



## State of the Mangrove in **BOHOL**

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### **I. Introduction**

Bohol is a 1<sup>st</sup> class province and the 10<sup>th</sup> largest island in the country. The island-province is roughly oval with major axes trending to the northeast at Camotes Sea and the southwest at Mindanao Sea. There are 47 municipalities grouped into three congressional districts. Tagbilaran City is the lone city serving as the provincial capital. Thirty municipalities are coastal with a coastline length of 1,009 km. Of the 1,109 barangays, 361 are coastal and 64 are island barangays surrounded by 72 smaller islands. Of the 411,726 ha total land area, only a quarter is forest, covering both public and private lands. There are 11 major watersheds and 16 protected areas (PAs). Twelve of the PAs are in coastal areas where old and new mangrove stands are located.

As of National Statistics Office (NSO) Census in 2005, the total population of Bohol is 1,313,560. Almost half of the population are living in coastal areas. Bohol is famous for its 1,776 chocolate hills, with rivers and caves, white sand beaches (e.g., Panglao and Anda), dive sites (in Balicasag, Pamilacan, and Cabilao islands), and rich coral reef biodiversity.

Bohol has the biggest mangrove area (natural and plantation stands) in the whole Visayas. In fact, the biggest man-made mangrove plantation in Southeast Asia is found in Banacon, Getafe. The province also has the highest mangrove species diversity in Central Visayas and probably in the entire country (Primavera 2000). The mangrove forest in Cogtong Bay in Candijay has 33 species (Yao 1999).

The primary sources of income in coastal areas are fishing, nipa weaving, seaweed and abalone culture, labor services, farming, and employment in government and private firms. Among the main socio-economic problems in coastal areas are illegal gambling, (isolated) drug addiction, insurgency, high population growth, and proliferation of informal settlers.

### ***Importance of Mangroves***

The most important role of mangroves in the province is as source of food and products for selling (such as firewood, charcoal, fiber, wine, vinegar, tannin, fish, clams, etc.). Mangroves provide breeding/feeding areas for fishes and crustaceans. They also provide protection against strong waves and storm surge.

Ecotourism in mangrove areas serves as a livelihood activity in the province. Some of the ecotourism activities in mangroves include mangrove tour (along boardwalk), kayaking, stand-up paddling, canoeing, and firefly tour. There are also floating restaurants touring along the mangroves in Loboc River. Mangroves are also used as educational and research sites.

The province has rich history of community-based forest management (CBFM) programs. For example, the Banacon island is the first recipient of the Certificate of Stewardship Contract (CSC) in 1980s. The tenurial instrument was given by DENR to fishers, who are dependent on mangroves, to protect and conserve the forest. The tenurial agreement generated revenues and paved way in managing the illegal fishponds. This effort was made possible through the United States Agency for International Development (USAID) EcoGov project.

The Banacon man-made mangrove forest is the first large-scale mangrove afforestation project in the Philippines, and probably in Asia. It is also one of the 11 Community-based Forest Management Agreement (CBFMA) holders in Bohol issued by DENR through the facilitation of the Coastal Resource Management Project (CRMP). Along with the local government of Calape, the project highlighted the protective value of mangrove plantation in effectively protecting the Pangangan causeway. This was made possible through the efforts of Mr. Ytac together with the scouts who started mangrove planting in the area (Yao undated).

## II. Status of Mangroves

Bohol is known to have the biggest mangrove area (both natural and plantation stands) in the entire Visayas (14,502 ha; DENR-Bohol undated). It also has high species richness.

Around 1,000 ha of mangroves were planted through the Sustainable Integrated Area Development (SIAD; 2016-2017). These mangrove plantations have a survival rate of 85 % and are found in the municipalities of Bien Unido, Buenavista, Carlos P. Garcia (CPG), Getafe, Inabanga, Mabini, Talibon, and Ubay. The mangrove planting project from the National Greening

Program (NGP; 2011–2017) covered a total area of 2,091 ha with 100 % survival rate (DENR-PENRO Bohol). These plantations are in Bien Unido, Buenavista, Getafe, Inabanga, CPG, Talibon, Calape, Loon, and Maribojoc. The Mangrove and Beach Forest Development Project (MBFDP; 2015-2017) reforested a total of 2,890 ha (189 ha in Tagbilaran and 2,701 ha in Talibon) with 87 % survival rate (**Table 1**). Other initiatives were done by the peoples' organizations (POs) in partnership with the Provincial Government of Bohol (PGBh), local government units (LGUs; municipal and barangay), and the private sectors.

Mangrove species recorded in the province include: *Aegiceras corniculatum*, *Avicennia alba*, *A. marina*, *A. officinalis*, *Bruguiera gymnorhiza*, *B. sexangula*, *Ceriops decandra*, *C. tagal*, *Excoecaria agallocha*, *Heritiera littoralis*, *Lumnitzera racemosa*, *Nypa fruticans*, *Osbornia octodonta*, *Rhizophora apiculata*, *R. mucronata*, *R. stylosa*, *Sonneratia alba*, and *S. caseolaris*. Mangrove-associate species include: *Dolichandrone spathacea*, *Hibiscus tiliaceus*, *Ipomoea pes-caprae*, *Morinda citrifolia*, *Pongamia pinnata*, and *Terminalia catappa*.

The mangrove areas of Bohol consist of both natural growth and plantation stands. Most mangrove areas are declared protected landscapes and seascapes, mangrove forest reserves, and mangrove swamp/wilderness areas. These are the declared protected mangrove areas: the Albuquerque-Loay-Loboc Mangrove Swamp Forest Reserve (Presidential Proclamation No. 293, s2000), the Panglao Island Protected Seascape (Presidential Proclamation No. 426, s2003), the Talibon Group of Islands Wilderness Area (Proclamation No. 131, s1999), the Cabilao-Sandigan Island Mangrove Swamp Forest Reserve; Pangangan Island Mangrove Swamp Forest Reserve; Tubigon Group of Islands Wilderness Area; Clarin Group of Islands Wilderness Area; Ubay-Mabini Swamp Forest Reserve/Wilderness Area; Inabanga-Buenavista Mangrove Swamp/Wilderness Area; Candijay-Anda-Mabini Mangrove Swamp Forest Reserve/Wilderness Area; Getafe Mangrove Swamp Forest Reserve/Wilderness Area, and the Carlos P. Garcia Mangrove Swamp Forest Reserve/Wilderness Area. These protected areas are managed by the Protected Area Management Board (PAMB).

**Table 1.** List of mangrove plantation management projects in Bohol.

Programs/Projects	Project duration	Areas covered (ha)	Survival rate (%)	Funding source	Project implementer/ Partner agencies	Budget (PHP)
SIAD: Mangrove Planting	2016–2017	1,000 (Bien Unido, Buenavista, CPG, Getafe, Inabanga, Mabini, Talibon, Ubay)	85	DENR	BLGUs, POs	40,200,000
MBFDP: Mangrove Planting	2015–2017	2,890 (Tagbilaran, Talibon)	87	DENR	BLGUs, POs	58,003,297
NGP: Mangrove Planting	2011–2017	2,090.57 (Bien Unido, Buenavista, Getafe, Inabanga, CPG, Talibon, Calape, Loon, Maribojoc)	100	DENR	DENR, BFAR, DepED, MLGU, BLGU & POs	
<b>Total area covered:</b>		<b>5,980.57</b>				

### *Degradation of Mangrove Forests*

The mangrove area in the province is generally increasing due to the mangrove reforestation/afforestation programs implemented by various groups. The DENR rehabilitation programs particularly the NGP (2011-2017), the MBFDP (2015-2017), and the SIAD (2016-2017) contributed mainly in the increase of mangrove stands, although most of these plantations are still undergoing forest development process.

The decline in mangrove stands (especially the old growth stands) in some areas is attributed to cutting of mangroves for fuelwood, charcoal, and construction materials. There are also cases of conversion into residential, commercial, and tourism areas. These conversions are related to the increasing number of informal settlers that needs areas for settlement.

### *Threats to Mangrove Forests*

Other threats on mangroves include coastal pollution and sand extraction. A rare case in Banacon, Getafe is the pest infestation in young mangrove plantations. Natural disturbances such as sea level rise and occurrences of earthquake also threatened the long-term survival of mangroves. In October 2013, a 7.2 magnitude earthquake hit Bohol. Portions of the coastal areas in Tubigon and Inabanga were inundated by few inches. Around 129 ha in Maribojoc and Loon were uplifted which caused the mangroves to deteriorate and eventually die. The uplifted areas were used as new settlement areas by the residents.



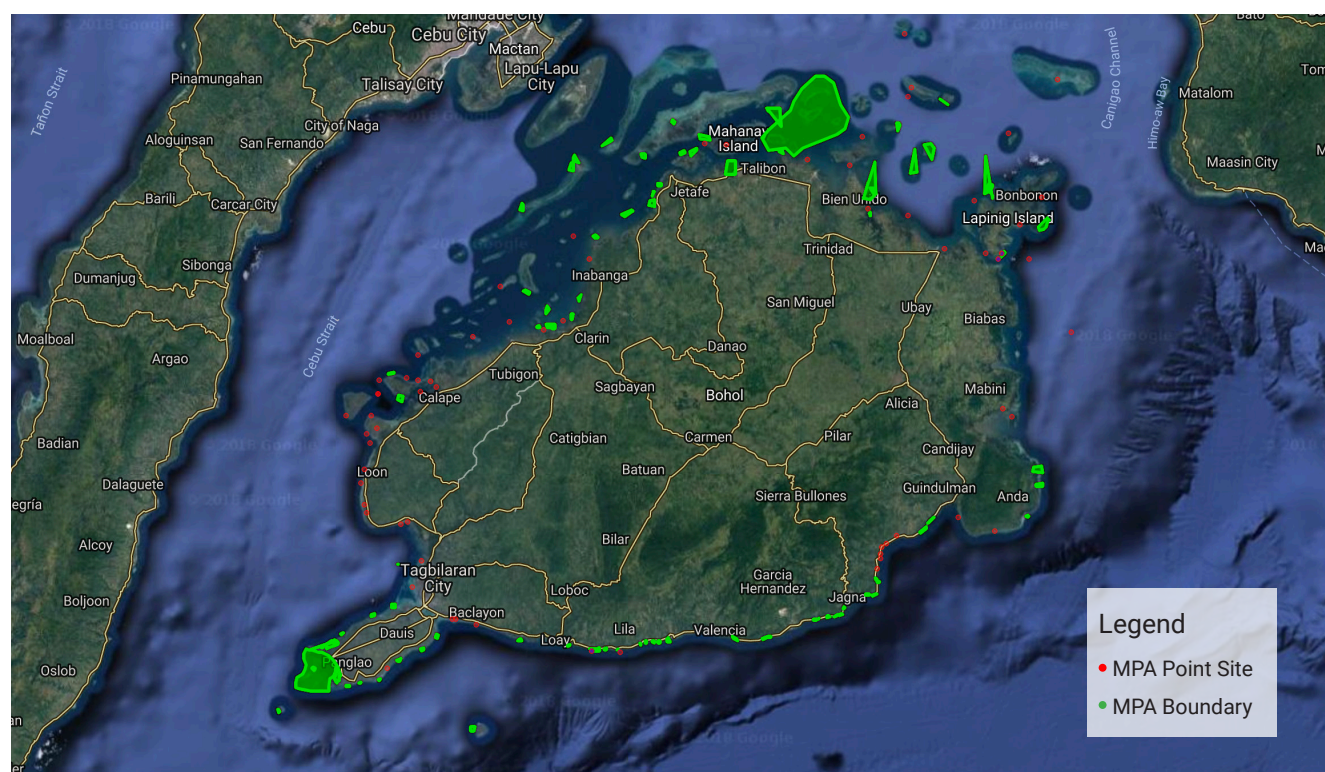
### III. Mangrove Protection and Management

The major activities under the CRM Program of BEMO is the conduct of participatory coastal resource assessment (PCRA). It includes mangrove assessment through a participatory manner. The province issued an Executive Order (EO) creating the Marine Protected Area – Provincial Technical Working Group (MPA-PTWG) to lead in the implementation of MPA plans and programs. Another activity is the provision of technical and livelihood assistance, and networking of MPA management councils. These councils formulate/ review management plans, conduct monitoring and assessment, provide training on MPA monitoring, provide land-based livelihood projects, assist/link the councils to livelihood opportunities, and seek funding assistance for the activities of the network (**Fig. 1**)

The mangrove protected areas are managed by the PAMB. These MPAs are headed by the Protected Area Superintendent (PASu) or the Community Environment and Natural Resources Officer (CENRO). Some areas are also managed by POs with CBFMA. As of 2014, the province has a total of 174 MPAs (including mangroves) with an aggregate area of 3,171 ha representing around 0.50 % of the total area of the municipal waters (MPA Support Network, 2014; **Fig. 2**).



**Figure 1.** Municipal Integrated Coastal Resource Management Planning Workshop.



**Figure 2.** Map of Bohol showing the location of the 174 Marine Protected Areas (MPAs).

Other CRM-related activities include giant clam seeding, mangrove rehabilitation and enhancement, and coastal restoration projects in MPAs.

In 2000, the Coastal Law Enforcement Summit was conducted. The summit resulted to the creation of the district-wide Coastal Law Enforcement Council (CLEC). In 2014, the 2<sup>nd</sup> Summit was conducted which resulted to the issuance of Executive Order No. 1 (s2015) enhancing the CLEC and expanding its membership. It was then followed by the creation of a Provincial Coastal Law Enforcement Task Force (PCLETF) and the Coastal Law Enforcement – Provincial Technical Working Group (CLE-PTWG). In 2016, the coastal LGUs were clustered into eight groups with contiguous waters, common issues and interests. Technical working groups were created to effectively respond to the issues and concerns in different clustered coastal municipalities.

#### *Monitoring and Evaluation*

The DENR is one of the main players doing monitoring and evaluation (M&E) in mangrove plantations in the entire province (**Fig. 3**). These M&Es are conducted together with the Provincial Government of Bohol particularly through the Office of the Provincial Agriculturist (OPA) and the BEMO.

#### **IV. Summary and Recommendations**

There is a need to enhance the mangrove stands (to make it more diverse) and update information on the actual mangrove cover and extent using geographic information system (GIS). As has been long practiced in reforestation, the province is limited to the use of *Rhizophora* species. Other species are often neglected. Mangrove nurseries and mangrovetum (as source of planting materials) shall be constructed in strategic sites. Site-species-matching and proper



**Figure 3.** Training on Habitat Enhancement and Rehabilitation Program and Actual Mangrove Planting (through cash-for-work program).

species zonation should be observed in implementing mangrove reforestation projects. Illegal activities such as mangrove cutting, conversion into different land-uses, and improper garbage disposal should be stopped. Enforcement of environmental laws, policies, and regulations should be strictly implemented. While ecotourism is an existing and potential source of alternative livelihood, there is a need to consider carrying capacity, biodiversity, and conservation in developing tourism programs. Continuous information, education, and communication (IEC) advocacy on the importance of mangroves, and the protection and conservation of coastal resources should also be implemented.

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