initiate, manage and supervise a low impact, environmentally-sound and community-participatory ecotourism program consistent with the ARNP Management Plan.
2004	• A marine law enforcement team for Apo Reef and Municipal Waters of Sablayan, locally known as the "Task Force Marine and Apo Reef Law Enforcement for Nature (TF MARLEN)", was established on September 24, 2004
2006	• The TF MARLEN was officially created and organized on July 28, 2006, under the Office of the Mayor of the Municipality of Sablayan, by virtue of Executive Order No. 02, Series of 2006.
2007	• The Protected Area Management Board (PAMB) declared the "NO-TAKE-ZONE POLICY" of Apo Reef, by virtue of PAMB Ordinance No. 001, Series of 2007
2008	• The Pavilion was constructed within the recreational zone at Apo Island in support to the Ecotourism Development of the PA (LGU Sablayan)
2010	• The Desalination Facilities (e.g., Mechanism House, Overhead Tank, Machines) was constructed/ installed by the Philippine Tourism Authority through the Department of Public Works and Highways.

Source: DENR IV-B Protected Area Office

Organization and Management Structure

The ARNP as a Protected Area is under the control and administration of DENR, specifically the Biodiversity Management Bureau (BMB) or formerly known as PAWB. At the regional level, the ARNP Protected Area is under the jurisdiction of Region IV, specifically the Protected Areas and Wildlife Division (PAWD). At the site level, the ARNP is under the control and administration of the DENR

through the Protected Area Management Board (PAMB) and Office of the Protected Area Superintendent (PASu), which shall exercise authority in overseeing the operations of the PAMB to ensure that it is acting within the scope of its powers and functions. The local government of Sablayan serves as co-managers with DENR in the protection and tourism development in ARNP.

Stakeholder Mapping, Profiling, and Analysis

The various local stakeholders identified in the Apo Reef Natural Park are summarized in Table 13 below. In addition to these, however, other stakeholders at the national level, as well as tasked with the implementation include: (a) Department of Environment and Natural Resources (DENR) is the government agency that administers the NIPAS; (b) Protected Area Management Board (PAMB). The PAMB is the site policymaking body formed under the NIPAS law; (c) Office of the Protected Areas Superintendent (PASu). The implementing arm of the PAMB, it is the administrator of the PA.

Protected Area Management Board (PAMB)

The NIPAS Act provided for the creation of PAMB, a multi-sectoral policy-making and permit-granting body who shall by a majority vote, decide matters relating to planning, resource protection and general administration in ARNP, promulgate rules and regulations to promote development programs and projects on biodiversity conservation and sustainable development, delineate and demarcate protected area boundaries and buffer zones, and other functions and powers prescribed by law. It decides on allocation of funds and all issues regarding management of the PA. The PAMB convenes at least once per quarter each year.

PAMB membership in accordance with the NIPAS Act, is composed of the following: (a) the DENR Regional Executive Director of Region IVb as Chairperson, (b) the Provincial Planning and Development Officer of Occidental Mindoro; (d) the Mayor of the municipality of Sablayan or his duly designated representative; (e) Liga ng mga Barangay representative from among the coastal barangays of Sablayan; (f) representatives from Non-Government Organizations (NGOs) operating in Sablayan; (g) representatives from fisher folk Peoples' Organizations or Cooperatives; (h) representative from the Philippine Coast Guard; (i) representative from the Philippine Coast Guard Auxiliary.

The Protected Area Superintendent (PASu)

The PASu, who serves as the Chief Operating DENR Officer of the PA, is designated by the DENR. The PASu performs and executes powers and functions set forth in the NIPAS Act and its Implementing Rules and Regulations and other functions as the PAMB may assign. The PASu is directly responsible to the RED and PAMB. Currently, the PASu has ten regular technical staff, three of which are detailed personnel from CENRO Sablayan while the seven are park rangers and boatmen in ARNP.

Cooperatives

With the continuous support of the government primarily of the Office of the Municipal Agriculture, DTI and LBP during the CPPA Project, cooperatives gained remarkable development. Leading cooperatives such KAPANTAY, SAMVEMCO and SANIFAMCO are able tomanage multi-million equities which now stands as great influence and encouragement for the people to be more active in this industry. These cooperatives caters to agriculture and entrepreneur services, such as multi-purpose loans, technical assistance, mini-banbug services, as savings account crop insurances and

medical assistance and other benefits to its members. However, it is noted that after the CPPA project, these cooperatives were not sustained and are now inactive.

Civil Society Organizations (CSOs)

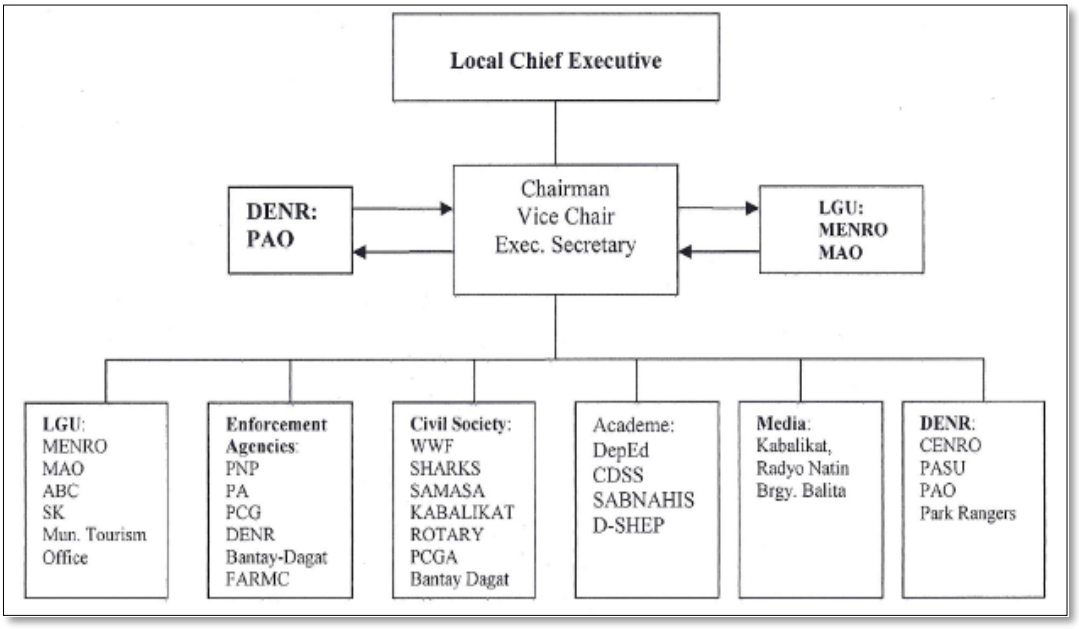
CSOs particularly the Non-Government Organizations (NGOs) play a prominent role in tourism development. In Sablayan, many NGOs are involved in either: protection of biodiversity and the environment; or sustainable development for local people. NGOs usually lead research on best practices, guide training, regional planning and stakeholder meetings, community development, protected area management, and targeted conservation initiatives.

Furthermore, NGOs often work to ensure that ecotourism is developing in a manner that is consistent with national and international conservation and sustainable development priorities, including: developing their own ecotourism programmes; and implementing the grassroots ecotourism initiatives focused on the conservation of local resources that can benefit from ecotourism's economic and educational potential. International and local NGOs are very supportive to Apo Reef including WWF-Philippines, Mindoro Biodiversity Conservation Foundation, Inc., GIZ, and the like.

Task Force MARLEN (Marine and Apo Reef Law Enforcement for Nature)

The Task Force is a Multi-Sectoral Marine Law Enforcement Team created to undertake law enforcement and related activities within the Municipal Waters of Sablayan and Apo Reef Natural Park. It was initially organized on September 24, 2004 and is composed of the following: (a) LGU Sablayan *(Park Rangers, boatman & other staff)*; (b) Philippine Army *(76th Infantry Battalion);* (c) Philippine National Police - PNP *(Sablayan Municipal Police Station & Regional Public Safety Battalion);* (d) Philippine Coast Guard (PCG); and (e) WWF Philippines. The figure below shows the organizational structure of Task Force MARLEN.

Figure 17. Organizational Structure of Task Force MARLEN



Source: Task Force MARLEN Operations Manual, DENR IV-B ARNP Protected Area Office

It was officially organized and created on July 26, 2006, by virtue of Executive Order No. 02, Series of 2006, issued by the Local Chief Executive of Sablayan. The TF MARLEN Manual of Operation, entitled as "BATAYANG GABAY ng TAGAPAGPATUPAD NG BATAS PAMPANGISDAAN (Task Force MARLEN)" was produced, completed and approved on June 20, 2006 through the initiative of WWF-Philippines in collaboration with the LGU Sablayan and DENR-ARNP PAO. This Manual of Operation serves as guide of the TF MARLEN and the Bantay Dagat in the execution of their important task in the enforcement of laws for the conservation and protection of the marine resources of Sablayan, Occidental Mindoro.

Table 17. Stakeholder Analysis

Local Stakeholder Groups	Interests and Roles	Importance of Stakeholder	Degree of Influence
DENR IV-B - PAMB - ARNP PAO	• Protection & conservation • Implementation of ecotourism related programs • IPAF Users' fee collection	5	4
Provincial Government of Occ. Mindoro	• Primary stewardship over ARNP • Promotes mainstream ARNP tourism as part of province-wide tourism promotion package	3	U
Task Force MARLEN	• Strengthening of marine law enforcement • Regular patrolling and monitoring in ARNP	5	4
Municipal Government of Sablayan and its offices: • MPDO • OMA • Tourism • MENRO	• Promote awareness (IECs) and formulate policies & programs on conservation and protection • Develop tourism-related livelihood opportunities • Implement marketing of municipal-wide tourism programs and activities • Partner in the development and implementation of Ecotourism Program at ARNP • Partner in the protection and conservation program Provider of technical, logistical, financial, and manpower support • Training of tour guides in coordination with the DOT. • Packaging tours at ARNP and other ecotourism sites	5	3
Hotel and Resort Owners	• Generates profit • Provides packages & itinerary for tourists • Job opportunities	5	3
Dive Operators	• Profit from dive tours • Main source of dive tourist • Promoters of diving industry • Controls itinerary of dive tourists • Orient divers on diving ethics • Orient dive boat operators on the protocols in ARNP	5	3
Divers	• Recreation • Reef research and conservation • Promoters of diving industry • Source of revenue (user's fees)	5	3

Non-Divers	• Recreation and research • Source of revenue (user's fees) • Snorkeling, island hopping	5	4
Fisher folks	• Derive sustenance and income from spill-over effect of marine resources in ARNP • Representation in PAMB • Partner in implementing protection & conservation • Potential leaders for sustainable community development and ARNP conservation • Control over commercial fishermen • Potential guardians of ARNP resources from illegal fishers from outside Sablayan	4	4
Cooperatives	• Livelihood opportunities • Support to PA Managers	3	3
NGOs/ CSOs (MBCFI, WWF, GIZ, KKP)	• Research, support protection & conservation • Provision of financial, technical and logistical support to development and protection of ARNP	5	4
Shipping vessels passing ARNP	• Disposing solid and liquid wastes along east and west passage in Apo Reef • International navigation	U	U

Source: Literature Reviews, Focus Group Discussion, Key Informant Interviews
Note: *Stakeholder Importance*: U- Unknown, 1-Little or No Importance, 2- Some Importance, 3-Moderate Importance, 4-Very Important, 5-Critical Player; *Degree of Influence*: U- Unknown, 1- No Influence, 2- Some Influence, 3-Moderate Influence, 4-Significant Influence, 5-Very Influential

The ratings were identified during the stakeholder consultation workshop. It is noted that aside from the PA Managers (DENR and LGU), the primary stakeholders that were given a high score on its importance and degree of influence are the private sector groups (resort owners, dive operators), the tourists (divers and non-divers), the fisher folks (from the coastal villages of Sablayan), and then the CSOs/ NGOs and cooperatives. The need for better coordination between the DENR and the LGU was also highlighted in the FGD. The assessment shows that continuous support from LGU in terms of assignment of park rangers, expand tourism promotion activities, development of alternative livelihood, and addressing the problem of informal settlements in coastal areas (conclusively has the most number of illegal fishers ins Sablayan, excluding those from other nearby towns).

The presence of technical and financial support from various NGOs was proven to be helpful and effective in the area of research development and implementation of ARNP programs. However, the need for organizing fisher folks and other community stakeholders is recognized as key to active participation and sustainable protected area management. From the focus group discussions and informal interviews conducted in Sablayan, it is noted that there are no functional and fully-organized cooperatives and fisherfolk associations left ever since the CPPA Project has ended. Additionally, the challenges brought about by shipping vessels passing through the east west passage of Apo Reef contributed greatly to solid and liquid wastes observed in the area. Furthermore, the minimal support from the Provincial government has been attributed to political conflicts and lack of clear avenues for partnership. Nevertheless, the participation of these identified stakeholders in planning and implementation of protection and ecotourism programs in ARNP is necessary for successful and effective PA management and sustainable ecotourism development.

Current Management Structures and Capabilities for Management

Table 18 summarizes the presence of absence of basic facilities in Apo Island and financial support in the management of Apo Reef Natural Park.

Table 18. Management Capabilities in Apo Reef Natural Park

	Presence	Absence
Infrastructures, facilities inside the PA	▪ Administration Building / Ranger Station (Semi-Concrete), Power House, Dilapidated Coast Guard Building at Apo Island (for rehabilitation) ▪ The Lighthouse at Apo Island ▪ Four (4) Kiosks (made up of local materials) ▪ Floating Raft and Bamboo Trails at the island lagoon and mangrove forest. ▪ The Ranger Station (Concrete) at Binanggaan Island. ▪ Patrol/Service Boat	▪ Additional Patrol Boat ▪ Ecotourism Boat ▪ Dive Shop e.g., SCUBA Gears for rental, Air refilling station for SCUBA Divers. ▪ Glass Bottom Flatboat for non-swimmers for appreciation of the underwater world.
Financial Institutions Supporting the operation of Apo Reef	▪ DENR ▪ IPAF ▪ WWF/KKP ▪ LGU Sablayan	▪ Provincial Government – Can be tapped to support the Apo Reef Protection, Conservation and Ecotourism Program
Tour Guides	▪ The LGU Sablayan in coordination with the DOT had already trained tour guides ▪ There are two (2) Park Rangers who successfully completed the training. ▪ The LGU, WWF and DENR-ARNP are available Dive Guides *(Please Take Note that dive guide is different from dive master).*	▪ The number of tour guides are not enough given the increasing number of tourists ▪ There are some tour guides without training that accompanies tourists and forgets to conduct briefing and orientation
Trainings	▪ Enhancement Training for the accredited/certified tour guides is requisite for better appreciation of tourists. Some other ecotourism related trainings for Apo Reef are the following: ▪ First Aide and Rescuers Training ▪ SCUBA Divers Training: Advance Open Water Diver, Rescue Diver, First Aide Diver and Dive Master Training Courses; Equipment Specialist Training ▪ Tour Packaging and Handling of Visitors ▪ Dive and BMS training	▪ Trainings conducted per year are limited ▪ Only a few people were able to attend and participate in the trainings

Source: DENR IV-B ARNP Protected Area Office and Focus Group Discussions

USER FEES[12]

1. Vessel Entry Fees

DESCRIPTION	RATES (in pesos)	CONDITIONS
a. 3 GT and below	200.00	Per Boat per visit
b. 3.1 GT to 20 GT	350.00	Per Boat per visit
c. 21 GT to 100 GT	500.00	Per Boat per visit
d. 101 GT to 200 GT	750.00	Per Boat per visit
e. 201 GT and above	1,000.00	Per Boat per visit

2. Visitor Entry Fees

DESCRIPTION	RATES (in pesos)	CONDITIONS
NON-DIVING:		
a. Sablayeño	50.00	Per person per visit
b. Local Tourist	175.00	Per person per visit
c. Foreign Tourist	350.00	Per person per visit
d. Tour Guide	100.00	Per person per visit
DIVING:		
a. Local Tourist	1,050.00	Per person per visit
b. Foreign Tourist	1,300.00	Per person per visit
c. Dive master	100.00	Per person per dive

(Per Visit is equivalent to 48 hours or less from arrival to departure)

3. Other Park Fees Exclusive of the Entrance Fees

DESCRIPTION	RATES (in pesos)	CONDITIONS
a. Filming / Video Taping	1,500.00	Per day
b. Filming for the production of movies & commercials	3,000.00	Per day
c. Kiosk/Bed Room Rental	200.00	Per day

[12] DENR IV-B ARNP Protected Area Office

Table 19. Assessment on the Guidelines and Restrictions in ARNP

Guidelines in ARNP	Remarks
1. Visitor entry permit shall be secured from the Protected Area Office (PAO) in the mainland Sablayan prior to the visit in the area.	Harmonize the numerous registration systems including in the Tourism Office and Philippine Coast Guard.
2. Register at the PAO Building/Ranger Station at Apo Island, Apo Reef Sablayan upon entry and prior to any activities to be undertaken.	
3. Strictly follow the guidelines and restrictions in the protected area per PAMB Ordinance No. 2005-001 and 2007-001, as amended.	There are not enough number of park rangers who can monitor if the visitors are following the code of conduct
4. Strictly follow the code of conduct at Apo Reef Natural Park	
5. Violations of any rules and regulations in the protected area are grounds for the cancellation of permits, administrative Adjudication and/or filing of necessary charges in court.	Fines and other sanctions shall be executed as well.

Existing Initiatives in ARNP Management

The table below shows the existing programs in ARNP in various areas. The following table discusses the effects of such initiatives in the management of the protected area.

Table 20. Existing Initiatives in Apo Reef Natural Park

PROGRAM	ACTIVITIES
Biodiversity Protection and Conservation	
Protection and Law Enforcement	• Patrolling, apprehensions, filing of cases • Coordination and linkage with the PNP & other law enforcement agencies
Community Based Protection	• Maintenance and operation of the TF MARLEN (Task Force Marine and Apo Reef Law Enforcement for Nature) • Tapping concerned fisher folks and dive operators as source of reliable information
Information, Education and Communication (IEC) Campaigns	• Production and distribution of brochures/pamphlets/flyers pertaining to Apo Reef biodiversity values and features, policies and guidelines, and effects of destructive practices. • Orientation of tourists/visitors, dialogues/meetings with the fisher folks for the sustainable use of Apo Reef.
Biodiversity Monitoring System (BMS)	• Setting up of BMS plots. • Regular conduct of BMS activities by the PA Staff with assistance from the community and other volunteers.
Resource Management Program	• Resource Monitoring System • Regulation (volume, type of resource + type of extraction)
Eco-tourism Management Program	• Monitoring the activities, volume and destinations of tourists/visitors guided by designated carrying capacity and geared towards education and conservation in the park. • Establishment of low impact facilities for PA visitors (avoid infrastructures). • Development of user fee system to support conservation efforts.
Strengthening of Institutional Capability for Biodiversity Conservation & Sustainable Use	
PA Gazette & Management Planning	• Lobbying for the enactment of Apo Reef PA Bill • Implementation of the Management Plan
PAMB Operation	• Assistance to PAMB Operation • Policy Development for Apo Reef
IPAF Operation	• Collection of Entrance and Users Fee

PROGRAM	ACTIVITIES
Project Management and Institutional Strengthening	• Maintenance and Hiring of PA personnel • Seminar, training for PA personnel, PAMB and stakeholders • Regular performance and effectiveness review of the DENR-ARNP Office and PAMB with corrective actions
Networking and Linkages	• Networking and linkage with various agencies and other stakeholders for technical and financial support.

Source: DENR IV-B ARNP Protected Area Office

Table 21. Effects of Existing Programs, Projects and Activities in the ARNP

Project Name	Implementor	Components/ Activities	Area of Coverage	Effects
Conservation of Priority Protected Areas Project (CPPAP) (1995-2001)	*National level:* DENR, NIPA *Site level:* DENR-PASu, NIPA	a) Community Organizing b) Mgt. Planning c) PA Gazetting d) IEC e) Resource protection and law enforcement f) Biodiversity monitoring g) Boundary demarcation h) Management zoning i) Resource Inventory	The entire protected area with a total area of 27,469.0 hectares, ARNP Boundary (15,792.0 ha) and Buffer Zone (11,677.0 ha)	▪ Protection of reefs and their associated habitats ▪ Empowerment of fishers-stakeholders empowered to conserve and manage the environment while enjoying satisfactory incomes ▪ Reduction of unregulated/illegal activities ▪ An increase in number of visiting divers
Maintenance and Operation of RP Lighthouse	DOTC with the Philippine Coast Guard (PCG)	▪ Maintenance and operation of RP Lighthouse as aid to navigation	The NE part of Apo Island containing an area of 1.33440 ha per E.O.No.118, dated 9Dec1914	▪ Lighthouse now serves as navigational guide for mariners that pass through the Apo West and East Pass ▪ Lighthouse now serves as tourist attraction
Lighthouse Construction (1998-1999)	John Holland Construction Philippine, Inc.	▪ Demolition of old lighthouse built in 1904 ▪ Construction of new lighthouse	Old lighthouse and surroundings on Apo Island	▪ A 30-50% drop in turtle nesting due to disturbance caused by the lighthouse construction ▪ Introduction of rats in the island from the boat ▪ hauling the construction materials ▪ Damage of corals due to the sacks of gravel & sand dropped & scattered along the reef crest/slope
Coral Reef Rehabilitation (2000)	CPPAP-PCU in coordination with John Holland	▪ Coral Transplantation	The Restoration Zone (marine) in the north and south lagoons	
Rat				

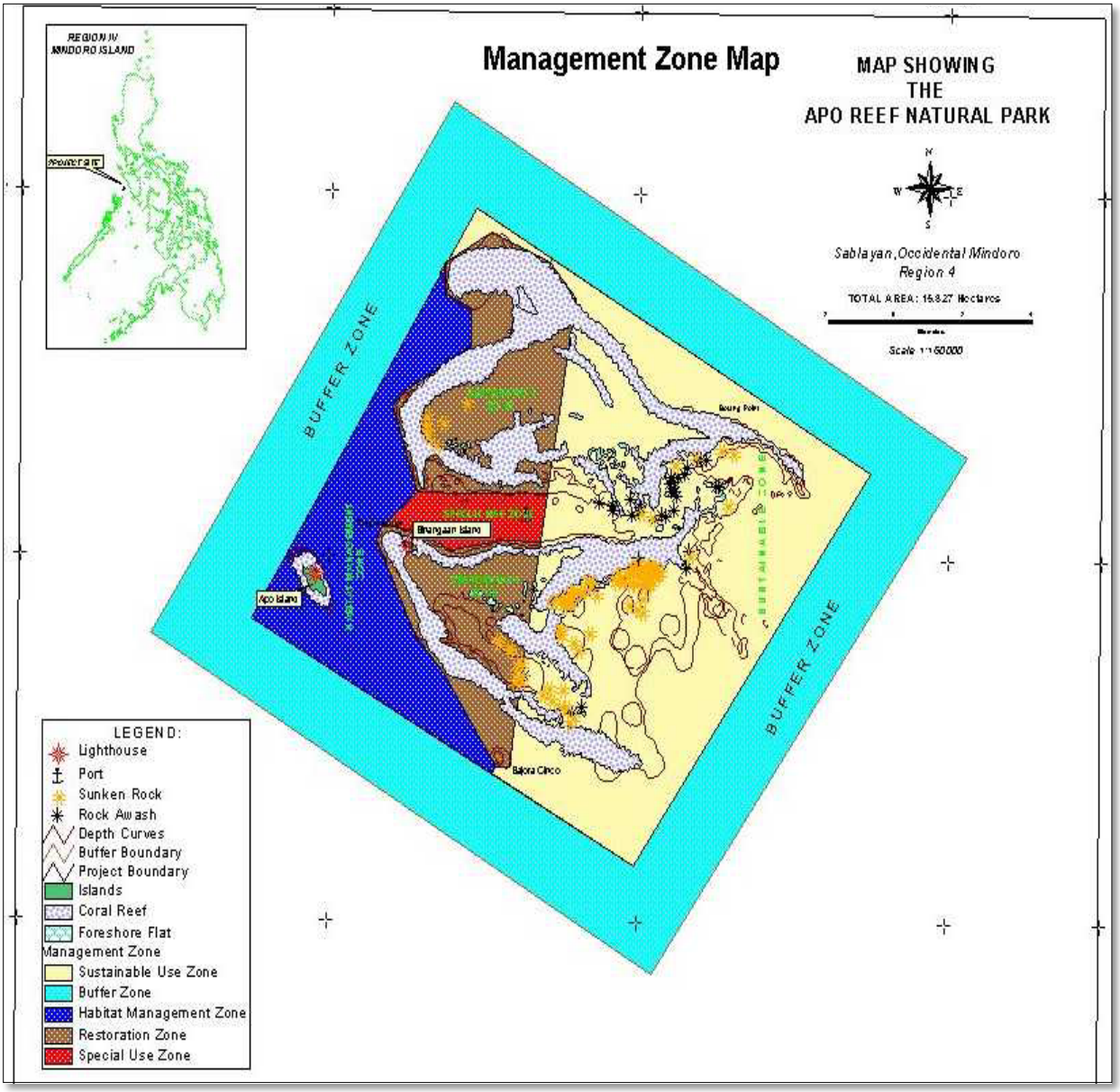
Project Name	Implementor	Components/ Activities	Area of Coverage	Effects
Eradication (2000)	Construction	▪ Eradication of Rats	Apo Island	

Source: DENR IV-B ARNP Protected Area Office

Existing Management Zones

One of the significant strategies in protected area (PA) and buffer zone management as provided for in the NIPAS Act is the categorization of these areas into management zones which includes; (1) Strict Protection Zone, (2) Sustainable-Use Zone, (3) Multiple Use Zone and others such as Cultural Zone, Recreation/Eco-Tourism Zone and Special Use Zone. These management zones are envisioned to provide flexibility in PA management and allow resource use of PA users.

Figure 18. Management Zone Map of Apo Reef Natural Park



Source: DENR – Apo Reef Natural Park Protected Area Office

Sustainable Use Zone

- This zone covers natural areas where habitat and its associated biodiversity shall be conserved. Members of the fisher community of Sablayan who migrate to Apo Reef seasonally for traditional fishing and other activities were previously allowed to collect and utilize the natural resources in this area provided that they use traditional sustainable methods that are not in conflict with biodiversity conservation requirements. Research can be undertaken and park visitors may be allowed for limited use. This zone, with an area of 8,496.98 hectares, shall cover the eastern side of the north and south atoll-like reefs including the largest islet of Cayos del Bajo (Tinangkapan) Island, Parolang Putol and San Antonio Point. The largest islet of Cayos del Bajo in its western side shall form part of this zone for the fishers utilizing the area for their subsistence activities and refuge against unfavorable weather conditions.
- The PAMB Ordinance No.001 of 2007 has declared a "No-Take-Zone Policy" throughout ARNP restricting fishing activities in all areas of the park including the sustainable use zone.

Recreational Zone

- This zone covers areas of high recreational, tourism, educational, or environmental awareness values where sustainable eco-tourism, recreational, conservation education and public awareness activities may be allowed as prescribed in the management plan. (a) Terrestrial: The picnic ground including the Nipa Hut to the beachfront with an area of 1.56 hectare; and (b) Marine: This is the reef area (reef flat up to the second drop-off) adjacent to PA Office and Picnic ground with an area of 6.44 hectares.

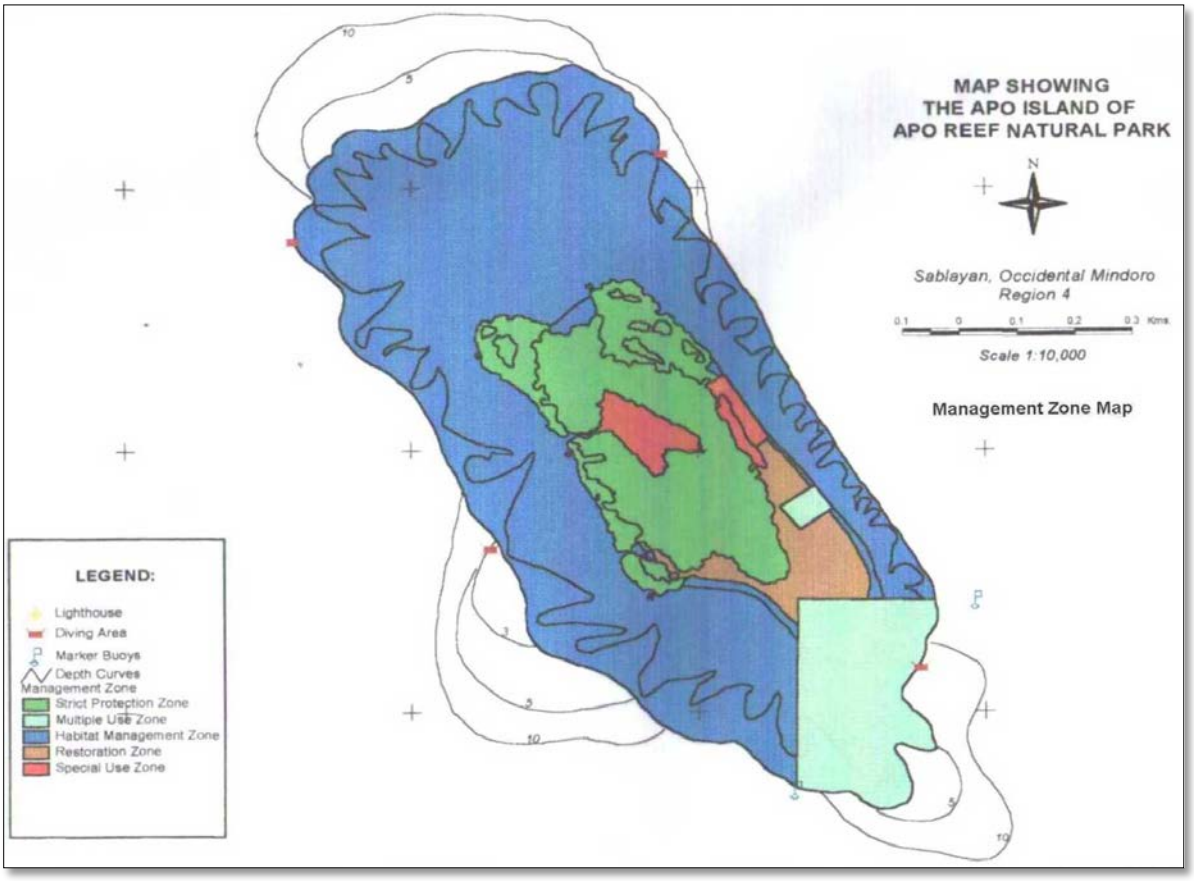
Special Use Zone

- This zone covers areas containing physical installations of national significance. (a) Terrestrial: All development areas, which include the lighthouse complex, access trails, the lagoon in Apo Island with a total area of 2.13 hectares. The island lagoon shall form part of this zone to permit guided tours such as bird watching and education of visitors. (b) Marine: The passages of boats between the north south atoll like reefs, the boat anchorage/passage near and going to Binanggaan Island and the entire designated dive sites outside the recreational and sustainable use zones with a total area of 508.36 hectares.

Buffer Zone

- The zone peripheral to the protected area, around 2 km from the PA boundary, with an area of 11,677.00 has, ideally serves as extra layer of protection preventing encroachment into PA.
- The PAMB Ordinance No.001 of 2007 has declared a "No-Take-Zone Policy" throughout ARNP restricting fishing activities in all areas of the park including the buffer zone.

Figure 19. Management Zone Map of Apo Island in ARNP



Source: DENR – Apo Reef Natural Park Protected Area Office

Strict Protection Zone

- This zone is characterized by old growth, mossy, forest lands above 50% slope and with 1000 masl elevation, highly erodible and hazardous areas with high endemism and biodiversity, and existing natural forests below 500 masl, sub-watersheds with drainage system supporting key infrastructure or a major coral reef or fishing ground.
- This zone covers areas with a high biodiversity value and shall be closed to all human activity except for scientific studies. It represents the core area where all forms of exploitations are prohibited. This zone includes the mangrove forest in Apo Island including karst areas, which are inhabited by the migratory, endemic and endangered species of birds (i.e. Nicobar Pigeon). This also covers the Apo Menor (Binanggaan) Island including surrounding waters up to 100m away from the outer edge of the karstic island and the two small islets in Cayos del Bajo (Tinangkapan) Island including surrounding waters up to 50m away from the outer edge of the islet, which are habitat and sanctuaries of migratory birds. Strict Protection covers an area of 33.72 has.

Restoration Zone

- This zone is characterized by deforested, degraded or highly marginal areas above 50% slope and near major waterways or near or inside critical habitats, areas in highly hazardous areas that are degraded. This zone covers areas with degraded habitats.
- The long-term goal will be to restore natural habitat with its associated biodiversity and to rezone the area into a strict protection level. Terrestrial areas covered by this zone shall include the beach forest in Apo Island located in between the Nipa Hut in the southern part, CPPAP Building and the Apo Reef Lighthouse Complex with an area of 3.41 hectares.
- The vegetation of Apo Island is delineated by a strip of ecotone, the ecotype mangrove forest and beach type forest. The presence of exotic species such as ipil-ipil, agave, tamarind tree, etc. and the degradation of natural vegetation were brought about by human interventions.
- Marine areas covered by this zone shall include the western side of the north and south atoll-like reefs including Barkong Lubog and Bajora Cinco, with an area of 3,902.54 hectares, excluding Apo Menor (Binanggaan) Island and areas covered by Special Use Zones.
- In relation to larval dispersal and recruitment processes, the northeast monsoon wind occurs from December to April, the time when corals disperse eggs. The interaction of wind, tidal and currents with the coral reef morphology retains a high number of planktonic larvae in this zone giving great chance for fertilization. Fertilized eggs will develop into young corals in the area. During the Southeast Monsoon rain, the unfertilized planktonic larvae will be carried back to the eastern side of the reef for fertilization.

Habitat Management Zone

- This zone covers areas with significant habitat and species values. The management practices are required periodically to maintain the specific habitat types or conditions required by native, rare, threatened or endangered species.
- Terrestrial areas covered by this zone are the turtle nesting sites on the southern, eastern and northern beaches of Apo Island, with an area of 1.05 hectare, excluding areas covered by recreational and special use zones. Marine areas covered by this zone start at the reef flat up to the edge of the drop-off of Apo Island and surrounding waters and extending to the western side of the restoration zone in the north and south atoll-like reefs. It shall exclude areas covered by recreational, multiple use and special use zones and has an area of 2,839.01 hectares. This area is habitation, breeding ground, sanctuaries and playground for marine wildlife (i.e., marine turtles, dolphins, whales, sharks, etc.).
- This zone (0.40 hectare) covers the Protected Area Office Complex including the CPPAP Building, powerhouse and other development areas, as well as the beach area.

Tourist Management

Tourists, particularly divers, may damage corals through different recreational activities such as scuba diving and snorkeling. Influx of tourists, if not regulated, could result in the destruction and increased contamination of terrestrial and marine habitats. Furthermore, tourists would inevitably bring in and generate garbage. Hence, the anticipated influx of tourists in the protected area for the coming years requires the tourist management strategies and rehabilitation of existing facilities.

Based on the 2001 ARNP Management Plan, the Carrying Capacity of Apo Island is 104 persons per day. Apo Reef is recommended only for a day destination and visitor management is necessary to avoid pressure on the island and reef. However, overnight are allowed for guided tour with proper briefing and orientation for visitors. Meanwhile, the table below shows the carrying capacity for the identified zones in ARNP. Carrying Capacity refers to the maximum number of individuals that an area's resources can sustain indefinitely without significantly depleting or degrading those resources.

Table 22: Carrying Capacity for Some Select Zones in ARNP[13]

Management Zones	Carrying Capacity (CC)	Potential Carrying Capacity (PCC)	Real Carrying Capacity (RCC)
Recreational Zone			
*Terrestrial - 1.56 hectare *Picnic Ground, Pavilion, Public Toilet, Kiosk & Administrative Building*	104 person per day	166 person per day	35 person per day
*Marine - 6.44 hectares *Dive Spots, Snorkeling Site, Mooring facilities*	129 person per day	258 person per day	49 person per day
Special Use Zone			
*Terrestrial – 0.8 hectare *Trails, boardwalk and lagoon*	53 person per day	212 person per day	40 person per day
*Terrestrial – 1.33 hectare *Lighthouse Complex and Desalination Facilities*	44 person per day	176 person per day	33 person per day
*Marine - 508.36 hectares *Anchorage/Mooring Areas and Boat Passage*	10 mooring buoys/ anchorage area x 1.7 = 17 tourist boats per day		
Dive Spots			
*Marine 5.5 hectares *[eleven (11) pre-identified dive sites (5,000 m²/site)]*	275 person per day	490 person per day	93 person per day

Financial Management

One of the critical elements of the NIPAS Act is the creation and administration of a trust fund, known as the Integrated Protected Areas Fund (IPAF) intended to finance the projects of the system.

[13] Draft Enterprise Development Plan of ARNP (DENR, 2011)

The law allows PAs to solicit, receive donations, endowments, and grants in the form of contributions that will form part of the IPAF (sec 16, NIPAS Act). All incomes earned by the protected areas are deposited to the National Treasury as a trust fund, with seventy-five percent (75%) of the IPAF being deposited to the PA Sub-Fund for the use of the PA generating the fund and 25% to a PA Central Fund for use of non-income generating PAs and the IPAF Governing Board.

Income sources include: (i) taxes for the permitted sale and export of flora, fauna, and other resources; (ii) proceeds from the lease of multiple use areas, including tourism concessions; (iii) contributions from industries and facilities directly benefiting from the PA; (iv) fines and fees, including PA entry fees collected and derived from the operation of the PA; (v) contributions, donations, endowments and grants from any source; and (vi) such other revenues as may be derived from the operation of the PA. The IPAF is disbursed solely for the development, maintenance, and operation of the PA and duly approved projects endorsed by the PAMB in the amounts authorized by the DENR[14].

Given the co-management scheme of DENR and LGU Sablayan, it is noted that from the total income of the Apo Reef Natural Park, 66.66% goes to the IPAF (25% of which goes to the central IPAF and 75% goes back to DENR ARNP Office) and 33% to LGU Sablayan, which also uses the collected revenue for the protection and conservation programs in the protected area as well as in the implementation of ecotourism development projects.

The revenues of the Apo Reef Natural Park under IPAF are being collected by the PAMB through the DENR-ARNP Protected Area Office. It is the 2/3 or the 66.66% of the total revenue collection *(user's fee under IPAF by the PAMB/DENR + Environmental Fee by the LGU Sablayan)* at ARNP.

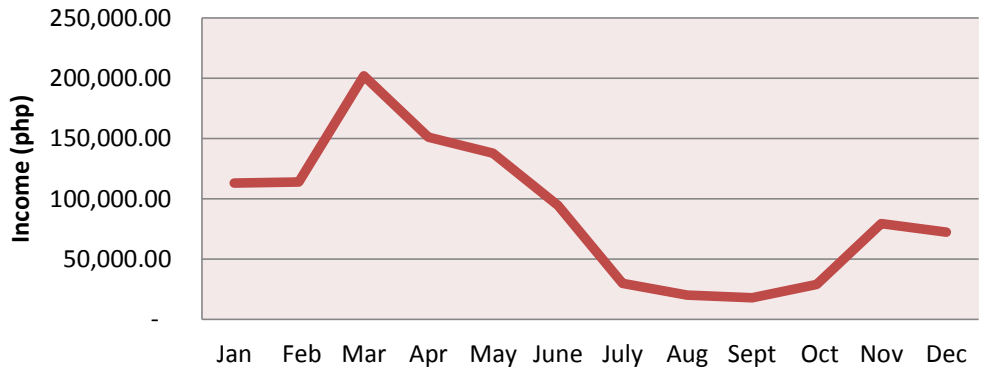
The environmental fee collected by the Local Government Unit (LGU) of Sablayan was not part or under the IPAF prescribed fees. The Environmental Fee being collected by LGU Sablayan is the 1/3 or the 33.33% of the total revenue collection and is only effective for 48-hour or 2 days use.

IPAF Collections

Figure 20 shows the average monthly income of ARNP from 1999 to 2013 as generated only from the IPAF collection of DENR-ARNP Protected Area Office. Needless to say, the total income is directly proportional to the number of tourists visiting Apo Reef. Tourists had visited the protected area mainly for SCUBA Diving and Snorkeling followed by Swimming and Island Hopping. Figure 21 shows that the average monthly income is highest during the summer months (March to May).

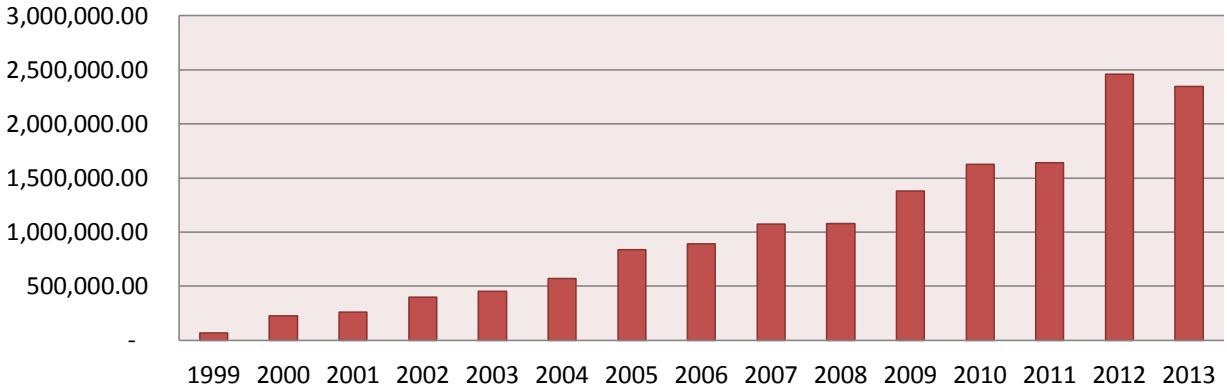
[14] Bagadion, Benjamin C. and Soriano, Ma. Edna A. "Opportunities and Challenges in Managing Protected Areas of the Philippines" Asian Institute of Management, June 2013

Figure 20. Average Monthly Income of ARNP (1999-2013)



On the other hand, Figure 21 shows that the increasing trend of the total annual income of ARNP from 1999 to 2013 (based on total revenues collected by DENR- ARNP PAO from IPAF only). Although, the records show that number of visitors in 2011 declined by 16% compared to the number of visitors in 2010, the number of visitors is still increasing when records from 2009 to 2013, excluding 2011, are compared. The decline in 2011 is attributed to the strong northeast monsoon and typhoons that prevents the tourists to go to the protected area.

Figure 21. Annual Income of ARNP (1999-2013)



Administrative and Operational Expenses

Budget allocation for the PAMB Capability Enhancement Program is appropriated through the Annual Work and Financial Plan. The IPAF PA-Sub Fund is the 75% of the total IPAF Collection from the protected area. At least 20% of the Sub-IPAF for (a) Administrative Expenses including PAMB operations (supplies and materials) and sundry expenses like traveling allowance, meal allowance, hiring of contractual staff, and honoraria; and (b) Operational Expenses including procurement of equipment, repair and maintenance of equipment/ vehicles, supplies, gasoline expenses, and other maintenance and operating expenses.

Meanwhile, the user's fee under IPAF (collected by DENR) refers to fees collected from diving, non-diving (snorkeling, swimming, and camping), Dive Master/ Tour Guide, Vessel Entry Fee, Others include rentals/ donations/ administrative fines, filming/ air fill. The table below shows the percent

of the total expenses of DENR / PAMB in Apo Reef Natural Park relative to the total income of the protected area from IPAF collection of DENR. The breakdown of expenses of LGU Sablayan funded from their revenue share / Environmental Fee collections were not included in the computation.

Table 23. Percent of Total Expenses to Total Income of ARNP[15]

TOTAL EXPENSES *(in PhP)*	2009	2010	2011	2012	2013
	809,475	1,032,825	1,220,000	1,230,000	-
Administrative Expenses	460,800	498,000	564,000	668,000	-
PAMB Operations	48,000	54,000	72,000	72,000	
Travel Expenses	48,000	60,000	60,000	60,000	
Hiring of Contractual Staff	364,000	384,000	432,000	536,000	
Total Admin Expense as a % of Revenue on IPAF (DENR)	33.5%	30.6%	34.3%	27.1%	-
Operational Expenses	348,675	534,825	656,000	562,000	-
Procurement of Equipment	-	50,000	50,000	-	
Repair and Maintenance of Equipment and Vehicles	60,000	60,000	60,000	60,000	
Supplies	29,600	60,000	60,000	60,000	
Gasoline/ Diesoline, Oil and other lubricants	249,600	336,000	456,000	432,000	
Other Maintenance and Operating Expenses	9,475	28,825	30,000	10,000	
Total Operational Expense as a % of Revenue on IPAF (DENR)	25.3%	32.9%	40%	22.9%	-
TOTAL REVENUE	2,065,650	2,440,650	2,462,655.50	3,689,262	3,521,754.75
Environmental Fee (LGU)	688,550	813,550	820,888.50	1,229,754	1,173,918.25
IPAF collection (DENR)	1,377,100	1,627,100	1,641,777	2,459,508	2,347,836.50
Entrance Fees:					
Diver	1,154,400	1,265,600	1,291,267	2,064,918	1,956,193
Non-Diver	167,100	154,050	153,577	219,252	238,495.50
Dive Master	33,100	35,700	33,200	45,850	43,500
Rentals/ Donations	2,500	8,600	-	2,000	-
Administrative Fines	20,000	50,000	50,000	-	-
Vessel Entry Fees	-	113,150	113,733	127,488	109,648
TOTAL Expenses as a % of Revenue from IPAF collection	58.8%	63.5%	74.3%	50%	-

From 2009-2011, a major share (58.8 – 74.3%) of the IPAF collected total revenue of DENR was used for administrative and operational expenses until it was reduced to only 50% in 2012. The highest source of expenditure is the salary for contractual staff and gasoline expenses, which increases almost annually. Likewise, the bulk of the IPAF collection was generated from visitor entrance fees, which also increases annually with a slight decrease in 2013.

[15] Figures obtained from DENR – Apo Reef Natural Park Protected Area Office

The data for 2013 expenses is not available because the PA Sub-fund utilization under the Special Budget Request (SBR) for CY 2013 was not approved nor released by the Department of Budget and Management (DBM). It is also noted that the total of the PA-Sub Fund of the previous year collection and the reserved unprogrammed balance of the previous year are utilized for the current year. For instance, the total of PA Sub-fund (75% of the collection in 2008) and the reserved unprogrammed by 2008 was utilized in CY 2009. Furthermore, the Administrative and Operational Expenses of DENR – Apo Reef Natural Park (ARNP) Protected Area Office (PAO) for CY 2013 were charged against the National Ecotourism Strategy (NES) budget of the DENR for Apo Reef Natural Park. Additionally, the Environmental Fees (LGU) shown in the table above are just estimated based on 2/3 (66.66%) and 1/3 (33.33%) sharing basis of the DENR/PAMB and LGU Sablayan. An increasing trend in the revenue collected from environmental fees was also observed.

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5 Appendices

5.1 Survey Team Composition

Name	Designation	Office
Project Management		
Grace C. Diamante	Executive Director	MBCFI
Terrestrial Fauna		
Don Geoff E. Tabaranza	Project Development and Resource Manager / Wildlife Biologist	MBCFI
Kathy Lene S. Cielo	Field Operations Manager / Wildlife Biologist	MBCFI
Virtito Natural Jr.	Researcher / Wildlife Biologist	PIBCFI
Terrestrial Flora		
Joan Laura Abes	Forester	
Rene Capoquian	Forester	MBCFI
Maria Lauren Abes	Communications and Administrative Assistant / Biologist	MBCFI
Marine Biodiversity		
Gregorio Dela Rosa Jr	Research Specialist / Marine Biologist	Haribon Foundation
Erina Pauline Molina	Research Assistant / Marine Biologist	Haribon Foundation
Socio-economic Profile		
Angelica N. Francisco	Socio-Cultural, Economic and Governance Specialist / Environmental Planner	

5.2 Summary of processed floral data per 10x10 quadrat.

Species	# species/ quadrat	Species Density (#/ha)	Species basal area (sqm/ha)	Relative density	Relative dominance
Quadrat 1 Total	**26**	**2600**	0.463		
Rhizophora apiculata	26	2600	0.463	100.00	100.00
Quadrat 2 Total	**17**	**1700**	**0.55**	**100.00**	100.00
Pemphis acidula	4	400	0.090	23.53	16.33
Cordia subcordata	3	300	0.123	17.65	22.37
Pouteria obovata	1	100	0.013	5.88	2.34
Xylocarphus rumphii	9	900	0.323	52.94	58.96
Quadrat 3 Total	**7**	**700**	**0.99**	**100.00**	**100.00**
Rhizophora mucronata	6	600	0.119	85.71	12.04
Sonneratia alba	1	100	0.870	14.29	87.96
Quadrat 4 Total	**7**	**700**	**0.75**	**100.00**	**100.00**
Rhizophora mucronata	1	100	0.01	14.29	1.08
Sonneratia alba	6	600	0.746	85.71	98.92
Quadrat 5 Total	**11**	**1100**	**0.54**	**100.00**	100.00
Diospyros maritima	2	200	0.01	18.18	1.92
Pandanus tectorius	1	100	0.00	9.09	0.47
Pouteria obovata	8	800	0.53	72.73	97.61
Quadrat 6 Total	**14**	**1400**	**0.14**	**100.00**	100.00
Guettarda speciosa	3	300	0.04	21.43	28.76
Pandanus tectorius	11	1100	0.10	78.57	71.24
Quadrat 7 Total	**5**	**500**	**0.30**	**100.00**	100.00
Rhizophora apiculata	4	400	0.21	80.00	70.57
Rhizophora mucronata	1	100	0.09	20.00	29.43
Quadrat 8 Total	**27**	**2700**	**0.30**	100.00	100.00
Bruguiera cylindrica	6	600	0.04	22.22	13.09
Talipariti tiliaceum	3	300	0.13	11.11	42.80
Xylocarphus rumphii	18	1800	0.13	66.67	44.10
Quadrat 9 Total	**44**	**4400**	**0.22**	100.00	100.00
Bruguiera cylindrica	9	900	0.057	20.45	26.21
Rhizophora mucronata	26	2600	0.102	59.09	46.77
Talipariti tiliaceum	3	300	0.047	6.82	21.44
Xylocarphus moluccensis	3	300	0.003	6.82	1.51
Xylocarphus rumphii	3	300	0.009	6.82	4.06
Quadrat 10 Total	**9**	**900**	**0.79**	100.00	100.00
Talipariti tiliaceum	2	200	0.008	22.22	0.97
Erythrina variegata	1	100	0.045	11.11	5.65
Sterculia foetida	4	400	0.728	44.44	91.75
Thespesia populnea	1	100	0.010	11.11	1.23
Diospyros maritima	1	100	0.003	11.11	0.40

5.3 List of Faunal Species Recorded in Apo Reef Natural Park.

BIRDS							
SPECIES	BFAR 1983	Dickinson *et al*.1991	UPLB 1998	CPPAP 1999	DENR 2009	MBCFI 2013	MBCFI 2014
SULIDAE - Boobies or Gannets							
Brown Booby *Sula leucogaster*						X	
FREGATIDAE – Frigatebirds							
Lesser Frigatebird *Fregata ariel*	X					X	
ARDEIDAE - Bitterns, Egrets & Herons							
Eastern Reef-Egret *Egretta sacra*	X	X	X	X		X	X
Little Egret *Egretta garzetta*							X
Cattle Egret *Bubulcus ibis*			X		X		X
Black-crowned Night-heron *Nycticorax nycticorax*					X		
ACCIPITRIDAE - Buzzards, Eagles, Harriers, Hawks & Kites							
Brahminy Kite *Haliastur indus*			X				
White-bellied Sea Eagle *Haliaeetus leucogaster*	X						
Grey-faced Buzzard *Butastur indicus*							X
FALCONIDAE – Falcons & Falconets							
Eurasian Kestrel *Falco tinnunculus*					X		
Peregrine Falcon *Falco peregrinus*							X
MEGAPODIIDAE - Megapodes & Scrubfowl							
Tabon Scrubfowl *Megapodius cumingi*			X				X
RALLIDAE - Coots, Crakes, Rails & Waterhens							
Barred Rail *Gallirallus torquatus*						X	X
Ruddy-breasted Crake *Porzana fusca*	X						
White-breasted Waterhen *Amaurornis phoenicurus*				X			
CHARADRIIDAE - Lapwings & Plovers							
Malaysian Plover *Charadrius peronii*			X	X			
Pacific Golden Plover *Pluvialis fulva*					X		
Marsh Sandpiper *Tringa stagnatilis*					X		
Common Greenshank *Tringa nebularia*					X		
SCOLOPACIDAE - Curlews, Godwits, Sandpipers & Snipes							
Common Sandpiper *Actitis hypoleucos*			X	X			
Pintail Snipe *Gallinago stenura*							X
Red-necked Phalarope *Phalaropus lobatus*							X
GLAREOLIDAE – Pratincoles							
Oriental Pratincole *Glareola maldivarum*						X	X
RECURVIRSOTRIDAE – Stilts & Avoceets							
Black-winged Stilt *Himantopus himantopus*							X
STERNIDAE - Terns & Noodies							
Whiskered Tern *Chlidonias hybridus*						X	
Black-naped Tern *Sterna sumatrana*	X		X				X
Bridled Tern *Sterna anaethetus*		X					
Great Crested Tern *Sterna bergii*	X					X	X
Sooty Tern *Sterna fuscata*	X						X

Black Noddy *Anous minutus*							X
COLUMBIDAE - Doves & Pigeons							
Black-chinned Fruit-Dove *Ptilinopus leclancheri*				X			
Island Collared-Dove *Streptopelia bitorquata*	X						
Nicobar Pigeon *Caloenas nicobarica*	X	X	X				X
Pied Imperial-Pigeon *Ducula bicolor*	X		X			X	X
Rock Dove (Domestic / Feral) *Columba livia*			X				
CUCULIDAE - Cuckoos, Malkohas & Coucals							
Common Koel *Eudynamys scolopacea*		X		X			
Oriental Cuckoo *Cuculus saturatus*						X	
STRIGIDAE - Owls							
Mantanani Scops-Owl *Otus mantananensis*						X	X
APODIDAE - Swifts							
Island Swiftlet *Collocalia vanikorensis*			X				X
ALCEDINIDAE - Kingfishers							
Common Kingfisher *Alcedo atthis*				X			X
White Collared Kingfisher *Halcyon chloris*	X		X	X		X	X
Ruddy Kingfisher *Halcyon coromanda*			X				
UPUPIDAE – Hoopoes							
Hoopoe *Upupa epops*					X		
MEROPIDAE – Bee-eaters							
Blue-tailed Bee-eater *Merops philippinus*							X
HIRUNDINIDAE - Swallows							
Barn Swallow *Hirundo rustica*			X			X	X
Pacific Swallow *Hirundo tahitica*		X					
CAMPEPHAGIDAE - Cuckoo-shrikes, Minivets, Trillers							
Pied Triller *Lalage nigra*	X		X	X		X	X
PYCNONOTIDAE - Bulbuls							
Black Bulbul Hypsipetes leucocephalus **						X	
ORIOLIDAE - Orioles & Fairy-bluebirds							
Black-naped Oriole *Oriolus chinensis*	X		X	X		X	X
CORVIDAE - Crows							
Large-billed Crow *Corvus macrorhynchus*							X
TURDIDAE - Robins, Shamas & Thrushes							
Brown-headed Thrush *Turdus chrysolaus*				X			
Eyebrowed Thrush *Turdus obscurus*		X					
Island Thrush *Turdus poliocephalus*				X			
Blue Rock-thrush *Monticola solitarius*							X
SYLVIIDAE - Old World Warblers							
Arctic Warbler *Phylloscopus borealis*		X	X			X	
Oriental Bush-Warbler *Cettia diphone*		X					
MUSCICAPIDAE - Flycatchers							
Japanese Paradise-Flycatcher *Terpsiphone atrocaudata*				X		X	
Grey-streaked Flycatcher *Muscicapa griseistica*			X				
Mangrove Blue-Flycatcher *Cyornis rufigastra*			X				

Pied Fantail *Rhipidura javanica*	X		X	X		X	X
Asian Paradise-Flycatcher *Terpsiphone paradisi*						X	
MOTACILLIDAE - Pipits & Wagtails							
Olive Tree-Pipit *Anthus hodgsoni*		X					
White Wagtail *Motacilla alba*					X		
Yellow Wagtail *Motacilla flava*			X			X	X
Grey Wagtail *Motacilla cinerea*							X
LANIIDAE - Shrikes							
Brown Shrike *Lanius cristatus*	X		X	X			X
STURNIDAE - Mynas & Starlings							
Chestnut-cheeked Starling *Sturnus philippensis*			X			X	X
NECTARINIIDAE - Spiderhunters & Sunbirds							
Olive-backed Sunbird *Nectarinia jugularis*	X	X	X			X	X
Purple-throated Sunbird *Nectarinia sperata*				X			
PLOCEIDAE - Old World Sparrow & Weavers							
Eurasian Tree Sparrow *Passer montanus*	X		X	X		X	X

MAMMALS			
FAMILY / Scientific Name	**Common Name**	**Residency Status**	**Conservation Status**
MURIDAE – Mice & Rats			
Rattus norvegicus	Common Brown Rat	Introduced	Least Concern
Rattus tanezumi	Oriental House Rat	Introduced	Least Concern
FELIDAE - Cats			
Felis catus	Domestic Cat	Introduced / Feral	Least Concern
CANIDAE - Dogs			
Canis familiaris	Domestic Dog	Introduced / Feral	Least Concern
PTEROPODIDAE – Fruit Bats			
Rousettus amplexicaudatus	Common Rousette	Native	Least Concern
DEPHINIDAE - Dolphins			
Peponocephala electra	Melon-headed Whale	Native	Least Concern
Stenella longirostris	Spinner Dolphin	Native	Data Deficient
Tursiops truncatus	Common Bottlenose Dolphin	Native	Least Concern
Grampus griseus	Risso's Dolphin	Native	Least Concern
Globicephala macrorhynchus	Short-finned Pilot Whale	Native	Data Deficient

HERPETOFAUNA			
FAMILY / Scientific Name	**Common Name**	**Residency Status**	**Conservation Status**
GEKKONIDAE			
Gekko gecko	Tocay gecko	Native	Not Assessed
Hemidactylus frenatus	Common House Gecko	Native	Least Concern
SCINCIDAE			
Eutropis cf *multicarinata*	Many-keeled Skink	Native	Not Assessed
Emoia atrocostata	Mangrove Skink	Native	Not Assessed
COLUBRIDAE			

Dendrelaphis sp.	Bronzeback tree snake	-	-
CHELONIIDAE			
Chelonia mydas	Green Sea Turtle	Native	Endangered
Eretmochelys imbricata	Hawksbill Sea Turtle	Native	Critically Endangered

5.4 Accounts of Notable Species

Mantanani Scops Owl (*Otus mantananensis*) is a poorly known owl species preferring small forested islands. It was presence was first confirmed on ARNP by MBCFI and DENR in 2013 when 1 individual was captured, ringed and released. This recent survey recorded atleast 3 individuals on Apo Island with the capture of 1 unringed individual and simultaneous calls from 2 more individuals from different locations.

Nicobar Pigeon (*Caleonas nicobarica*) is a rare resident breeding species preferring small uninhabited islands throughout SEAsia. It has been documented as breeding on Apo Island with photographs of nests and hatchlings. Recently, 5 confiscated individuals of this species were released on Apo Island. Three of the 5 immediately dispersed into less accessible parts of the island while 2 individuals appeared to have become accustomed to human presence and frequently loiter near the picnic area.

Little Egret (*Egretta garzetta*)

This migrant egret species is common in all wetland areas throughout the country. A single individual was observed on Apo Menor on April 7 during transit to Apo Island. This serves as the first record of the species in ARNP.

Grey-faced Buzzard (*Butastur indicus*)

This fairly common raptor species migrates through the Philippines in large flocks. A total of seven (7) individuals were seen from April 8-10 on Apo Island. Lone individuals were observed in April 8 and 9 while a group of 5 was observed on April 10. This serves as the first record of the species in ARNP.

Peregrine Falcon (*Falco peregrinus calidus*)

This uncommon raptor can be found in a wide variety of habitats. A single individual of the migrant race *calidus* was observed perched on a large tree on Apo Menor on April 8. This serves as the first record of the species in ARNP.

Pintail Snipe (*Gallinago stenura*)

This migratory species is fairly common in freshwater wetlands. In the Philippines, it has been recorded in the islands of Calayan, Luzon, Mindanao and Palawan. It has not yet been reported from mainland Mindoro. A single individual was caught through the mist net inside the mangrove forest in the western part of Apo Island on April 10. This serves as the first record of the species in ARNP.

Red-necked Phalarope (*Phalaropus lobatus*)

Flocks of this migratory species are often observed in pelagic waters. A flock of seven (7) in non-breeding plumage were seen in Apo East Pass during transit to Apo Island on April 7. This serves as the first record of the species in ARNP.

Black-winged Stilt (*Himantopus himantopus*)

A single adult in breeding plumage was seen in coastal area of Apo Island near the lighthouse on June 10. This serves as the first record of this uncommon migratory species in ARNP.

Black Noddy (*Anous minutus*)

This species nests in large numbers in Cavilli Island and Tubbataha Reefs between Palawan and Sulu. A single individual was observed in flight along Apo East Pass on April 7 during transit to Apo Island. This serves as the first record of the species in ARNP.

Blue-tailed Bee-eater (*Merops philippinus*)

A total of seventeen (17) individuals of this fairly common species were seen from April 8-10 in Apo Island. This serves as the first record of the species in ARNP.

Large-billed Crow (*Corvus macrorhynchus*)

Two (2) individuals of this large common species were observed in Apo Island. This serves as the first record of the species in ARNP.

Blue-rock Thrush (*Monticola solitarius*)

A lone male of this common migrant species was observed on April 9 in the karstic rock in the western side of Apo Island. This serves as the first record of the species in ARNP.

Grey Wagtail (*Motacilla cinerea*)

A single adult in breeding plumage was observed walking and foraging on the beach near the lighthouse in Apo Island on April10. This serves as the first record of the species in ARNP.

Tokay Gecko (*Gekko gecko*) is native to the Philippines and widely distributed in Asia. It has become a threatened species in the Philippines due to hunting of large individuals. It has been reported that Chinese buyers pay thousands of pesos for this species which allegedly used for treating different ailments. However, it is not assessed by the IUCN red list of species. Only one individual was observed in the trunk of *Cocos nucifera.*

Common House Gecko (*Hemidactylus frenatus*) is native to the Philippines and widely distributed with a near global distribution. This species is considered least concern by the IUCN due to its wide distribution and could inhabit diverse types of habitats. Large numbers of individuals were observed every night, approximately 14 individuals per night found in tree branches, driftwoods and other concrete structures found in ARNP.

Many-keeled Skink (*Eutropis* cf *multicarinata*) is native to the Philippines and Southeast Asia specifically Malaysia, Taiwan and Indonesia. *Eutropis multicarinata borealis* is a subspecies endemic only to the Philippines. It is distributed in Caluya, Catanduanes, Cebu, Gigante North, Gigante South, Luzon, Marinduque, Masbate, Negros, Polillo, Semirara, Sicogon, Panay including Mindoro. ***Eutropis indeprensa*** is native to the Philippines and can found in Sunda Region, Indonesia and Malaysia. In the country it is found in the islands of Panay, Mainland Palawan, Calamian Islands, Negros, and Cebu. Its type locality is San Jose, Occidental Mindoro. During the survey, one individual was observed in the leaf litter in Apo Island. It was first identified as *Eutropis multicarinata,* however, the physical characteristic of this species is closely similar to *Eutropis indeprensa.* It could be distinguished by counting the scales of the individual. Unfortunately, the individual was not captured due to the dense tree branches thus the unconfirmed identification.

Mangrove Skink (*Emoia atrocostata*) is native to the Philippines and widely distributed around the world. This species can be found mostly in coastal area. One individual was found in the rock crevices in Apo Menor (Binanggaan).

Bronzeback tree snake (*Dendrelaphis* sp.) is native to the Philippines. One individual was observed in Apo Island near the ranger station. Unfortunately, the individual was not captured. Species under the *Dendrelaphis* complex has recently been reviewed and separated.

5.5 List of Fish Species Recorded in Apo Reef Natural Park

#	FAMILY / *Species*	#	FAMILY / *Species*
ACANTHURIDAE		LUTJANIDAE (continued)	
1	*Acanthurus guttatus*	150	*Lutjanus decussatus*
2	*Acanthurus japonicus*	151	*Lutjanus fulviflamma*
3	*Acanthurus lineatus*	152	*Lutjanus fulvus*
4	*Acanthurus nigricans*	153	*Lutjanus kasmira*
5	*Acanthurus olivaceous*	154	*Lutjanus sebae*
6	*Acanthurus pyroferus*	155	*Macolor macularis*
7	*Acanthurus thompsoni*	156	*Macolor niger*
8	*Ctenochaetus binotatus*	MALACANTHIDAE	
10	*Ctenochaetus striatus*	157	*Hoplolatilus starcki*
11	*Naso caeruleocauda*	158	*Malacanthus latovittatus*
12	*Naso hexacanthus*	MICRODESMIDAE	
13	*Naso lituratus*	159	*Nemateleotris magnifica*
15	*Naso unicornis*	160	*Ptereleotris evides*
16	*Naso vlamingii*	161	*Ptereleotris grammica*
17	*Paracanthurus hepatus*	MONACANTHIDAE	
18	*Zebrasoma flavescens*	162	*Amanses scopas*
19	*Zebrasoma scopas*	163	*Paraluteres prionurus*
20	*Zebrasoma veliferum*	164	*Pervagor melanocephalus*
APOGONIDAE		MULLIDAE	
21	*Pristicon trimaculatus*	165	*Parupeneus barberinus*
AULOSTOMIDAE		166	*Parupeneus bifasciatus*
22	*Aulostomus chinensis*	167	*Parupeneus crassilabris*
BALISTIDAE		168	*Parupeneus cyclostomus*
23	*Balistapus undulatus*	169	*Parupeneus multifasciatus*
24	*Balistoides conspicillum*	NEMIPTERIDAE	
25	*Balistoides viridiscens*	170	*Pentapodus caninus*
26	*Melichthys vidua*	171	*Pentapodus emeryii*
27	*Odonus niger*	172	*Scolopsis bilineata*
28	*Sufflamen bursa*	173	*Scolopsis margaritifer*
29	*Sufflamen chrysopterus*	OSTRACIIDAE	
30	*Xanthichthys auromarginatus*	174	*Ostracion meleagris*
BLENNIIDAE		PINGUIPEDIDAE	
31	*Atrosalarias fuscus*	175	*Parapercis clathrata*
32	*Ecsenius bicolor*	176	*Parapercis cylindrica*
33	*Meiacanthus atrodorsalis*	177	*Parapercis hexophtalma*
34	*Meiacanthus grammistes*	PLOTOSIDAE	
35	*Plagiotremus laudandus*	178	*Plotosus lineatus*
36	*Plagiotremus rhinorhynchos*	POMACANTHIDAE	
CAESIONIDAE		180	*Centropyge bicolor*
37	*Caesio caerulaurea*	181	*Centropyge bispinosus*
38	*Caesio lunaris*	182	*Centropyge flavissimus*
39	*Pterocaesio digramma*	183	*Centropyge heraldi*
40	*Pterocaesio marri*	184	*Centropyge tibicen*
41	*Pterocaesio pisang*	185	*Centropyge vrolikii*
42	*Pterocaesio randalli*	186	*Chaetodontoplus mesoleucus*
43	*Pterocaesio tile*	187	*Pomacanthus imperator*
CARANGIDAE		188	*Pygoplites diacanthus*
44	*Carangoides bajad*	POMACENTRIDAE	
45	*Carangoides ferdau*	189	*Abudefduf vaigiensis*

46	*Caranx ignobilis*
47	*Caranx melampygus*
48	*Elagatis bipinnulata*
CARCHARHINIDAE	
49	*Triaenodon obesus*
CHAETODONTIDAE	
50	*Chaetodon adiergastos*
51	*Chaetodon auriga*
52	*Chaetodon baronessa*
53	*Chaetodon bennetti*
54	*Chaetodon kleinii*
55	*Chaetodon lunula*
56	*Chaetodon melannotus*
57	*Chaetodon mertensii*
58	*Chaetodon ocellicaudus*
59	*Chaetodon octofasciatus*
60	*Chaetodon ornatissimus*
61	*Chaetodon oxycephalus*
62	*Chaetodon punctatofasciatus*
63	*Chaetodon rafflesii*
64	*Chaetodon trifascialis*
65	*Chaetodon trifasciatus*
66	*Chaetodon ulietensis*
67	*Chaetodon unimaculatus*
68	*Chaetodon vagabundus*
69	*Forcipiger flavissimus*
70	*Forcipiger longirostris*
71	*Hemitaurichthys polylepis*
72	*Heniochus chrysostomus*
73	*Heniochus monoceros*
74	*Heniochus singularis*
75	*Heniochus varius*
CIRRHITIDAE	
76	*Cirrhitichthys falco*
77	*Paracirrhites arcatus*
78	*Paracirrhites forsteri*
HAEMULIDAE	
79	*Plectorhinchus chaetodontoides*
HOLOCENTRIDAE	
80	*Myripristis adusta*
81	*Myripristis berndti*
82	*Myripristis murdjan*
84	*Sargocentron caudimaculatum*
85	*Sargocentron diadema*
86	*Sargocentron melanospilos*
KYPHOSIDAE	
87	*Kyphosus cinerascens*
LABRIDAE	
88	*Anampses caeruleopunctatus*
89	*Anampses twistii*
90	*Bodianus anthioides*
91	*Bodianus axillaris*
190	*Acanthochromis polyacanthus*
191	*Amblyglyphidodon aureus*
192	*Amblyglyphidodon curacao*
193	*Amblyglyphidodon leucogaster*
194	*Amphiprion clarkii*
195	*Amphiprion frenatus*
196	*Amphiprion ocellaris*
197	*Amphiprion sandaracinos*
198	*Chromis amboinensis*
199	*Chromis analis*
200	*Chromis atripes*
201	*Chromis flavipectoralis*
202	*Chromis leptolepis*
203	*Chromis margaritifer*
204	*Chromis ovatiformes*
205	*Chromis retrofasciata*
207	*Chromis ternatensis*
208	*Chromis viridis*
209	*Chromis weberi*
210	*Chromis xanthura*
211	*Chrysiptera cyanea*
212	*Chrysiptera rex*
213	*Chrysiptera rollandi*
214	*Chrysiptera talboti*
215	*Dascyllus aruanus*
216	*Dascyllus reticulatus*
217	*Dascyllus trimaculatus*
218	*Dischistodus perspicillatus*
219	*Dischistodus prosopotaenia*
220	*Neoglyphidodon melas*
221	*Neoglyphidodon nigroris*
222	*Neoglyphidodon thoracotaeniatus*
223	*Neopomacentrus cyanomos*
224	*Neopomacentrus violascens*
225	*Plectroglyphidodon dickii*
226	*Plectroglyphidodon lacrymatus*
227	*Pomacentrus alexanderae*
228	*Pomacentrus amboinensis*
229	*Pomacentrus bankanensis*
230	*Pomacentrus brachialis*
231	*Pomacentrus coelestis*
232	*Pomacentrus lepidogenys*
233	*Pomacentrus moluccensis*
234	*Pomacentrus philippinus*
235	*Pomacentrus stigma*
236	*Pomacentrus vaiuli*
PRIACANTHIDAE	
237	*Priacanthus hamrur*
PSEUDOCHROMIDAE	
238	*Labracinus cyclophthalmus*
SCARIDAE	
239	*Bolbometopon muricatum*

92	*Bodianus loxozonus*	240	*Cetoscarus bicolor*
93	*Bodianus mesothorax*	241	*Chlorurus bleekeri*
94	*Cheilinus chlorourus*	242	*Chlorurus macrorhinos*
95	*Cheilinus fasciatus*	243	*Chlorurus troschelii*
96	*Cheilinus trilobatus*	244	*Hipposcarus longiceps*
97	*Cheilinus undulatus*	245	*Scarus dimidiatus*
98	*Choerodon anchorago*	246	*Scarus forsteni*
99	*Cirrhilabrus cyanopleura*	247	*Scarus frenatus*
100	*Cirrhilabrus exquisitus*	248	*Scarus ghobban*
101	*Cirrhilabrus temminckii*	249	*Scarus hypselopterus*
102	*Coris batuensis*	250	*Scarus niger*
103	*Coris gaimard*	251	*Scarus oviceps*
105	*Diproctacanthus xanthurus*	252	*Scarus psittacus*
106	*Epibulus insidiator*	253	*Scarus quoyi*
107	*Gomphosus caeruleus*	254	*Scarus rivulatus*
108	*Gomphosus varius*	255	*Scarus rubroviolaceus*
109	*Halichoeres biocellatus*	256	*Scarus schlegeli*
110	*Halichoeres chloropterus*	257	*Scarus sordidus*
111	*Halichoeres hortulanus*	261	*Scarus spinus*
112	*Halichoeres leucurus*	SCOMBRIDAE	
113	*Halichoeres marginatus*	262	*Gymnosarda unicolor*
114	*Halichoeres melanurus*	SERRANIDAE	
115	*Halichoeres prosopeion*	263	*Anyperodon leucogrammicus*
119	*Hemigymnus fasciatus*	264	*Cephalopholis argus*
120	*Hemigymnus melapterus*	265	*Cephalopholis cyanostigma*
121	*Hologymnosus doliatus*	266	*Cephalopholis leopardus*
122	*Labrichthys unilineatus*	267	*Cephalopholis microprion*
123	*Labroides bicolor*	268	*Cephalopholis urodeta*
124	*Labroides dimidiatus*	269	*Epinephelus fasciatus*
126	*Macropharyngodon meleagris*	270	*Epinephelus maculatus*
127	*Novaculichthys taeniourus*	271	*Epinephelus merra*
128	*Oxycheilinus digrammus*	272	*Epinephelus spilotoceps*
129	*Oxycheilinus unifasciatus*	273	*Plectropomus laevis*
130	*Pseudocheilinus evanidus*	274	*Pseudanthias dispar*
131	*Pseudocheilinus hexataenia*	275	*Pseudanthias huchtii*
132	*Pseudocheilinus octotaenia*	276	*Pseudanthias pleurotaenia*
133	*Stethojulis bandanensis*	277	*Pseudanthias tuka*
134	*Stethojulis strigiventer*	278	*Variola albomarginata*
135	*Stethojulis trilineata*	279	*Variola louti*
136	*Thalassoma amblycephalum*	SIGANIDAE	
137	*Thalassoma hardwicke*	280	*Siganus puellus*
138	*Thalassoma janseni*	281	*Siganus vulpinus*
139	*Thalassoma lunare*	SPHYRAENIDAE	
140	*Thalassoma purpureum*	282	*Sphyraena flavicauda*
141	*Thalassoma quinquevittatum*	SYNODONTIDAE	
142	*Thalassoma trilobatum*	283	*Saurida gracilis*
LETHRINIDAE		284	*Synodus variegatus*
143	*Gnathodentex aureolineatus*	TETRAODONTIDAE	
144	*Lethrinus microdon*	285	*Arothron nigropunctatus*
145	*Lethrinus olivaceus*	286	*Arothron stellatus*
146	*Monotaxis grandoculis*	287	*Canthigaster compressa*
LUTJANIDAE		288	*Canthigaster valentini*

147	*Aphareus furca*	ZANCLIDAE	
148	*Aprion virescens*	289	*Zanclus cornutus*
149	*Lutjanus bohar*		

5.6 Photodocumentation

Photographs during Biodiversity Survey at ARNP










Photographs during Stakeholder Workshop for ARNP Socio-economic Assessment at Sablayan