# Status of Marine Protected Areas in Nasugbu, Batangas, Philippines: Basis in Scaling Up its Marine Conservation Initiatives

**Asia Pacific Journal of Multidisciplinary Research**
Vol. 3 No. 4, 57-68
November 2015 Part III
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com

**Maria Luisa A. Valdez (Ph.D) [1], Melecio Joseph B. Bo [2], Aniceto A. Samonte, Jr.[3]**
Batangas State University – ARASOF, Nasugbu, Batangas Philippines
*[1]maluhvaldez888@gmail.com, [2]bomj02121960@gmail.com, [3]anicetosamonte10@gmail.com*

*Date Received: September 4, 2015; Date Revised: October 15, 2015*

***Abstract -*** *The study aimed to identify the present status of the Marine Protected Areas (MPAs) in Nasugbu, Batangas, Philippines and to determine the possible course of action to be undertaken to scale up the marine conservation initiatives for these MPAs.The respondents of the study include 30 key informants purposively chosen from selected coastal areas of Barangay Papaya, Nasugbu, Batangas. Findings of the study revealed that the enormous number of species found within the identified MPAs is an indication of the great number of habitat opportunities afforded by this environment. In addition to the observable community of flora and fauna visible below and above the reef's surface, there are still thousands of unnoticed, diverse communities of organisms that live in regenerating coral slabs and rocks or in the crevices of the coral reefs in the identified MPAs. This study also revealed the ongoing environmental challenges within the areas and calls for collaboration among the local government officials and stakeholders in redefining and strengthening the conservation initiatives for MPAs to meet local, national and international commitments, to preserve ecological balance and to reduce the ongoing deterioration of their marine biodiversity.*

**Keywords:** *Etayo, Hamilo Coast, Marine Conservation Initiatives, Marine Protected Areas, Pico de Loro, Santelmo*

## INTRODUCTION

Nowadays, marine ecosystems undergo unceasing threat and destruction caused by the impact of natural phenomena and human-induced activities. Thus, the demand for Marine Protected Areas (MPAs) as a channel for protecting biodiversity and marine resources is considerable than before.

Marine Protected Areas refer to areas of the intertidal or subtidal territory, including its overlying waters and associated fauna, flora, cultural and historical attributes, which have been reserved by law or other valuable medium to safeguarda section or its entiresurrounding environment [1].

Recently,these MPAs have been recognized as a mainstream management toolstructured to safeguard and possibly rehabilitate coastal ecosystems around the world. The intensified urgency with which coastal resource management practitioners now regard the necessity to conserve marine resources has steered to an upsurge in the number of MPAs being engendered and acknowledgedon international level as a feasible means to safeguard resources at the ecosystem level[2].Numerous local, national, and internationalagenciesendorse MPAs as instruments in addressing the demands for long-term conservation of biodiversity,and sustainable utilization of marine resources [3].

The establishment of MPAs is substantial because they safeguard ecosystems and habitats to sustain and avert the loss of their biodiversity; they safeguard the representative species and habitat to prevent their extinction; they ensure the proper balance of the marine ecosystem; and they help in safeguarding resources vital to commercial and recreational fishers, such as schooling sites, nursery areas, spawning and breeding grounds[4]. Likewise, they serve as sanctuaries for marine creatures thatprovidefood and other ecosystem services as well as resource security where there is an adequate interaction of design and management of MPAs and fisheries; they help sustain

the ecosystem services of marine water quality maintenance, sediment production and flow and beach protection; they support quality sites for education on marine and coastal heritage, culture and science;they support quality sites for recreation and tourism; they support quality sites for research and development of new technology;they support benchmarks or reference sites for performance reporting; and they help maintain and maximize options for future sustainable development and use of marine resources and environments [5].

In 1988, the International Union for Conservation of Nature (IUCN) advocated a resolution calling for the establishment of a global representative system of MPAs. The IUCN aims*"To provide for the protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world in perpetuity through the creation of a global, representative system of marine protected areas and through management in accordance with the principles of the World Conservation Strategy of human activities that use or affect the marine environment."*The said resolution clearly correlates the issues of marine area protection and sustainability andrecognizesMPAsat the focal point of the machinery of management for sustainable utilization, awareness and leisure as well as biodiversity preservation [6].

The 17th and 19th International Union for Conservation of Nature (IUCN) General Assemblies and the fourth World Parks Congress put forth the centralization of the establishment of protected areas. In 2002, the World Summit on Sustainable Development called for the creation of marine protected areas in consonance with international laws and anchored on scientific information, including representative networks by 2012.Across the globe, many countries have set up MPAs to reverse marine decline caused by illegal fishing methods, habitat destruction, and marine pollution[7].

Industrial development associated with technological developments has also led to impacts on the marine environment, both from at-sea activities and on-land activities. Ocean dumping is minimized throughupgraded waste treatment facilities, however land-based sources of pollution have led to massive degradation of some areas, and even collapse of fisheries and ecosystems. Added to thisenvironmental management problems is the fact that most coastal and even some open ocean marine habitats are continuing in their downward spiral of decline and degradation [8].

The largest marine protected areas are located in the Indian and Pacific Oceans around the territorial waters of certain British Overseas Territories and Territories of the United States. As of 2014, more than 6,500 MPAs encompassed 2.09% of the world's oceans [9]. In 2015, the United Kingdom governmentdeclared a budgetary allocation for the creation of the largest contiguous marine protected reserve in the world around the Pitcairn Islands [10].

With 464 reef-building coral species identified, the Philippines hosts one of the most highly biodiverse regions in the world. But due to destructive fishing techniques, overfishing and rapid coastal development, these are declining at a fast pace. In the country, there are around 600 MPAs established for marine conservation. Some have positively impacted reef health, decreased coral bleaching, increased fish biomass and yields in adjacent fisheries. However, the majority is poorly enforced and is highly unproductive[11].

The global Coral Triangle is renowned as the world's center of marine biodiversity. Often referred to as the "Amazon Rainforest of the Seas", it is home to 37% of the world's reef fish species and 76% of the world's coral species. The Coral Triangle encompasses the waters Indonesia, Malaysia, the Philippines, Papua New Guinea, the Solomon Islands, and Timor- Leste. The Verde Island Passage, which is located between the provinces of Batangas and Mindoro Oriental in the Philippines is one of the richest areas of the global Coral Triangle[12].

Hamilo Coast in Barangay Papaya, Nasugbu, Batangas is situated at the heart of the Asia-Pacific region and is providentially located at the entry of the Verde Island Passage, one of the most vibrant areas of the global Coral Triangle. The Coast's location at the entry of the said passage makes it an ideal jump-off point for cruising to other renowned Philippine island destinations such as Apo Reef, Bohol, Boracay, Cebu, Mindoro, and Palawan[13].

One of the strong appeals of this leisure destination and residential haven is the extensive natural setting, which includes 13 majestic coves located along Barangay Papaya, Nasugbu, Batangas. These include the:Pico de Loro, Santelmo, Etayo, Balibago, Subli, Arkaya, Papaya, Neela, Durado, Patungan, Bucanita, Limbones, and Baybay Coves. Each cove is blessed with mountain ranges, endless

views of the South China Sea, and teeming marine and terrestrial life. The recent declaration of the three coves of Hamilo Coast namely: Pico de Loro, Santelmo, and Etayo as MPAs is a significant move towards the attainment of sustainable development of the Coast. The said declaration is the result of a successful partnership between SM Land, World Wide Fund for Nature (WWF)-Philippines, local stakeholders, and surrounding communities [14].

The Pico de Loro Cove, which was formerly called *Cutad*, was named after Mt. Pico de Loro. It is located in a lush tropical valley, bounded by rolling mountains and a protected cove that shelters a pristine beachfront [15]. Santelmo Cove, on the other hand, was formerly called *Pinagdakutan* and was aptly named Santelmo after the local residents saw St. Elmo's fire in this areasome years back. Classified as a marine sanctuary or a "No Take Zone (NTZ) area with pristine, white sand and turquoise waters, Santelmo offers one of the best beachfronts in the entire coast [16].Moreover, the Etayo Cove, formerly called *Taytayen*, is one of the identified prime diving sites within Hamilo Coast.Its new name was coined after the Sanskrit term for "of the two" that pertains to acouple of smaller coves which share a common shoreline within Etayo. It is believed to have been a refuge of pirate vessels and a popular berthing place of ships because of its thick foliage[17]. The said cove is classified as a marine reserve wherein only traditional fishing by means of hook and line is allowed.

According to Palma, the World Wide Fund for Nature-Philippines (WWF-Philippines)Vice President for Conservation Programs, the declaration of these three coves as MPAs was very timely. He cited that an initial baseline study conducted on the site last 2007 revealed that the area has been subjected to various environmental strains caused by illegal means of fishing, which results in the deteriorating conditions of the coral, reef fish and seagrass or macroalgae communities[18].

With reference to the foregoing inputs, the researchers were deeply motivated to conduct a study about the present status of the Marine Protected Areasin the Municipal Coasts of Nasugbu, Batangas, Philippines in order to conceptualize environmental measures to strengthen the conservation initiatives for the area and to substantiate the previous study.

Therelevance of this study is underscored in terms of its implication to a number of beneficiaries. For the local community leaders and development planners, this paper will serve as a baseline data in theorizing and implementing their developmental policies to ensure the conservation of marine resources in the identified coves will be integrated in its priorities, programs, and projects. This will help them realize the necessity of capitalizing on enhanced cost-effective assessments of these areas, in order to better understand the trade-off that are made when development threatens the nursery areas and the ecological services they provide. This study will also be valuable for the academic managers in the sense that the paper may help them update the local government units as regards the current status of the MPAs in order to enhance their understanding of the significance of coordinating and sharing information about MPAs to create a larger network through the support of community. This paper may likewise motivate the media practitioners to introduce an involvement strategy which incorporates instructive messages on environmental stewardship into various forms of media to change the attitudes, behavior, and norms of the people. Moreover, this will provide the College instructors of Fisheries and allied programs opportunities to emphasize the concepts of environmental concern and sustainability in their major courses and open their students' minds and hearts to its varied lessons which may serve as inputs in understanding the environment as life sources. This paper will also give the students of fisheries a wide-ranging and reflectiveviewpointabout their field of specialization through the status of the identified marine protected area. In addition, this paper will stimulate their appreciation of nature and inspire them to engage in research writing as an academic endeavor. Likewise, this study may benefit the researchers through the knowledge and skills learned from the study and from the research methodology employed. This study will help answer some essential inquiries on how the ecosystems function, the real impact of human activities on them, and what can be done to effectively mitigate against the loss and degradation of these habitats in order to convince policymakers and the public that the protection of marine nurseries is of paramount importance. Finally, this paper may be used as a frame of reference by future researchers who want to conduct more studies about the environment and environmental stewardship.

## OBJECTIVES OF THE STUDY

The study aimed to identify the status of the Marine Protected Areas in Nasugbu, Batangas, Philippines. Specifically, the paper presented the aquatic resources found along the Barangay Papaya Coast in Nasugbu, Batangas in terms of: aquatic floraand fauna; the identified threats affecting the said aquatic resources; and the possible course of action to be undertaken to scale up the areas' marine conservation initiatives.

## METHODS

### Research Design

The present study employed the descriptive research method. This method is used to obtain information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation[19]. This method applies prominently because the present study aimed to determine the current status of the Marine Protected Areas in Nasugbu, Batangas, Philippines so as to scale up their conservation initiatives.

### Participants of the Study

The respondents of the study include 30 key informants purposively chosen from selected coastal areas of Barangay Papaya, Nasugbu, Batangas, Philippines. These include multiple stakeholders like the Barangay Captain and representatives of the Municipal Fishery and Aquatic Resource Management Council (MFARMC), the Barangay Fishery and Aquatic Resource Management Council (BFARMC), fisherfolk, divers or dive guides and selected residents who form part of the civilian fisheries patrol forcein the area known as *Bantay Dagat*.

### Instruments

In order to attain the objectives of this study, the researchers used documentary materials from reputable publications and electronic sources as well as the questionnaire and the Interview Schedule (IS) as basic tools for gathering data. Mercado (1999)[20] defined the questionnaire as a self-administered research tool which consist of a series of questions and prompts information from the respondents while an IS is an interviewer-administered research tool that influences the reliability and validity of the data gathered from the respondents. Filipino translations of the data gathering instruments were done to facilitate the gathering of data. In order to appreciate and understand the identified MPAs' abundant diversity of life forms, the classification and scientific names used in the*Atlas of Common Fishes of Tayabas Bay, Quezon Province, Philippines* by Ramos, Mendoza, Santos, Reyes, Jr., Capuli and Bimbao [21] was used in this study. The respondents also utilized the*Indo-Pacific Coral Reef Field Guide* by Allen and Steene [22] published by the Tropical Reef Researchas reference when the identified fish and other aquatic resources werenot found in the cited atlas. Positive identification of some species is largely dependent on the examination of a specimen sample. The experts consulted by Allen and Steene were hesitant in providing scientific names of some species. These uncertain identifications are indicated with a question mark. Likewise, the classification of mangroves was based on the Mangrove Management Handbook of Melana, Atchue, Yao, Edwards, Melana and Gonzales [23].

### Procedures

An approval to conduct the study was sought from the respondents.After which, the Personal Interview Technique (PIT) and the Group Interview Technique (GIT) were employed. Considering the limitations of the former, the GIT, as a complementary technique involves interviewing groups instead of individuals. It captures group consensus rather than individual opinion. More so, this is much faster to conduct than personal interview. The GIT, according to Mercado [24] is appropriate for gathering data needed in planning action projects while the personal interview is suitable in generating benchmark data that can serve as a basis of comparison for evaluating the impact of the project to the beneficiaries.The steps relative to analyzing data from the questionnaires and interview schedules, as described by Taylor-Power and Renner [25] were followed in this study. These include: getting to know the data, focusing the analysis, categorizing information, identifying patterns and connections within and between categories, and interpretation of the data

## RESULTS AND DISCUSSION

### Identified Aquatic Resources Found in the Marine Protected Areas of Nasugbu, Batangas, Philippines.

The identified Marine Protected Areas of Nasugbu, Batangas, Philippines have some of the region's richest ecosystems characterized by dense mangrove forests and extensive coral reefs. This could be attributed to the fact that the area is blessed with warm tropical climate and high rainfall. Likewise, the waters of these MPAs are further enriched with nutrients from land which enable them to support an extensive diversity of marine life.

With reference to aquatic resources most commonly found in the areas, the respondents enumerated them as follows:

Table 1. Most CommonAquatic ResourcesFound in the Identified Marine Protected Areas of Pico de Loro, Santelmo and Etayo Coves in Nasugbu, Batangas, Philippines

| |
|---|
| **A. Seaweeds** |
| 1. Green Algae (Chlorophyceae) |
| 1.1 Turtle Weed –*Chorodesmis fastigiata* ** |
| 1.2 Sea Lettuce -*Ulva* sp. ** |
| 1.3 Coralline alga –*Halimeda capiosa* ** |
| 2. Red Algae (Rhodophyceae) |
| 1.1 *Fauchea peltata* ** |
| 1.2 *Halymenia* sp. ** |
| 1.3*Rhodymenia* sp. ** |
| 3. Brown Algae ** |
| 1.1*Sargassum* sp. a common tropical seaweed ** |
| 1.2*Dictyota* sp.** |
| 1.3 Turbin weed –*Turbinariaornata* sp. ** |
| **B. Seagrasses** |
| 1. *Cymodocea serrulata* ** |
| 2. *Halodule pinifoli ?*** |
| 3. *Syringodium isoetifolium* ** |
| **C. Mangroves** |
| 1., *Rhizophora mucronata*(Local Name:*Bakauan babae )* *** |
| 2. *Rhizophora apiculata*(Local Name:*Bakauan lalaki)* *** |
| 3. *Rhizophora* sp.(Local Name: *Bakauan*) *** |
| 4. *Nypa fruticans*(Local Name: *Nipa*)*** |
| **Aquatic Fauna** |
| **D. Sponges** |
| 1. *Strepsichordaia lendenfeldi* (Dictyoceratida Spongiidae) ** |
| 2. *Carteriospongia* sp. (Dictyoceratida, Spongiidae) ** |
| 3. *Callyspongia* sp. (Haploclerida, Callyspongiidae) ** |
| **E. Hydrozoans** |
| 1. Family Milleporidae (Stinging Corals) |
| 1.1 Fire Coral, *Millepora* sp. ** |
| 2. Stinging Corals and Lace Corals |
| 2.1 Lace Corals, *Distichoporaviolacea* (Stylasteridae) ** |
| **F. Sea Anemones** |
| 1. Family Stichodactylidae, etc. (Anemones) |
| 1.1 Merten's sea anemone, *Stichodactyla mertensii* (Stichodactylidae) ** |
| 2. Family Cerianthide (Anemones) |
| 2.1 Tube anemone, unidentified species ** |
| **G. Corals** |
| 1. Family Pocilloporide (Corals) |
| 1.1*Pocillopora verrucosa* ** |
| 1.2*Pocillopo raeydouxi* ** |
| 1.3 *Stylophora pistillata* ** |
| 2. Family Acroporidae (Corals) |
| 2.1. *Montipora* sp. ** |
| 2.2*Acropora digitifera*** |
| 2.3 Mixed Acropa corals, mainly *A. hyacinthus*** |
| 2.4*Acropora Formosa* ** |
| 3. Family Fungiidae(Corals) |
| 3.1 *Fungi aconcinna* ** |
| 3.2 *Lythophyllon* sp. ** |
| 3.3 *Fungi arepanda* ** |
| 3.4 *Podabacia crustacea*** |
| 4. Family Oculinidae (Corals) |
| 4.2 *Galaxea astreata* (Oculinidae) ** |
| **H. Soft Corals** |
| 1. Soft Coral |
| 1.1 Soft Coral, *Sinularia* sp. ** |
| 2. Blue Coral |
| 2.1 Blue Coral, *Heliopora coerulea* ** |
| **I. Crustaceans** |
| 1. Subclass Cirripedia (Barnacles) |
| 1.1 Gooseneck barnacle, *Lepas testudinata* (C. Bryce) ** |
| 1.2 Tidepool barnacle, *Tetraclita multicostata* (C. Bryce) ** |
| 1.3 Acorn barnacle, *Tetraclita porosa* (C. Bryce) ** |
| 2. Subclass Stomatopoda(Mantis Shrimps) |
| 1.1 Mantis shrimp (Squillidae) ** |
| 3. Family Nephropidae (Reef Lobsters) |
| 1.1 Reef lobster, *Enoplometopus daumi* (Nephropidae) ** |
| 1.2 Reef lobster, *Enoplometopus holthuisi*(Nephropidae) ** |
| 1.3 Reef lobster, *Enoplometopus occidentalis*(Nephropidae) ** |
| 4. Family Palinuridae (Spiny Lobsters) |
| 1.1 Blue-spot rock lobster, *Panulirus femoristriga* ** |

| |
|---|
| 1.2 Painted rock lobster, *Panulirus versicolor* ** |
| 1.3 Slipper lobster, *Panulirus caledonicus* ** |
| 5. Family Grapside (Shore Crabs) |
| 1.1 Shore crab, *Grapsus albolineatus* (Grapside) ** |
| 1.2Sargassum crab, *Varuna litterata* (Grapsidae) ** |
| 1.3 Shore crab, *Percnor plannissimum* (Grapsidae) ** |
| **J. Sea Shells** |
| 1. Giant clam, *Tridacna gigas* ** |
| 2. Giant clam, *Tridacna crocea* ** |
| 3. Giant clam, *Tridacna squamosal* ** |
| **K. Cephalopods** |
| 1. Family Octopodidae |
| 1.1 Bigfin reef squid, *Sepioteuthis lessoniana* (Loliginidae) ** |
| 1.2 Common reef octopus, *Octopus cyanea*** |
| 1.3 Fijian octopus, *Octopus vitiensis* ** |
| **L. Sea Stars** |
| 1. *Linckia laevigata* ** |
| 2. *Gomphia rosea*? ** |
| 3. *Echinaster luzonicus* (Echinasteridae) ** |
| **M. Brittle Stars** |
| 1. *Ophiarachnella septemspinosa* (Ophiodermatidae) ** |
| 2. *Ophiarachnella gorgonia*(Ophiodermatidae) ** |
| 3. *Ophiomastix janualis* (Ophiocomidae) ** |
| **N. Feather Stars** |
| 1. Feather Stars |
| 1.1 *Capillaster multiradiatus* (Comasteridae) ** |
| 2. Feather Stars - Family Comasteridae |
| 1.2 *Comanthina schlegelii* ** |
| 1.3 *Oxycomanthus benneti* ** |
| **O. Sea Urchins** |
| 1. *Diadema setosum* (Diadematidae) |
| 2. *Mespilia globulus* (Temnopleuridae) |
| 3. *Echinothrix diadema*? (Diadematidae) |
| **P. Holothurians** |
| 1. *Holothuria fuscogilva*? ** |
| 2. *Euapta godeffroyi* (Synaptidae) ** |
| 3. Unidentified species (Holothuriidae) ** |
| **Q. Fishes** |
| • Family Acanthuridae |
| 1. Lined surgeonfish,*Acanthus lineatus*(Local Name: *Mangadlit)* (Author: Linnaeus, 1758) * |
| 2. Epaulette surgeonfish, *Acanthus nigricauda*(Local Name: *Labahita)* (Authors: Duncker& Mohr, 1929)* |
| *3.* Bluespine unicornfish,*Nasounicornis*(Local Name:*Suraan, Labahita, Tidluan, Turuan)* (Author: Forsskal, 1775) * |
| • Family Balistidae |
| 1. Orange-lined triggerfish, *Balistapus undulates* ** |
| 2. Blackpatch triggerfish, *Rhinecanthus verrucosus* ** |
| 3. Flagtail triggerfish, *Sufflamen chrysopterus* ** |
| • Family Caesionidae, etc. |
| 1. Blue and gold fusilier,*Caesio caerulaurea* (Local Name:*Dalagang - bukid, Bilog, Burgis)* (Author: Lacepede, 1801) * |
| 2. Neon fusilier, *Pterocaesio tile* ** |
| 3. Wideband fusilier, *Pterocaesio lativittata* ** |
| • Family Chaetodontidae |
| 1. Threadfin butterflyfish, *Chaetodon auriga* ** |
| 2. Klein's butterflyfish, *Chaetodon Kleinii* ** |
| 3. Longfinbannerfish, *Heniochus acuminatus* ** |
| • Family Carangidae |
| 1. Shrimp cad, *Alepes, djedaba* (Local Name:*Salay-salay, Salayaso)* (Author: Forsskal, 1775)* |
| 2. Herring scad, *Alepesvari*(Local Name:*Salay-salay, Salay-salaybatang)* (Author: Cuvier, 1833) * |
| 3. Blue trevally, *Carangoides ferdau* (Local Name*: Talakitok, Sebo, Muslo)* (Author: Forsskal, 1775) * |
| 4. Bigeyescad, *Selar crumenophthalmus*(Local Name*: Matambaka)* (Author: Bloch,1793) * |
| 5. Almaco jack, *Seriola rivoliana* ** |
| 6. Bluefin trevally, *Caranx melampygus* ** |
| • FamilyEphippidae |
| 1. Golden spadefish, *Platax boersii*(Local Name:*Bayang)* (Author:Bleeker, 1853) * |
| 2. Orbicular batfish, *Platax orbicularis* ** |
| • Family Haemulidae |
| 1. Harlequin sweetlips, *Plectorhinchus chaetodonoides*(Local Name:*Alatan, Labian)* (Author: Lacepede, 1801) * |
| 2. Striped sweetlips, *Plectorhinchus diagrammus*(Local Name:*Alatan, Hundon)* (Author: Linnaeus, 1758)* |
| 3. Yellowbanded sweetlips, *Plectorhinchus lineatus*(Local Name:*Alatan, Hundon)* (Author: Linnaeus, 1758)* |
| 4. Ribbonned sweetlips, *Plectorhinchus polytaenia*(Local Name: *Alatan)* (Author:Bleeker 1853)* |
| • Family Holocentridae |
| 1. Doubletooth soldierfish, *Myripristis* |

| |
|---|
| *hexagona*(Local Name: *Tangislawin, Sigang batuhan)* (Author:Lacepede, 1802) * |
| 2. Whitetip soldierfish, *Myripristis vittata*** |
| 3. Seychelles squirrelfish, *Sargocentron seychellense* ** |
| 4. Sabre squirrelfish, *Sargocentron spiniferum* ** |
| • Family Labridae |
| 1. Redbreasted wrasse, *Cheilinus fasciatus*(Local Name: *Dulusan)* (Author: Bloch, 1791) * |
| 2. Tripletail wrasse, *Cheilinus trilobatus*(Local Name:*Dulusan, Mameng)* (Author:*Lacepede, 1801)** |
| 3. Cheeklined wrasse, *Oxycheilinus digramma*(Local Name: *Dulusan, Isdang bato)* (Author:*Lacepede, 1801)** |
| 4. Threespot wrasse, *Halichoeres trimaculatus* ** |
| 5. Sixbar wrasse, *Thalassoma Hardwicke* ** |
| 6. Moon wrasse, *Thalassoma lunare* ** |
| • Family Lethrinidae |
| 1. Smalltooth emperor, *Lethrinus microdon* (Local Name: *Kanuping, Lugso)* (Author: Valenciennes, 1830) * |
| 2. Trumpet emperor, *Lethrinus miniatus*(Local Name:*Kanuping, Lugso, Manutsot)* (Author: Forster, 1801)* |
| 3. Black blotch emperor, *Lethrinus semicinctus*(Local Name: *Kanuping, Amusin)* (Author: Valenciennes, 1830) * |
| 4. Thumbprint emperor, *Lethrinus harak (*Local Name: *Kanuping)* (Author: Forsskal, 1775) * |
| 5. Big-eye bream, *Monotaxis grandoculis*(Local Name:*Kanuping)* (Author: Forsskal, 1775) * |
| 6. Slender emperor, *Lethrinus variegatus*(Local Name: *Kanuping)* (Author: Valenciennes, 1830) * |
| • Family Lutjanidae |
| 1. Dory snapper, *Lutjanus fulviflamma*(Local Name:*Talingan, Pingaw)* (Author: Forsskal, 1775)* |
| 2. Malabar blood snapper, *Lutjanus malabaricus*(Local Name*: Pulahan)* (Authors: Bloch and Schneider, 1801) * |
| 3. Red bass, *Lutjanus bohar* ** |
| 4. Paddle snapper, *Lutjanus gibbus* ** |
| 5. Onespot snapper, *Lutjanus monostigma*(Local name: *Maya-maya )* (Authors: Cuvier 1828)* |
| • Family Monacanthidae |
| 1. Brush-side filefish, *Amanses scopas* ** |
| 2. Honeycomd filefish, *Cantherhines pardalis* ** |
| 3. Orangetail filefish, *Pervagor aspricaudus* ** |
| • Family Mullidae |
| 1. Gold-saddle goatfish, *Parupeneus cyclostomus*(Local Name: *Saramulyete)* (Author:Lacepede, 1801) * |
| 2. Indian goatfish, *Parupeneus indicus*, (Local Name:*Salmonete, Manitis, Yanggutan, Saramulyete)*(Author: Shaw, 1803) * |
| 3. Manybar goatfish, *Parupeneus multifasciatus*(Local Name: *Saramulyete)* (Authors: Quoy and Gaimard, 1825) * |
| 4. Dash-dot goatfish, *Paruneneus barberinus*(Local Name:*Saramulyete)* (Author: Lacepede, 1801)* |
| 5. Doublebar goatfish, *Parupeneus bifasciatus* ** |
| • Family Muraenidae |
| 1. Starry moray, *Echidna nebulosa* ** |
| 2. Whitemouth moray, *Gymnothorax meleagris* ** |
| 3. Undulated moray, *Gymnothorax undulates* ** |
| • Family Nemipteridae |
| 1. Yellowbelly threadfin bream, *Nemipterus bathybius*(Local Name:*Bisugo)* (Author: Snyder, 1911)* |
| 2. Ornate threadfin bream, *Nemipterus hexodon*, (Local Name*: Bisugo)* (Authors: Quoy & Gaimard, 1824)* |
| 3. Redspine threadfin bream, *Nemipterus nemurus*(Local Name:*Bisugo)* (Author:Bleeker, 1857) * |
| 4. Two-lined monocle bream, *Scolopsis bilineatus* ** |
| 5. Whitecheck monocle bream, *Scolopsis vosmeri* ** |
| • Family Pempheridae |
| 1. Vanicolo sweeper, *Pempheris vanicolensis* ** |
| • Family Pomacanthidae (Angelfishes) |
| 1. Pearl-scaled angelfish, *Centropyge vroliki* ** |
| 2. Emperor angelfish, *Pomocanthus imperator* ** |
| 3. Regal angelfish, *Pygoplites diacanthus* ** |
| • Family Pomacentridae (Damselfishes) |
| 1. Maomao, *Abudefduf abdominalis* ** |
| 2. Scissortail sergeant, *Abudefduf sexfasciatus* ** |
| 3. Bengal sergeant, *Abudefduf bengalensis* ** |
| 4. Twospot demoiselle, *Chrysiptera biocellata* ** |
| 5. Onespot demoiselle, *Chrysiptera unimaculata* ** |
| 6. Springer's demoiselle, *Chrysiptera springeri* ** |
| • Family Pomacentridae (Anemonefishes) |
| 1. Barrier Reef anemonefish, *Amphiprion* |

*akindynos* **

2. Clark's anemonefish, *Amphiprion clarkia* **
3. Allard's anemonefish, *Amphiprion allardi* **

- Family Pomacentridae (Chromis)

1. Twotonechromis, *Chromis dimidiate* **
2. Bicolor chronis, *Chromis margaritifer* **
3. Blue-green chromis, *Chromis viridis* **

- Family Priacanthidae

1. Glasseye, *Heteropriacantathus cruentatus*(Local Name:*Siga, Dilat)* (Author:Lacepede, 1801) *
2. Moontailbullseye, *Priacanthus hamrur*(Local Name:*Siga, Dilat)* (Author: Forsskal,1775) *
3. Red bigeye, *Priacanthus macracanthus*(Local Name*: Siga, Dilat)* (Author: Cuvier,1829) *
4. Purple-spotted bigeye, *Priacanthus tayenus*(Local Name:*Siga,Dilat)** (Author: Richardson, 1846)

- Family Scaridae

1. Steephead parrots, *Chlorurus sordidus* (Local Name: *Bun-ak)* (Author:Forskal, 1775) *
2. Festive parrotfish, *Scarus festivus*(Local Name:*Bun-ak)* (Author: Valenciennes, 1840) *
3. Dusky parrotfish, *Scarus niger*(Local Name*: Isdang bato)* (Author: Forskal, 1775) *
4. Bleeker's parrotfish, *Scarus bleekeri* **
5. Yellowfin parrotfish, *Scarus hypselopterus*(Local Name:*Bun-ak)* (Author: Bleeker, 1853) *

- Family Serranidae

1. Areolate grouper, *Epinephelus areolatus*(Local Name: *Lapu-lapu, Sigapoluba)* (Author:Forsskal. 1775) *
2. Malabar grouper, *Epinephelus malabaricus*(Local Name:*Lapu-lapu,Sigapo)* (Authors: Bloch & Schneider, 1801) *
3. Longfin grouper, *Epinephelus quoyanus*(Local Name:*Lapu-lapu, Sigapo)* (Author: Valenciennes, 1830) *
4. Greasy grouper, *Epinephelus tauvina*(Local Name:*Sigapong putik)* (Author: Forsskal. 1775) *
5. Slender grouper, *Anyperodon leucogrammicus*(Local Name:*Lapu-lapu, Sigapo, Banahan)* (Authors: Valenciennes, 1828) *
6. Six blotch hind grouper, *Cephalopholis sexmaculata*(Local Name*: Lapu-lapu, Sigapong pula)* (Author: Ruppell, 1830) *
7. Hexagon grouper, *Epinephelus hexagonatus* **

- Family Siganidae

1. Streamlined spinefoot, *Siganus argenteus*(Local Name: *Baliwis, Tilis, Samaral)* (Author: Quoy & Gaimard, 1825) *
2. White-spotted spinefoot, *Siganus canalicultus*(Local Name:*Baliwis, Tilis, Samaral)* (Author: Park, 1797) *
3. Mottled spinefoot, *Siganu sfuscescens*, (Local Name:*Tilis, Baliwis)* (Author: Houttuyn, 1782) *
4. Blue-spotted spinefoot,*Siganus corallinus*,(Local Name:*Talagbago, Baliwis)* (Author: Valenciennes, 1835)*
5. Gold lined spinefoot, *Siganus guttatus*, (Local Name:*Samaral)* (Author: Bloch, 1827) *
6. Indian rabbitfish, *Siganus luridus* **

- Family Sphyraenidae

1. Great barracuda, *Sphyraena barracuda* (Local Name:*Barracuda, Rompe)* (Author: Edwards, 1771) *
2. Pickhandle barracuda, *Sphyraena jello*(Local Name:*Torsilyos, Barakuda, Rompe)* (Author: Cuvier, 1829 ) *
3. Obtuse barracuda, *Sphyraena obtusata*(Local Name:*Torsilyos)* (Author: Cuvier, 1829 ) *
4. Chevron barracuda, *Sphyraena genie* **

- Family Synodontidae

1. Gracile lizardfish, *Saurida gracilis* (Local Name: *Kalaso)* (Authors: Quoy&Gaimard,1824) *
2. Brushtooth lizardfish, *Saurida undosquamis*(Local Name:*Kalaso, Utinbundok)* (Author: Richardson, 1848) *
3. Wanieso lizardfish, *Saurida wanieso*(Local Name:*Kalaso)* (Authors:Shindo & Yamada, 1972) *

- Family Tetraodontidae

1. Star puffer, *Arothron stellatus* (Local Name: *Butete)*** 
2. Freckled porcupinefish, *Diodon holocanthus* (Local Name: *Bot-butan)*** 
3. Three-barred sharpnose puffer, *Canthigaster coronate* ,(Local Name:*Butete)*** 

- Miscellaneous Fishes

1. Striped catfish, *Plotosus lineatus* (Plotosidae), juveniles (Local Name:*Sumbilang, Lito, Ito-Ito, Patuna*)(Author: Thunberg, 1787) *
2. Variegated lizardfish, *Synodus variegatus*

| | |
|---|---|
| | (Synodontidae)(Local Name: *Kalaso, Utin Bundok)* (Author: Lacepede 1803) * |
| | 3. Keel-jawed needlefish, *Tylosaurus melanotus* (Belonidae)(Local Name: *Haba*) (Author: Bleeker, 1850)* |
| **R.** | **Turtles** |
| | 1. Olive ridley turtle, *Lepidochelys olivacea* ** |
| | 2. Green sea turtle, *Chelonia mydas* ** |

*Legend:*
** Atlas of Common Fishes of Tayabas Bay, Quezon Province, Philippines by Ramos, Mendoza, Santos, Reyes, Jr., Capuli and Bimbao (2013); Classification includes local names and authors of the identified fish*
*** Indo-Pacific Coral Reef Field Guide by Allen and Steene (2000)*
****Mangrove Management Handbook by Melana, Atchue, Yao, Edwards, Melana and Gonzales (2000)*

It is significant to note that the enormous quantity of species found within these areas is a direct manifestation of the great number of habitat opportunities afforded by this environment. In addition to the observable community of plants like seaweeds, seagrasses and mangroves and animals like sponges, hydrozoans, sea anemones, corals, soft corals, crustaceans, sea shells, cephalopods, sea stars, brittle stars, feather stars, sea urchins, holothurians, fishes, turtles and many morevisiblebelow and above the reef's surface, there are still thousands of unnoticed organisms. Diverse communities live in regenerating coral slabs and rocks, or in the crevices of the coral reefs within the identified MPAs.

**Identified Threats Affecting the Marine Protected Areas of Nasugbu, Batangas, Philippines**

The respondents of the study identified threats affecting the Marine Protected Areas of Nasugbu, Batangas, Philippines. Because environmental policies and ordinances are not strictly enforced, the respondents collectively stressed that proper utilization, protection and conservation of marine resources are all compromised.

With reference to the major challenges affecting the areas, the fisher folk cited their lack of adequate information regarding the Coral Triangle Conservancy (CTC) proposal is one of them. Although the CTC was established to organize and fund coral reef restoration and conservation efforts in the Philippines and to implement sustainable business models in partnerships with local communities to preserve coral reefs[26], the fisher folk are still apprehensive about the said proposal which underscores the expansionof the other identified coves of Barangay Papaya, Nasugbu, Batangas into MPAs. The respondents strongly suggest that information dissemination with regard to the said expansionthrough public hearings, consultations and deliberation of a re-defined ordinance should be conducted among key stakeholders particularly the fisherfolk.

Likewise, the respondents stated that even though, these areas now has relatively little threat from fishing operations coming from nearby towns, still they are threatened occasionally by illegal commercial fishing operations and fishers from nearby provinces that require enforcement surveillance, which is generally beyond existing capability and outside the influence of local stakeholders. This view could be attributed to the respondents' strong belief that the town of Nasugbu is highly dependent on coastal resources for livelihood projects and poverty alleviation which are greatly affected by vessels of commercial operators fishing illegally within their waters.

In relation to threats to reefs and mangroves, the respondents cited that both mangroves and coral reefs are at risk due to siltation. While the mangroves are destroyed to make way for land conversion, tourist resorts, or cut for firewood, the coral reefs, on the other hand,are destroyed by pollution, occasional dynamite fishing, tourist activities and unnoticed coral collection for souvenirs and for other purposes. This view could be attributed to the fact that mangroves often run parallel to coral reefs and have a significantcorrelation. While mangroves grow well in brackish, nutrient-rich waters, coral reefs need clear,clean and nutrient-poor waters. Mangroves filter the water of silt, human waste and nutrients, providing the clean water that corals need to thrive[27].

Finally, the respondents mentioned the lack of extensive Information, Education and Communication (IEC) program regarding the utilization, management, monitoring and evaluation of established MPAs among local stakeholders particularly the fisherfolk.This viewpointcould be attributed to the fact that the respondents value the education process that transpiresduring the development and implementation of MPAs.The IEC may focus onsharing the political process, budgetary allocation, funding options, management strategies, enforcement and monitoring, and discerning lessons learned from these phases. They also highlighted the need for government planners and policy makers, representatives from the Barangay Officials, Municipal/Barangay Fisheries and

Aquatic Resources Management Council, People's Organization, *BantayDagat*, resort owners, developers, Non-Government Units, academe, the private sectors andother stakeholders' active involvement in the participatory monitoring and evaluation of the MPAs since all will share in the responsibility for implementing the program and reaping the benefits. Such monitoring conforms to Christie and White's [28] concept which says that the monitoring processshould also be complemented with careful and constructive evaluations using systematic social and natural science methods.

**Conservation Initiatives to Scale up the Identified Marine Protected Areas**

It is encouraging to note that the local government of Nasugbu, Batangas has begun implementing means to conserve and integrate management of its marine resources. This could be attributed to the fact that local government units are aware of the need to preserve ecological balance and biological diversity. Indeed, political commitment and active participation of the community are key factors for the success in this endeavor.However, for a more efficient and effective marine conservation initiatives, the respondents suggested for the re-activation of theFishery Management Office (FMO) and installation of its officers as provided for in the existing Marine Reserve's Ordinance. The said office may redefine itsplan toscale up the existing marineconservation initiatives byoutliningthe terms and procedures for access, utilization, development, protection and conservation of the aquatic resources within the MPAs of Barangay Papaya. Specifically, the FMO may incorporatesome regulatory and non-regulatory techniques in the plan.

The regulatory techniques include the consistent and strict implementation of the existing ordinance regarding the MPAs;utilization of limitations like close portions of areas from boat docking, fry collection, shell collection, swimming, etc.; enforcement of fishery laws, rules and regulations that needs to be coordinated;capitalizing on an enhanced cost-effective assessment of the areas;provisions for a more realistic budgetary allocation for the operational expenses of the *Bantay Dagat* enforcers in the conduct of patrolling, surveillance and monitoring of the areas and the municipal waters specifically for the maintenance of their patrol boats or vessels; appropriate and just salary for "coral gardeners" and *Bantay Dagat* enforcers; consistent and effective monitoring and evaluation measures of MPAs; and active inter-/intra participation of the Local Government Unit/s (LGU/s), Department of Environment and Natural Resources (DENR), Municipal Agricultural Office (MAO), Municipal Environment and Natural Resources Office (MENRO), community and other stakeholders.

On the other hand, thenon-regulatory techniques include public education like seminars/workshops, meetings, video and slide shows, dialogues, publications on the importance of aquatic resources, desilting and dredging of the rivers, sustainable development; training on aquatic resources rehabilitation and management, alternative livelihood, enterprise development, cooperatives; habitat enhancement/rehabilitation; research and monitoring likeaquaticresource assessment, fishery assessment, growth and yields studies, socio-economic profiling, monitoring of livelihood projects and their impact; community organizing like cooperatives,fishers' association, mangroveplanters association, and women's organizations; special projects like the annual community coastal cleanup, food production, population control, and waste management; and other interventions like sea ranching or mariculture, fishery, cottage industry and Government Organizations/Non-Government Organization interventions like credit assistance, medical missions,etc. This finding conforms to Melana, et al.'s [29] concept which involves the need for the creation of a Community-Based Resource Management Framework (CBRMF) Plan, which helps define the terms and procedures for access, use, and protection of resources within the CBRMF area.

**CONCLUSIONS AND RECOMMENDATION**

The enormous number of species found within the identified Marine Protected Areas of Nasugbu, Batangas, Philippines is a direct indication of the great number of habitat opportunities afforded by this environment. In addition to the observable community of flora and fauna visible below and above the reef's surface, there are still thousands of unnoticed, diverse communities of organisms that live in regenerating coral slabs and rocks or in the crevices of the coral reefs in the identified MPAs.This study also revealed the ongoing environmental challenges within the areas and calls for collaboration among the local government officials and stakeholders in redefining

and scaling up the conservation initiatives for the MPAs to meet local, national and international commitments,to preserve ecological balance andto reduce the ongoing deterioration of their marine biodiversity. From the foregoing findings and conclusions, the study offers the following recommendations: Re-activation of a Fishery Management Office is recommended to redefine and scale up the terms and procedures for accessing, utilizing, developing, protecting and conserving the aquatic resources within the identified MPAs. Information dissemination among stakeholders about the recent priorities, programs, projects and policies as regards these MPAsbeconductedfor a more effective means ofpublic awareness about environmental stewardship and sustainability.Researches about other Marine Protected Areas be conducted to substantiate the present study.

**ACKNOWLEDGEMENTS**

The researchers wish to express their personal thanks and appreciation to those who helped make this humble work a reality. First and foremost, they wish to thank God, for inspiring them during the writing process. To Dr. Tirso A. Ronquillo, the Batangas State University President and the other University officials most especially to Dr. Erma B. Quinay, the Vice President for Research, Development and Extension and Prof. Enrico M. Dalangin, the BatStateU ARASOF Nasugbu Executive Director, for the motivation that helps hasten the completion of this study. To the pool of writers whose works were included in this study for posterity, for their emboldened wisdom in every page of this research. To all of you, the researchers owe their deep gratitude.

**BIBLIOGRAPHY**

[1] Challenges for Marine Protected Areas and Examples for Addressing Them (2015). URL: https://goo.gl/Wut4BV, 20 August 2015

[2] Rawlins, D. (2015) The Marine Protected Area Network of Batangas Province, Philippines: An Outcome-Based Evaluation of Effectiveness and Performance

[3] Threats to the Oceans and the Need for Marine Protected Areas (2015); url: http://goo.gl/MdI9h6 ; date retrieved: 08/30/2015

[4] Transcript of The Successful Implementation of a Marine Protected Area in the Successful Implementation of a Marine Protected Area in the country: The Case of Twin Rocks Sanctuary in Anilao, Batangas (2015); url: https://goo.gl/9hE8UI, date retrieved: 08/30/2015.

[5] Threats to the Oceans and the Need for Marine Protected Areas (2015). url: http://goo.gl/MdI9h6; date retrieved: 08/30/2015

[6] Threats to the Oceans and the Need for Marine Protected Areas; url: http://goo.gl/MdI9h6; date retrieved: 08/30/2015

[7] Wells, Sue; Sheppard, V.; van Lavieren, H.; Barnard, N.; Kershaw, F.; Corrigan, C.; Teleki, K.; Stock, P.; Adler, E., (2008). *"National and Regional Networks of Marine Protected Areas:A Review of Progress"* (PDF). Master Evaluation for the UN Effort. World Conservation Monitoring Centre The Americas; date retrieved 2009-03-18.

[8] Threats to the Oceans and the Need for Marine Protected Areas; url: http://goo.gl/MdI9h6; date retrieved: 08/30/2015

[9] MPAtlas (2014) Retrieved 29 September 2014.

[10] National Geographic Magazine, January 2011

[11] Summary Report for MPAs in the Philippines; url http://www.reefbase.org/key_topics/pdf/Philippines%20mpa.pdf; date retrieved: 08/30/2015.

[12] Hamilo Coast.Com Website, (2015) *Entry of Verde Island Passage*; url: http://hamilocoast.com/location; date retrieved: 08/30/2015.

[13] Hamilo Coast.Com Website, (2015) *Entry of Verde Island Passage*; url: http://hamilocoast.com/location; date retrieved: 08/30/2015.

[14] Hamilo Coast coves declared protected areas / Agriculture (2009). URL: http://goo.gl/QWIZgX; date retrieved: 08/30/2015

[15] www.philrealty-showroom.com Website (2015) *Hamilo Coast Pico de Loro Cove*; url: http://goo.gl/b1Nfzb; date retrieved: 08/30/2015.

[16] *Hamilo Coast. The 13 Coves (2015)*, url; http://smcorporation.weebly.com/hamilo-caost-nasugbu-batangas--sm-development-corporation.html; date retrieved: 08/30/2015.

[17] *Hamilo Coast. The 13 Coves (2015)*, url; http://smcorporation.weebly.com/hamilo-caost-nasugbu-batangas--sm-development-corporation.html; date retrieved: 08/30/2015.

[18] Reyes, R. R. (2009) *Business Mirror* ; url: http://www.sminvestments.com/sm-wwf-partner-protect-biodiversity-hamilo-coast; date retrieved: 08/30/2015.

[19] Key, J. P. (1997) *Research Design in Occupational Education.* Oklahoma State University

[20] Mercado, C. M. (1999) *Conducting and Managing Communication Survey Research: The Asian Experience.* Quezon City, Philippines: Development Consultants for Asia Africa Pacific (DCAAP)

[21] Ramos, M. H., Mendoza, E. M., Santos, A. G., Reyes, Jr., R. B., Capuli, E. C., & Bimbao, M. A. P.

(2013). Atlas of Common Fishes of Tayabas Bay, Quezon Province, Philippines. Department of Agriculture, Bureau of Fisheries and Aquatic Resources Region IV-A, National Fisheries Research and Development Institute and Fish Base Information and Research Group, Inc. under the National Stock Assessment Program.

[22] Allen, G. R. & Steene, R. (2000) Indo-Pacific Coral Reef Field Guide Published by the Tropical Reef Research.

[23] Melana, D. M., Atchue III, J., Yao, C. E., Edwards, R., Melana, E. E., & Gonzales, H. I. (2000). Mangrove Management Book. Department of Environment and Natural Resources, Manila, Philippines through the Coastal Resource Management Project, Cebu City, Philippines

[24] Mercado, C. M. (1999) *Conducting and Managing Communication Survey Research: The Asian Experience.* Quezon City, Philippines: Development Consultants for Asia Africa Pacific (DCAAP)

[25] Taylor-Power, Ellen and Marcus Renner (2003) *Analyzing Qualitative Data*, url: http://goo.gl/OoVjU, date retrieved: 3/17/2014

[26] The Coral Triangle Conservancy, Inc. Website (2015) *The Coral Triangle Conservancy*; url: https://www.linkedin.com/company/the-coral-triangle-conservancy; date retrieved: 09/06/2015.

[27] World Land Trust Website (2015) *Reef & Mangrove Appeal*; url: http://goo.gl/C6wKG4; date retrieved: 09/06/2015.

[28] Christie, Patrick and Alan T. White (2006) *Best Practices in Governance and Enforcement of Marine Protected Areas: An Overview*. This paper was produced for the FAO Expert Workshop on Marine Protected Areas and Fisheries Management: Review of Issues and Considerations (12-14 June, 2006); url: ftp://ftp.fao.org/docrep/fao/010/a1061e/a1061e04.pdf ; date retrieved: 09/6/2015.

[29] Melana, D. M., Atchue III, J., Yao, C. E., Edwards, R., Melana, E. E. & Gonzales, H. I. (2000) Mangrove Management Book. Department of Environment and Natural Resources, Manila, Philippines through the Coastal Resource Management Project, Cebu City, Philippines.