

# **Management Plan for the Olango Wildlife Sanctuary (1992)**

*(This management plan is currently being updated)*

Environment Agency of Japan  
Department of Environment and Natural Resources

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# INTRODUCTION

The Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar Convention) defines wetlands as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salty, including areas of marine water, the depth of which at low tide does not exceed six (6) meters.

Wetlands are among the world's most productive environments. They provide economic benefits to mankind through fishery production, maintenance of water tables for agriculture, water storage and flood control, shoreline stabilization, timber production, waste disposal, water purification and recreational opportunities. Wetlands also provide critical habitats for waterfowl and other birds as well as for countless mammal, reptile, amphibian, fish and invertebrate species, many of which are threatened with extinction.

Unfortunately, wetlands are among the world's most threatened habitats due mainly to accelerated drainage, land reclamation, conversion to agriculture, conversion to fishponds or saltworks, pollution, and over-exploitation of wetland species.

Against this background, the Department of Environment and Natural Resources (DENR), through the Protected Areas and Wildlife Bureau (PAWB), and the Environment Agency of Japan, entered into a Memorandum of Agreement to establish a Wetland Conservation Program to ensure the protection and conservation of wetlands in the Philippines, especially those of international importance.

The formulation of a management plan for the Olango Wildlife Sanctuary has been identified as the primary activity in this joint undertaking between DENR and the EA of Japan.

The choice of the Olango Wildlife Sanctuary is based on the fact that it is one of the most important areas for migratory waterbirds in the Philippines. The high bird numbers indicate that the island is being utilized by migratory birds as staging or wintering ground. The intertidal flats serve as foraging grounds for the birds indicating the area's high productivity. The higher ground among the mangrove stands within the Sanctuary also serves as a roosting site for the birds at high tide.

Several important migratory bird species use Olango as a feeding area. Among these are the Chinese Egret (*Egretta eulophotes*), Asian dowitcher (*Limnodromus semipalmatus*), Eastern Curlew (*Numenius madagascariensis*), and the Great Knot (*Calidris tenuirostris*).

It is worthwhile mentioning that the formulation of this management plan had the participation of a cross-section of relevant agencies and the affected inhabitants of the Sanctuary. Among these area the Asian Wetland Bureau Philippine Foundation, Inc. (AWBPFI), the Department of Agriculture (DA) as represented by the Bureau of Fisheries and Aquatic Resources (BFAR), the Philippine Tourism Authority (PTA), the National Economic and Development Authority (NEDA), the Department of Interior and Local Government (DILG) as represented by the local officials of Barangays Sabang, Sta. Rosa and Pangan-an, and the Department of Environment and Natural Resources (DENR).

This management plan is meant to serve only as a guide in the management and development of the Olango Wildlife Sanctuary.

# CHAPTER I

## 1. General Information

### 1.1. Location

Olango Island is located east of Mactan Island in the province of Cebu, Philippines (Fig. 1). It lies between latitudes 10 deg., 13 minutes and 10 deg., 16 minutes North and between longitudes 124 deg., 2 minutes and 124 deg., 4 minutes East. The island is bordered by four bodies of water: the Cebu Strait in the south, Olango Channel in the east, Camotes Sea in the north, and Gilutongan Channel in the west (Fig. 1). Olango Island is part of the group of islands /islets known as the Olango Island group composed of Olango, Camungi, Pangang-an, Caohagan, Gilutongan, and Sulpa.

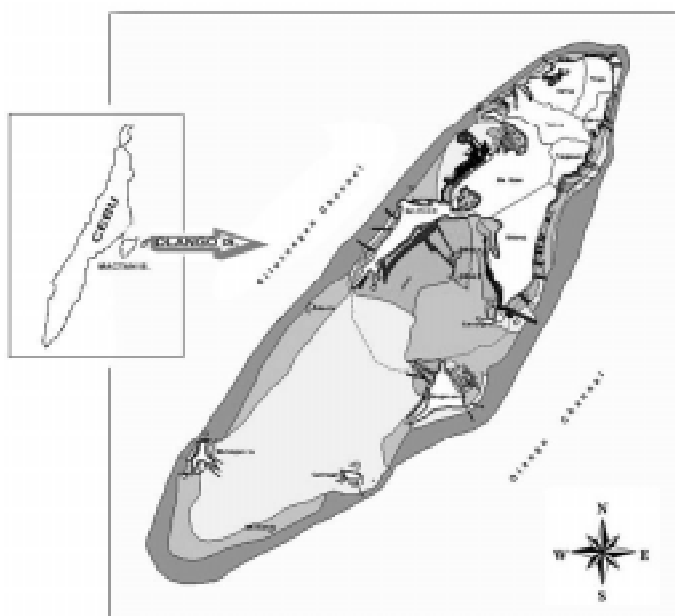
The Olango Wildlife Sanctuary lies on the southern shores of Olango Island (Fig. 2).

### 1.2. Access

The province of Cebu can be reached from Manila via Mactan by airplane or via Cebu City by boat. From Mactan, Olango Island can be reached by taking private or public land transport to the motorboat docking station in Maribago, Dapdap or Buot. From Maribago, Dapdap or Buot, a motorboat leaves every hour for Poo, Sta. Rosa, and Baring, or Tingo, on Olango Island. The Olango Wildlife Sanctuary can be reached by tricycle or on foot.

Travel by public transport from Cebu City is by bus to the Lapu-Lapu City bus terminal, where tricycles can take Olango-bound passengers to the motorboat docking station in Maribago, Dapdap or Buot.

The straight-line distance from Maribago to Sta. Rosa proper in an east-southeast direction is approximately 5 km.



### *1.3. General Description*

Olango Island, with an area of approximately 1,041 hectares, is 3 km across at its widest point and 7.5 km long. It is generally flat with no portions of the island reaching an elevation of more than 10 m ASL. Its rock base is coralline limestone and littoral flats with thin sand or silt substrate or exposed rock base. It extends up to the fringing foul ground where seagrasses, algae and coral polyps dominate. Mangrove forests and coconut groves also occur on the island.

The Olango Wildlife Sanctuary is approximately 1,120 hectares with a large intertidal area, forming a veneer (to 20 cm deep) over a hard substrate of coralline limestone. The lower shore consists of soft sandy mud of up to 10 cm deep. The middle shore level is covered with shallower sand substrate while the upper shore level is also covered with sand but with mangrove shrubland and low woodland growths.

The reserve is protected on all sides from extreme weather conditions as it is practically enclosed by the island's land mass with its arm-like projections which are parts of barangay Sabang in the east and barangay Poo in the west. Seaward, it is covered by the islets of Camungi, Caohagan, Pangan-an and Sulpa.

Presence of seawater is entirely dependent upon tidal fluctuations, thus water cover is not similar at all times. During low tides, the only watered zones are its natural flow channels which criss-cross the area, the pools made by the fish trap dikes and the dents and shallows within the mangroves. The most prominent of the channels infringe arc-like on the northern boundaries of the reserve, with entry points coming from the southern tips of barangays Sabang and Poo. There are dikes and diversion canals along the margins of the Sanctuary which are used to trap seawater from an abandoned saltwork while the entire area serve as gleaning grounds for the collection of crustaceans as food and seashells as sources of raw materials for the shellcraft industry, which is one of the main sources of livelihood for some of the islanders.

Bolinao Clay is generally a thin surface soil rich in organic matter, and has a large amount of iron and an excellent structure. The soil is considered thin and sometimes the subsoil is even missing with the limerock immediately beneath. This means that surface soil is formed as fast as the limerock is weathered and the plants can produce humus.

### *1.4. Land Tenure*

Most of the areas are owned by the government while some few selected areas especially near fine beaches are privately owned. Table 1 shows Olango Island tenure by parcel in which the owner has the highest percentage of about 49.08% while the lessee and the cultivator has the lowest percentage of 1.09%.

The island with its surrounding marine environment is an established tourism and marine reserve mandated under P.D. 1801 and placed under the administrative jurisdiction of the Philippine Tourism Authority, a corporate arm of the Department of Tourism (DOT). However, the absence of an implementing guideline has inhibited PTA from assuming effective jurisdiction over the Island except in granting clearance for some development activities such as fishpond development.

Several forms of land uses were in existence when the proposal for the establishment of the Olango Wildlife Sanctuary was made. Some land uses are legitimate claims like approved leases for fishpond development, while others are uses related to marginal livelihood activities such as dikes for fishtraps, shell collection zones, gleaning grounds and flat zones for salt making. Other parts of the area, which are not covered by water, are planted with coconut and other agricultural crops.

One of the fishpond leases had been cancelled lately, while the clearance for the development of the last fishpond lease has been recalled by the DOT.



Table 1. Land tenure by parcel, Olango Island (n=273)

Tenure Status	Percentage
1. Owner	49.08
2. Tenant	27.11
3. Part owner	20.15
4. Temporary ownership (1)	1.47
5. Cultivators (2)	1.09
6. Lessee	1.09
<b>Total</b>	<b>100.00</b>

(1) The farmer has received the land as a debt mortgage

(2) The farmer is a caretaker for an absentee owner, who may be a relative to whom he is not required to pay shares

(Source: Remedio and Olofson, 1988)

## 2. Physical Environment

### 2.1. Climate

The island has a hot and humid climate, with temperatures ranging from 26 deg. Centigrade to 33 deg. Centigrade. The rainy season is from June to January, with the heaviest rainfall in November and December. The dry season is from February to May.

The island is partly sheltered from the southeast monsoon by the islands of Bohol and Mactan. However, it is open to the northwest monsoon and cyclonic storms.

### 2.2. Hydrology

Fresh water wells are unsanitary open wells and restricted to the center of the island. Water from public wells is not enough to support the daily needs of the people, thus many residents settle for brackish water as drinking water. Those who can afford it, buy fresh water from vendors, while those who cannot walk to the source and carry water home. Residents in far-flung barangays and sitios, where daily water procurement is a burden, resort to harvesting rain water for storage and use.

### 2.3. Geology

Olango Island and the surrounding small islets are raised coral reefs nestled atop a bigger coral reef east of Mactan Island. The island is composed of two (2) lithologic units, the Plio-Pleistocene Carcar Formation and the Quarternary Alluvium, the youngest lithologic unit (Figure 2).

Carcar Formation is typically a porous coralline limestone. It is characterized by small sinkholes, pitted grooves and branching of pinnacles, which is suggestive of an *in-situ* deposition. It is composed mostly of shell, algae and other carbonate materials. Macro and micro fossils are abundant in this formation. The alluvium occupies mostly the coastal areas of the island. The so-called "tidal", the 1,120 hectares wildlife sanctuary, is overlain by this formation. It is composed mostly of calcareous sand derived from the weathering of the limestone.

Megascope examination of the sand samples shows that it consists of fine to coarse-grained sand mixed with shell fragments (Figure 2).

#### 2.4. Soil/Substrates

Soils of Olango Island has not been classified. However, nearby Mactan Island, which has a similar Carcar limestone base has both blackish Faraon Clay and reddish Bolinao Clay, and it is likely that Olango Island has at least one of these. When the stone floor of the reservation is exposed during low tide, islanders utilize it as a direct path from Poo to Pangan-an, and as they pass through, tracking soil and mud on their path, a reddish tint appears on the lime-white footpath which indicates that there is at least some Bolinao clay.

### 3. Biological Environment

#### 3.1. Fauna

Olango Island is rich in faunal organisms. A total of 20 zoobenthic species were identified in the survey conducted by the DENR on the Wildlife Sanctuary (Table 2). Ophiuroids (brittle stars) are the most common followed by nerites (*Nerita sp.*). Annelids, on the other hand, have the highest density with *Nerita sp.* ranking second. Sponges, ophiuroids, and *Echinotrix sp.* weighed 471.50 grams, 180.52 grams, and 26.80 grams respectively, in terms of wet biomass. They were weighed from individuals counted from an area of approximately 1.0625 sq. m., 2.0625 sq. m, and 0.6250 sq. m., respectively.

In the nearby areas of the Sanctuary, in Talima and Poo, 22 species of echinoderms, 8 species of crustaceans and 74 species of mollusks were recorded by the USC Marine Biology Section (Appendix 1).

With this diversity of invertebrate species in Olango Island, the area is an ideal place for roosting and feeding of waterbirds, specifically the migratory species. The DENR and the AWB Philippines identified 42 species of waterfowl with an average of 10.956 individuals counted per year from 1987 to 1991, except 1988 (Table 3). Sixty percent (60%) of the counted waterbirds identified are observed yearly. The least observed (25%) and with only one individual seen are *Gallinago megala*, *Fregata ariel*, *Egretta intermedia*, *Ixobrychus sinensis* and *Ixobrychus cinnamomeous*. Ten percent (10%) of the 42 species are considered rare and threatened, namely: *Limnodromus semipalmatus*, *Egretta eulophotes*, *Calidris tenuirostris*, and *Numenius madagascariensis*. They are regular migrants of the island except for *Egretta eulophotes*.

*Table 2. Population density and wet biomass of zoobenthic organisms collected in the seagrass bed south of Olango Island. (Area of core samples is 0.0625 sq. m.)*

<b>Species</b>	<b>No. of individuals counted</b>	<b>No. of core samples with individuals</b>	<b>Total area of core samples (sq m)</b>	<b>Estimated density</b>	<b>Wet biomass (g)</b>
Slugs	12	4	0.2500	48	3.25
Sponges	22	17	1.0625	21	471.5
Polychaetes	8	8	0.5000	16	0.56
Hermit crabs	14	10	0.6250	22	3.32
Isopods	2	2	0.1250	16	0.17
Crayfish	1	1	0.0625	16	0.09
Annelids	7	2	0.1250	56	0.32
Holothuria sp.	4	4	0.2500	16	1.11
Ophiocoma sp.	98	33	2.0625	47	180.91
Echinotrix sp.	2	2	0.1250	16	26.80
Littorina sp.	6	5	0.3125	19	0.88
Phacoides sp.	4	4	0.2500	16	0.50
Strombus sp.	1	1	0.0625	16	0.65
Tectus sp.	1	1	0.0625	16	0.25
Cynatium sp.	1	1	0.0625	16	0.10
Terebralia sp.	1	1	0.0625	16	0.05
Nerita sp.	31	10	0.6250	50	6.13
Nessarius sp.	3	2	0.1250	24	8.10
Niotta sp.	2	1	0.0625	32	2.18
Cerithium	4	2	0.1250	32	4.10

Table 3. Waterbirds identified in Olango Island with the number of individuals counted per year and their relative frequency of occurrence from 1987 to 1991, except 1988.

Order/Family	Common name	Scientific name	Number of individuals counted				Relative frequency
			1987	1989	1990	1991	
<b>Charadriiformes</b>							
	Little Ringed Plover	Charadrius dubius	37	60	44	50	100
	Kentish Plover	Charadrius alexandrinus	169	150	98	175	100
	Mongolian Plover	Charadrius mongolus	39	1940	1600	1425	100
	Greater Sand Plover	Charadrius leschenaultii	2000	1100	751	1075	100
	Gray Plover	Pluvialis squarata	500	956	830	875	100
<b>Scolopacidae</b>							
	Great Knot	Calidris tenuirostris	500	235	306	275	100
	Red Knot	Calidris cantus	72	33	121	141	100
	Sanderling	Calidris alba	22	3	3	2	100
	Red-necked Stint	Calidris ruficollis	2000	3000	900	900	100
	Curlew Sandpiper	Calidris ferruginea	26				100
	Asiatic Dowitcher	Limnodromus semiplamatus	48	93	55	47	100
	Black-tailed Godwit	Limosa limosa	16	400	700	595	100
	Bar-tailed Godwit	Limosa lapponica	324	16	8	10	100
	Whimbrel	Numenius phaeopus	300	166	183	164	100
	Eurasian Curlew	Numenius arquata	124	48	23	17	100
	Eastern Curlew	Numenius madagascariensis	26	18	22	10	100
	Common Redshank	Tringa totanus	350	900	465	532	100
	Common Greenshank	Tringa nebularia	170	54	90	77	100
	Terek Sandpiper	Xenus cinereus	147	192	201	241	100
	Common Sandpiper	Actictris hypoleucos	28	18	180	500	100
	Gray-tailed Tattler	Heteroscelus brevipes	300	733	375	360	100
	Ruddy Turnstone	Arenaria interpres	193	264	119	5	100
	Asiatic Golden Plover	Pluvialis fulva	300	41	114	150	100
	Little Curlew	Numenius minutus		3			25
	Swinhoe's Snipe	Gallinago megala			1		25
	Wood Sandpiper	Tringa glareola			4		25
	Sharp-tailed Sandpiper	Calidris acuminata			2		25
	Black-headed Gull	Larus ridibundus		106	165	750	75
	Gull-billed Tern	Sterna nilotica	120	50	65	68	100
	Little Tern	Sterna albifrons	300	585	245	425	100
	Common Tern	Sterna hirundo	482	1072	2000	3000	100
	Black-naped Tern	Sterna sumatrana			75		25
	Whiskered Tern	Sterna hybrida	536		155	300	75
	White-winged Black Tern	Sterna leucoptera		4			25
<b>Pelicaniformes</b>							
	Lesser Frigatebird	Fregata ariel			1		25
<b>Ciconiiformes</b>							
	Intermediate Egret	Egretta intermedia			1		25
	Little Egret	Egretta garzetta	79	28	18		75
	Striated Heron	Butorides striatus	6	44	29		75
	Yellow Bittern	Ixobrychus sinensis		1			25
	Chinese Egret	Egretta eulophotes	90		75		50
	Cinnamon Bittern		1				25
<b>Anseriformes</b>							
	Garganey Teal	Anas querquedula	4				25
	Northern Shoveler	Anas clypeata		2	2	1	75
			9,309	12,315	10,035	12,171	

AWB-Philippines reported that March and December are the peak months to observe waterbirds specifically waders which migrate between North Asia and Southeast Asia and Australia to overwinter.

Olango Island also supports 38 species of other birds, of which 32% are endemic to the country (Appendix 2).

Other wildlife in the area are some species of snakes, skinks, lizards and bats.

### *3.2. Flora*

Olango Island has relatively few plant species and they are sparsely distributed. In the wildlife sanctuary, 27 mangrove and mangrove-associated species were identified by DENR and AWB-Philippines (Appendix 3). *Rhizophora mucronata* is the dominant species, followed by *Avicennia alba* and *Sonneratia caseolaris*. *Osbornia octodonta* is the most common at the waterbird roosting site, interspersed with *Lumnitzera littorea* and *L. racemosa*. Other plant species are scattered throughout the area.

The marine algae and seagrass species recorded in the sanctuary are shown in Appendix 4. Marine algae grow among the mangroves and in the rocky substrate on the intertidal and subtidal areas, while extensive seagrass cover occurs on the lower intertidal flats and on subtidal areas of the sanctuary boundary. The most commonly observed were *Ulva sp.*, *Enteromorpha sp.*, *Cladophora sp.*, *Bostrychia sp.*, *Codium sp.*, and *Gracilaria sp.* for marine algae, and *Enhalus sp.*, *Halodule sp.* and *Thalassia sp.* for the seagrasses.

In some parts of Olango Island, specifically in Talima and Poo, 89 species of algae and 8 species of seagrasses were identified (USC 1988) (Appendix 5).

## **4. Socio-economic Features**

### *4.1. Population*

Olango Island has a total human population of 20,439 with the inclusion of 3,792 households as of May 1990 (Table 4). The household structure is classified into single family, nuclear family, and extended family. The single and extended families ranked first and second, respectively, and the household average is approximately six.

### *4.2. Sex Ratio*

Females outnumber males in three barangays, while there are more males than females in the other four barangays (USC, 1987). The overall sex ratio is 98.54 males to every 100 females (Table 5).

### *4.3. Age Dependency*

Age dependency is defined as the ratio of persons 65 years old and above plus those 14 years and below to those aged between 14 years and 64 years multiplied by 100 (Table 6). The age dependency ratio in Olango is such that every 100 persons of working age must support 113.81 dependents.

### *4.4. Education*

Educational attainment in Olango show a very low median year (Grade 3.34), an extremely low percentage of those technically or professionally trained (1.26%), and a high percentage of school-age youth not in school (75%) (Table 7).

#### 4.5. Health

87.63% of the households recorded sickness of a household member in the 12 months prior to the survey (USC, 1987). The most common ailments were influenza (26.81%), respiratory diseases (20.96%), gastro-intestinal diseases (15.46%), and unclassified ailments (12.37%).

On health care, 38.14% consulted a physician, 30.58% consulted no one, 13.06% consulted a folk healer, and 5.50% consulted both folk healer and physician.

*Table 4. Total population and number of households by barangay as of May 01, 1990*

Barangay	Total Population	Number of Households
Baring	2,122	372
Caohagan	256	52
Pangan-an	1,263	174
Sabang	3,212	564
Sta. Rosa	4,090	787
Subabasbas	1,890	370
Talima	3,039	567
Tingo	2,266	401
Tungasan	1,331	252
<b>TOTAL</b>	<b>20,439</b>	<b>3,792</b>

*(Source: AWB-Philippines, 1992)*

*Table 5. Sample populations of males and females and sex ratio per barangay, Olango Island*

Barangays	Males in Sample Households	Females in Sample Households	Sex Ratio
Baring	135	122	110.65
Cao-oy	46	42	109.52
Sabang	155	172	90.17
Sta. Rosa	180	184	97.83
Talima	126	104	121.16
Tingo	110	136	80.88
Tungasan	52	57	98.54
<b>OLANGO ISLAND</b>	<b>304</b>	<b>817</b>	<b>98.54</b>

*(Source: Remedio and Olofson, 1988)*

*Table 6. Age Distribution and Age Dependency Ratios, Olango Island*

Barangay	Age Interval (%)				Median Age	Age Dependency Ratio
	0-6	0-14	15-64	65+		
Baring	17.90	42.41	52.92	0.78	19.14	81.62
Cao-oy	20.45	47.72	47.73	3.41	20.55	107.14
Sabang	27.38	50.77	46.77	2.46	13.50	113.81
Sta. Rosa	17.58	39.56	56.87	3.30	16.97	75.36
Talima	25.22	44.35	49.13	4.88	16.91	86.15
Tungasan	20.18	40.36	56.88	2.75	17.17	75.81
<b>OLANGO ISLAND</b>	<b>21.04</b>	<b>44.07</b>	<b>52.56</b>	<b>3.37</b>	<b>18.59</b>	<b>90.26</b>

*(Source: Remedio and Olofson, 1988)*

*Table 7. Levels of Education, Olango Island*

Barangay	Median years in education	% with technical/professional training	No. with college education	% of school-age not in school
Baring	3.04	0.39	6	76.7
Cao-oy	3.00	1.14	--	82.7
Sabang	2.82	0.31	4	82.6
Sta. Rosa	3.64	3.02	6	74.0
Talima	3.35	1.30	2	76.3
Tingo	4.19	1.63	7	79.4
Tungasan	2.87	0.92	--	86.0
<b>OLANGO ISLAND</b>	<b>3.34</b>	<b>1.25</b>	<b>25</b>	<b>78.5</b>

*(Source: Remedio and Olofson, 1988)*

#### 4.6. Occupation

The major economic activities are fishing and farming, but some residents are involved in other forms of livelihood such as lantern making, shellcraft, trade in aquarium fish, weaving and selling mats, and livestock raising.

##### 4.6.1. Fishing

Fishers go out fishing 28 times a month, or the equivalent of almost daily. In certain seasons, fishers have to go as far as Palawan as well as to nearby places such as Cordova, Caubian Island, Bohol and Camotes Island. Motorized boats, paddleboats, hook and line and fishing nets are the most reported fishing gears; the use of cyanide and dynamite for fishing has also been reported.

#### 4.6.2. Farming

Cassava, which thrives in poor soil, and corn are given about equal importance as major crops. Other agricultural products are camote, banana and green vegetables such as malunggay, ampalaya and alugbati. Crop rotation (mainly for corn and cassava) is practiced on 58.24% of land.

#### 4.7. Land Use

Most of the island's arable area is planted with coconut, corn, horse radish, giant *ipil-ipil*, and cassava; coastal areas are used for offshore fishing and harvesting of some edible seashells and seaweeds. Portions of the mangrove and adjacent intertidal areas are used as docking sites for outrigger boats.

#### 4.8. Infrastructure

All barangays are connected by a dirt road network. Electricity is not available on the island, except in some households that have their own power generators.

### 5. Ecological Relationships and Implications for Management

The island is small, with limited physical resources in terms of tillable land, and majority of the inhabitants has to rely on the bounty provided by its marine resources. However, overextraction and unmanaged exploitation have led to the depletion of the most economically important fishes and some invertebrates which are sold as food, ornaments, or raw materials for the shellcraft industry. This has led to outward movement in collection, wherein fishermen have to travel as far as Palawan to gather aquarium fishes and rare shells, while those that remain have to make do with what is available using destructive collection techniques. Examples of these are the use of "sudsud" in collecting shells which destroys the seagrass beds and disturbs the substrates, the use of diluted cyanide in the collection of aquarium fishes, and the use of fine mesh nets in catching food fishes which further depletes its dwindling resources with consequent harmful environmental effects on the island's ecology. Proper management and conservation measures have to be undertaken to re-establish the lost resources. The management plan for the Olango Wildlife Sanctuary should address these problems in its entirety. Unorganized conservation and management of resources can lead to failure in managing the area effectively.



## Chapter II

### 1. Evaluation and Objectives

#### *1.1. Historic*

The place came into notice in the early 80s when an interwader program conducted a survey of known wetlands in the country. Migratory shorebirds and waders were observed in the area through vigorous Asian Wetland Bureau intercession. The area was officially surveyed, demarcated and endorsed for proclamation as a wildlife sanctuary by the DENR (Appendix 6).

#### *1.2. Site Definition and Boundaries*

The landward boundary generally follows the edge of the coralline limestone escarpment at the spring high tide level. Seaward, the boundary extends southward from Sitio Basbas of Barangay Sta. Rosa, then eastward toward the southern tip of Barangay Sabang.

### 2. Evaluation of Features

#### *2.1. Criteria for Evaluation*

The Olango Wildlife Sanctuary is of international conservation significance. The criteria used for determining this are those of the Ramsar Convention, an international multi-lateral convention on the protection of important wetlands. Although the Philippines is not yet a signatory, the criteria used in this Convention are useful nonetheless. Listed below are the Ramsar criteria for which Olango qualifies as internationally significant.

- (1) Supports more than 1% (at least 100 individuals) of a flyway or biogeographical population on a species of waterbird – The area supports more than 1% of the known population in the East Asian flyway, and up to 100 individuals of the Chinese Egret.
- (2) Supports an appreciable number of rare, vulnerable or endangered species – The Chinese Egret and Asian Dowitcher are considered to be endangered species in the IUCN Red Data Book. A significant proportion of the world's population of Chinese Egrets occurs in the area.
- (3) Is of special value for maintaining the genetic and ecological diversity of a region because of the peculiarity and quality of its flora and fauna – The area is a rich and diverse coastal habitat, including mangrove woodland, and it supports a wide range of waterbird species.
- (4) Is of special value as the habitat of plants and animals at a critical stage of their biological cycles – Olango Island is a nursery ground for many species of fish and prawns. It is a key staging and wintering area for migratory waterbirds.
- (5) Is a particularly good example of a specific type of wetland characteristic of its region – The extensive fringing sandy coralline intertidal flats and extensive mangroves are features not common in the

Philippines. Olango is an intact example of a coastal wetland characteristic of coralline islands in the Indo-Malayan realm.

## *2.2. National and International Context*

The Olango Wildlife Sanctuary holds large populations of many species of waders. Based on surveys so far, the area supports the largest known concentrations of waders in the Philippines, and the largest total numbers of any known site. This makes the area of outstanding national importance. As outlined in the preceding section, the area qualifies as internationally significant as a waterbird habitat.

## **3. Factors Influencing Management**

*(The following are outputs from a workshop organized by the Protected Areas and Wildlife Bureau of the DENR in 1992 as a form of consultation among the different sectors that actually or potentially will be affected by the establishment of the Sanctuary. The workshop was organized to assure the different sectors that their needs and concerns are properly addressed and to let them know that they will be partners in the management of the protected area.*

*Representatives from the Asian Wetland Bureau Philippines Foundation Inc., the Philippine Tourism Authority, the Bureau of Fisheries and Aquatic Resources of the Department of Agriculture, the Bantay-Dagat Federation, the National Economic and Development Authority, the Department of Environment and Natural Resources Region 7, the Protected Areas and Wildlife Bureau, and the people of Olango Island as represented by their local officials participated in the workshop.)*

### *3.1. Natural Trends*

#### 3.1.1. Positive

- a. Favorable weather condition, away from typhoon belt
- b. Wide coralline flat areas
- c. Good mangrove stand, although growth is stunted
- d. Presence of seagrass beds
- e. Feeding ground of migratory birds
- f. Presence of big populations of migratory birds
- g. Available marine resources such as fish and shells, though in small quantities

#### 3.1.2. Negative

- a. siltation
- b. erosion

### *3.2. Man-made or Human-induced Factors*

#### 3.2.1. Positive

- a. Support of communities for establishment of the protected area

- b. Use of the area as an alternative fishing ground and place for collection of shells, crabs, sea cucumbers, etc., though at very low intensity

### 3.2.2. Negative

- a. mangrove cutting
- b. bird hunting
- c. fishing by use of toxic chemicals
- d. haphazard mangrove replanting by Island Ventures near Brgy Pangan-an which has a tendency to overlap with the birds' feeding ground

## 3.3. External Factors

### 3.3.1. Existing

- a. Noise pollution due to blast fishing and lime extraction
- b. Coral destruction
- c. Negative rumors

### 3.3.2. Foreseen

- a. Coastal development
- b. Population pressure
- c. Presence/absence of livelihood and employment opportunities
- d. Participation of communities and barangay councils in the management of the area
- e. Political intervention and instability
- f. Support from elected officials

## 4. Legal Constraints and Obligations

At present, the protection of Olango Island is provided for in some legal documents.

Proclamation No. 1801 – Declaring certain islands, coves and peninsulas in the Philippines as tourist zones and marine reserves under the administration and control of the Philippine Tourism Authority (Appendix 7)

Presidential decrees prohibiting the exploitation and collection of certain marine and fishery products

Presidential Decree 704 or the Revised Fishery Code preventing the use of dynamite and other destructive techniques for fishing

Presidential Decree 705 or the Revised Fishery Code preventing the cutting of mangroves

Resolutions and local ordinances for the establishment and protection of the Sanctuary, including:

Ordinance No. 8 (Resolution No. 73-88) of the City Government of Lapu-Lapu passed on March 16, 1988 regulating the hunting of birds in the City of Lapu-Lapu, most especially in the island of Olango and the neighboring islets of Caubian, Pangan-an and Caohagan

Association of Barangay Captains of Olango Island Resolution No. 1 dated April 10, 1988 resolving that Olango Island be protected from any form of hunting, collecting and such other form of exploitation that would endanger the wildlife species found therein

Bantay Dagat Federation Resolution dated January 26, 1990 supporting and endorsing the project and proposal of the Asian Wetland Bureau Philippines Foundation Inc. making the mangrove forest and the adjoining tidal area in the southern part of Olango as Migratory Bird Sanctuary

Regional Development Council Executive Committee Resolution No. 53, Series of 1991 requesting the President of the Philippines through the Department of Environment and Natural Resources to issue a Proclamation Order declaring 920 hectares of Olango Island as the Olango Wetland National Park

## **5. Ideal Management Objectives**

- 5.1. To protect the birds by maintaining their habitats
- 5.2. To properly identify areas for purposes of zoning such as feeding areas, buffer zone, roosting site, etc.
- 5.3. To regulate activities that could be permitted in the area such as gathering of shells, crabs and sea cucumber as well as mangrove cutting
- 5.4. To maintain the mangroves within the area and along the boundaries, if appropriate, to serve as buffer
- 5.5. To provide livelihood projects to the people along the boundary of the area
- 5.6. To promote and enhance ecotourism
- 5.7. To provide job opportunities to qualified local inhabitants
- 5.8. To provide additional income to local government units from taxes and entrance fees from visitors and tourists
- 5.9. To promote community development
- 5.10. To encourage involvement and participation of relevant government agencies (GAs) and non-governmental organizations (NGOs) in the management of the project

## **6. Operational Objectives**

### *6.1. Habitat Maintenance for Bird Protection*

- 6.1.1. Maintain the present status of the area and enrichment of degraded areas
- 6.1.2. Conduct survey on existing land use permits issued by DENR including new applications within the proposed area
- 6.1.3. Disseminate information and enforce city ordinance on bird hunting ban
- 6.1.4. Reinstall billboards regarding the resolution at strategic places
- 6.1.5. Deputize qualified elected barangay officials as wardens of the protected area
- 6.1.6. Monitor and conduct research about flora and fauna
- 6.1.7. Impose total ban on sand extraction, and
- 6.1.8. Develop protection scheme that will safeguard the habitat inside the reserve

## *6.2. Zoning the Area*

- 6.2.1. Ground delineation of identified buffer zone, feeding areas, roosting areas and maintain them as such (and as passageway of island inhabitants); and
- 6.2.2. Conform with zoning plan

## *6.3. Identify Allowable Activities*

- 6.3.1. Monitor the number of islanders who are gathering shells, crabs, and sea cucumber and allow them to continue such activities provided they will only do what they are presently doing.

## *6.4. Maintain Buffer Zones*

- 6.4.1. Rehabilitation of degraded areas within the buffer zone by residents, and
- 6.4.2. Regulate harvesting of mangroves in designated areas

## *6.5. Provide Livelihood Projects*

- 6.5.1. The Department of Agriculture to conduct feasibility study on appropriate fishery activities
- 6.5.2. For Department of Agriculture to provide technical assistance or assistance in kind to appropriate projects
- 6.5.3. Conduct mangrove rehabilitation in reserve areas through contract reforestation, and
- 6.5.4. Encourage handicraft industry such as shellcraft and cococraft

## *6.6. Promote and Enhance Nature Ecotourism*

- 6.6.1. Provide information materials about nature walk
- 6.6.2. Disseminate information about nature through tri-media facilities, TV, radio and print media
- 6.6.3. Provide nature center, board walks, hides and other interpretative signs for use of visitors

## *6.7. Provide Job Opportunity for Local Inhabitants*

- 6.7.1. Prioritize hiring of qualified local inhabitants,
- 6.7.2. To conduct mangrove reforestation within the reserve (selected areas) thru DENR's Assisted Natural Regeneration Program

## *6.8. Provide Additional Income to Local Government*

- 6.8.1. Require standard charges as per DENR's AO. No. 05, S-1991
- 6.8.2. Allot appropriate share from revenue to barangay concerned

## *6.9. Community Development*

- 6.9.1. Social preparation of affected residents
- 6.9.2. Total acceptance of the community to the idea of setting up the protected area
- 6.9.3. Ensure that the design of infrastructure will not disrupt the traditional activities of the affected communities
- 6.9.4. Organize community groups
- 6.9.5. Mobilize/strengthen existing community groups, and
- 6.9.6. Impose sanitation awareness and welfare benefits

### 6.10. Institutional Linkages

- 6.10.1. Coordination and delineation of roles of relevant government agencies (GAs) and non-governmental organizations (NGOs)
- 6.10.2. Establish communication network, and
- 6.10.3. Organize task force

## 7. Project List

Projects and the corresponding agencies responsible for their implementation are as follows (see Appendix 8 for the list of government agencies and non-governmental organizations):

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Project Title	Agency
7.1. Habitat maintenance for bird protection	
7.1.1. Flora and fauna inventory	DENR, AWB
7.1.2. Surveying and monitoring of avian population and species composition	DENR, AWB
7.1.3. Bird banding activities	DENR, AWB
7.1.4. Patrol activities for resource protection	Mgt Unit
7.1.5. Rehabilitation of degraded areas within the protected area	DENR
7.1.6. Conduct research on endangered species	DENR, AWB
7.1.7. Enforcement of rules and regulations	DENR, Mgt Unit
7.2. Zoning of the Wildlife Sanctuary	
7.2.1. Survey of area for purposes of delineating prescribed zones for feeding areas, roosting site, passageway for local inhabitants, etc.	DENR, AWB
7.2.2. Produce maps showing prescribed zones	DENR
7.2.3. Implementation of approved zoning plan	Mgt Unit
7.3. Identification of allowable activities	

Project Title	Agency
7.1. Habitat maintenance for bird protection	
7.1.1. Flora and fauna inventory	DENR, AWB
7.1.2. Surveying and monitoring of avian population and species composition	DENR, AWB
7.1.3. Bird banding activities	DENR, AWB
7.1.4. Patrol activities for resource protection	Mgt Unit
7.1.5. Rehabilitation of degraded areas within the protected area	DENR
7.1.6. Conduct research on endangered species	DENR, AWB
7.1.7. Enforcement of rules and regulations	DENR, Mgt Unit
7.2. Zoning of the Wildlife Sanctuary	
7.2.1. Survey of area for purposes of delineating prescribed zones for feeding areas, roosting site, passageway for local inhabitants, etc.	DENR, AWB
7.2.2. Produce maps showing prescribed zones	DENR
7.2.3. Implementation of approved zoning plan	Mgt Unit
7.3. Identification of allowable activities	
7.3.1. Surveying and monitoring of present users	DA, DENR, AWB
7.3.2. Formulation of guidelines for allowable activities within the protected area	DENR
7.4. Maintenance of buffer zones	
7.4.1. Implementation of Assisted Natural Regeneration (ANR) project	DENR, LGU
7.5. Provision of livelihood projects	
7.5.1. Transfer of technology on livelihood projects	DA, DENR
7.5.2. Implementation of livelihood projects:	mariculture
7.6. Promotion and enhancement of ecotourism	
7.6.1. Design preparation of structures and facilities	PTA, AWB, DENR
7.6.2. Construction of structures and facilities	PTA, AWB, DENR
7.6.3. Maintenance of facilities	Mgt Unit
7.6.4. Production of information materials	Mgt Unit
7.6.5. Conduct information/education drive on conservation values	Mgt Unit
7.6.6. Conduct workshops, seminars, trainings on conservation values	DA, DENR, AWB, PTA
7.7. Creation of job opportunities for local inhabitants	

7.8. Provision of additional income to local government	
7.8.1. Enforcement of existing policies	Mgt Unit
7.8.2. Conduct of training, workshops, etc.	DA, AWB, DENR
7.9. Community development	
7.9.1. Establishment of cooperatives and community organizations	DA, DENR, AWB
7.9.2. Conduct of training, workshops, etc.	DA, DENR, AWB
7.10. Institutional Linkages	
7.10.1. Organize dialogues	Mgt Unit
7.10.2. Formulate operating guidelines	Mgt Unit
7.10.3. Formulate agreements	Mgt Unit
7.10.4. Mobilize task forces	Mgt Unit
7.10.5. Procure communication equipment (communication, patrol craft, etc.)	Mgt Unit

USD1=Php26.00



<b>Project Title</b>	<b>Estimated Budget (\$)*</b>
1. Habitat Maintenance for Bird Protection	200,000
2. Zoning of the Olango Wildlife Sanctuary	20,000
3. Identification of Allowable Activities	20,000
4. Maintenance of Buffer Zones	25,000
5. Provision of Livelihood Projects	100,000
6. Promotion and Enhancement of Ecotourism	800,000
7. Creation of Job Opportunities for Local Inhabitants	15,000
8. Provision of Additional Income to Local Government	10,000
9. Community Development	12,000
10. Institutional Linkages	5,000
<b>TOTAL</b>	<b>\$1,207,000</b>

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**Appendix 1. Echinoderms, crustaceans and mollusks recorded in Poo and Talima in Olango Island between Sep. 1987 and Feb. 1988**

A. Echinoderms

<i>Holothuria sp.</i>	<i>Tripneustes gratilla</i>
<i>Synapta sp.</i>	<i>Prionocidaris sp.</i>
<i>Holothuria atra</i>	<i>Salmacis sphaeroides</i>
<i>H. scabra</i>	<i>Echinometra oblongata</i>
<i>Bohadschia sp.</i>	<i>Protoreaster sp.</i>
<i>Thelenota ananas</i>	<i>Linckia laevigata</i>
<i>Stichopus sp.</i>	<i>Archaster typicus</i>
<i>Diadema setosum</i>	<i>Mastiphiotrix sp.</i>
<i>Echinotrix calamaris</i>	<i>Ophiomastrix sp.</i>
<i>Toxopneustes sp.</i>	<i>Ophiorachna incrassata</i>

B. Crustaceans

<i>Squilla sp.</i>	<i>Pagurus sp.</i>
<i>Thalamita sp.</i>	<i>Periclemnes sp.</i>
<i>Uca sp.</i>	<i>Coenobita sp.</i>
<i>Portunus pelagicus</i>	<i>Calappa sp.</i>

C. Mollusks

<i>Terebralia sulcata</i>	<i>Strombus sinuatus</i>
<i>Terebralia sp.</i>	<i>Strombus urceus</i>
<i>Terebralia telescopi</i>	<i>Strombus labiatus labiatus</i>
<i>Dolabella sp.</i>	<i>Strombus gibberulus albus</i>
<i>Littorina scabra</i>	<i>Strombus mutabilis</i>
<i>L. fascianata</i>	<i>Strombus sp. 1</i>
<i>Littorina sp.</i>	<i>Strombus sp. 2</i>
<i>Cerithium sp.</i>	<i>Strombus sp. 3</i>
<i>Cerithium carbonarium</i>	<i>Strombus sp. 4</i>
<i>Cerithium vertagus</i>	<i>Strombus sp. 5</i>
<i>Cypreae olivacea</i>	<i>Strombus sp. 6</i>
<i>Cypreae Isabella</i>	<i>Strombus sp. 7</i>
<i>Cypreae boivini</i>	<i>Strombus sp. 8</i>
<i>Telescopium telescopium</i>	<i>Dostorsio anus</i>
<i>Cypreae labrolineata</i>	<i>Bursa bufo</i>
<i>Lambis millepeda</i>	<i>Bursa sp. 1</i>
<i>Lambis lambis</i>	<i>Bursa sp. 2</i>
<i>Strombus aurisdiane</i>	<i>Conus literatus</i>
<i>Strombus lentiginosus</i>	<i>Conus mustelinus</i>
<i>Strombus luhuanus</i>	<i>Conus chaldeus</i>

<i>Conus marmoreus</i>	<i>Angaria delphinula</i>
<i>Conus planorbis</i>	<i>Astrea sp.</i>
<i>Conus rattus</i>	<i>Turbo marmoratus</i>
<i>Conus pohlianus</i>	<i>Turbo petholatus</i>
<i>Thais echinata</i>	<i>Turbo sp.</i>
<i>Thais bufo</i>	<i>Ovula ovum</i>
<i>Polinices tumidus</i>	<i>Oliva annulata</i>
<i>Polinices flemingians</i>	<i>Ischnochiton sp.</i>
<i>Nassarius bicolor</i>	<i>Cardium sp.</i>
<i>Nassarius subspinosum</i>	<i>Tridacna crocea</i>
<i>Bulla ampula</i>	<i>Spondylus spondylus</i>
<i>Nerita undata</i>	<i>Spondylus sp. 1</i>
<i>Nerita exuvia</i>	<i>Spondylus sp. 2</i>
<i>Rapana sp.</i>	<i>Malleus malleus</i>
<i>Buccinum sp.</i>	<i>Anadara maculosa</i>
<i>Trochus niloticus</i>	<i>Modiolus metcalfei</i>
<i>Trochus pyramis</i>	(Source: USC, 1988)

**Appendix 2. Avifauna other than waterfowls found in Olango Island**

Family/Order	Common Name	Scientific Name
Passeriformes		
Pycnonotidae	Philippine Bulbul	<i>Hypsipetes philippinus*</i>
Turdidae	Yellow-vented Bulbul	<i>Pycnonotus goiavier*</i>
Sylviidae	Pied Bushchat	<i>Saxicola caprata*</i>
	Dubois Leaf Warbler	<i>Phylloscopus cebuensis*</i>
	Great Reed Warbler	<i>Acrocephalus arundinaceus</i>
	Manchurian Bush Warbler	<i>Cettia diphone</i>
	Yellow-breasted Wren Warbler	<i>Gerygone sulphurea</i>
Muscicapidae	Bright-capped Cisticola	<i>Cisticola exilis</i>
Estrildidae	Grey-streaked Flycatcher	<i>Muscicapa griseisticta</i>
	Chestnut Munia	<i>Lonchura Malacca</i>
	Richard's Pipit	<i>Anthus novaeseelandiae</i>
	Petchora Pipit	<i>Anthus gustavi</i>
	Gray Wagtail	<i>Motacilla cinerea</i>
Lanidae	Brown Shrike	<i>Lanius cristatus</i>
	Schack's Shrike	<i>Lanius schack</i>
Ploceidae	Tree Sparrow	<i>Passer montanus</i>
	Philippine Glossy Starling	<i>Aplonis panayensis</i>
	Olive-backed Sunbird	<i>Nectarinia jugularis*</i>
Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>
	Pacific Swallow	<i>Hirundo tahitica</i>
Campephagidae	Pied Triller	<i>Lalage nigra</i>
Cuculiformes		
	Greater Coucal	<i>Centropus sinensis</i>
	Lesser Coucal	<i>Centropus bengalensis</i>
	Philippine Coucal	<i>Centropus viridis*</i>
	Common Koel	<i>Eudynamys scolopacea</i>
	Large-billed Crow	<i>Corvus macrorhyncus</i>
Campephagidae	Common Cuckoo/Oriental Cuckoo	<i>Cuculus canorus</i>
Columbiformes		
Columbidae	Emerald Dove	<i>Chalcophaps indica</i>
	Philippine Turtle Dove	<i>Streptopelia bitorquata</i>
	Spotted Ground Dove	<i>Streptopelia chinensis</i>
	White-eared Brown Dove	<i>Phapitreron leucotis*</i>
	Zebra Dove	<i>Geopelia javanica</i>
Coraciiformes		
	River Kingfisher	<i>Alcedo atthis</i>
	Variable Forest Kingfisher	<i>Ceyx lepidus*</i>
	White-collared Kingfisher	<i>Halcyon chloris</i>
Psittaciformes		
	Philippine Hanging Parakeet	<i>Loriculus philippinensis*</i>
Galliformes		
Phasianidae	Painted Quail	<i>Coturnix chinensis</i>
	Magpie Robin	<i>Copsychus saularis*</i>

*\*Endemic*

*Appendix 3. Mangrove species and associates within the Olango Wildlife Sanctuary*

*Rhizophora stylosa*  
*Rhizophora mucronata*  
*Rhizophora apiculata*  
*Lumnitzera racemosa*  
*Avicennia littorea*  
*Avicennia officinalis*  
*Avicennia alba*  
*Avicennia lanata*  
*Avicennia marina*  
*Sonneratia caseolaris*  
*Excoecaria agallocha*  
*Ceriops tagal*  
*Ceriops roxburghiana*  
*Bruguiera gymnorrhiza*  
*Xylocarpus mollucensis*  
*Osbornia octodonta*  
*Bruguiera cylindrical*  
*Aegiceras floridum*  
*Acanthus abracteatu*  
*Scyphiphora hydrophyllacea*  
*Thespesia populnea*  
*Sesuvium portulacastrum*  
*Terminalia catappa*  
*Chloris sp.*  
*Pemphis acidula*  
*Pongamia junnata*

#### ***Appendix 4. Marine algae and seagrass within the Olango Wildlife Sanctuary***

##### **A. Marine Algae**

*Hydroclathrus clathrates*  
*Padina australis*  
*Padina vichersiae*  
*Padina minor*  
*Ulva lactoca*  
*Hormophysa triquera*  
*Turbinaria omata*  
*Turbinaria conoides*  
*Gracilaria sp.*  
*Hypnea sp.*  
*Laurencia sp.*  
*Chaetomorpha sp.*  
*Sargassum sp.*  
*Enteromorpha intestinalis*  
*Cladophoria sp.*  
*Bostrychia sp.*  
*Codium sp.*

##### **B. Seagrass**

*Enhalus sp.*  
*Halodule sp.*  
*Thalassia sp.*  
*Zostera marina*

## Appendix 5. Marine plants in Poo and Talima, Olango Island

### Blue-green Algae (Cyanophyta)

1. *Lyngbya majuscula*
2. *Symploca* sp.

### Green Algae (Chlorophyta)

3. *Anadyomene plicata*
4. *Anadyomene wrightii*
5. *Boodles composita*
6. *Bornetella nitida*
7. *Bornetella sphaerica*
8. *Boergesenia forbesii*
9. *Bryopsis plumosa*
10. *Caulerpa peltata*
11. *Caulerpa racemosa* var. *clavifera*
12. *Caulerpa racemosa* var. *typical*
13. *Caulerpa serrulata*
14. *Chaetormorpha crassa*
15. *Cladophora* sp.
16. *Codium arabicum*
17. *Codium tenue*
18. *Codium ovale*
19. *Dictyosphaeria cavernosa*
20. *Enteromorpha clathrata*
21. *Enteromorpha intestinales*
22. *Halicoryne wrightii*
23. *Halimeda macroloba*
24. *Halimeda opuntia*
25. *Halimeda* sp.
26. *Monostroma nitidum*
27. *Neomeris van-Bosseae*
28. *Spongomorpha* sp.
29. *Struvea anastomosans*
30. *Tydemania expeditionis*
31. *Ulva lactuca*
32. *Udotea* sp.
33. *Ulva reticulata*
34. *Valonia aegagrophila*
35. *Valonia ventricosa*

### Brown Algae (Phaeophyta)

36. *Colpomenia sinuosa*
37. *Dictyota dichotoma*
38. *Dictyota carvicornis*
39. *Dictyopteris repens*
40. *Hormophysa triquetra*
41. *Lobophora variegata*
42. *Hydroclathrus clathratus*
43. *Padina* sp. 1
44. *Padina* sp. 2
45. *Sargassum* sp. 1
46. *Sargassum* sp. 2
47. *Sargassum* sp. 3
48. *Turbinaria conoides*
49. *Turbinaria ornate*
50. *Zonaria variegata*

### Red Algae (Rhodophyta)

51. *Acanthophora spicifera*
52. *Actinotrichia fragilis*
53. *Amphiroa foleacae*
54. *Amphiroa fragillissima*
55. *Amansia glomerata*
56. *Bostrychia binderi*
57. *Carpopeltis* sp.
58. *Catenella caespitosa*
59. *Champia parvula*
60. *Claudea batanensis*
61. *Dasya* sp.
62. *Eucheuma* sp. 1
63. *Eucheuma* sp. 2
64. *Eucheuma* sp. 3
65. *Galaxaura fastigiata*
66. *Galaxaura fasciculata*
67. *Galaxaura oblongata*
68. *Galaxaura repens* (or *G. arborea*?)
69. *Gelidiella acerosa*
70. *Gracilaria coronopifolia*
71. *Gracilaria eucheumoides*
72. *Gracilaria salicornia*
73. *Halymenia durvilliae*
74. *Halymenia dilatata*
75. *Hypnea charoides*
76. *Hypnea annosa*
77. *Jania* sp.
78. *Laurencia papillosa*
79. *Laurencia obtuse*
80. *Laurencia undulata*
81. *Marensia flabelliformis*
82. *Mastophora rosea*
83. *Peyssonelia rubra*
84. *Polysiphonia* sp.
85. *Rhodymenia* sp. (?)
86. *Varvooresia spectabilis*
87. *Tolypiocladia glomerulata*
88. Unidentified red 1
89. Unidentified red 2



*Seagrasses (Marine angiosperms)*

90. *Enhalus acoriodes*
91. *Cymodocea rotundata*
92. *Cymodocea serrulata*
93. *Halodule pinifolia*
94. *Halodule univervis*
95. *Halophilis ovalis*
96. *Syringodium isoetifolium*
97. *Thalassia hemprichii*

(Source: USC, 1988)

## Appendix 6.

MALACANAN

Manila

BY THE PRESIDENT OF THE PHILIPPINES

PROCLAMATION NO. 903

AMENDING PROCLAMATION NO. 1801, DATED NOVEMBER 10, 1978, WHICH DECLARED CERTAIN ISLANDS, COVES AND PENINSULAS IN THE PHILIPPINES AS TOURIST ZONES AND MARINE RESERVES UNDER THE ADMINISTRATION AND CONTROL OF THE PHILIPPINE TOURISM AUTHORITY, BY EXCLUDING CERTAIN PORTIONS WITHIN OLANGO ISLAND, LAPU-LAPU CITY, CEBU, RESERVING THE SAME AS WILDLIFE SANCTUARY UNDER THE ADMINISTRATIVE JURISDICTION OF THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES.

Upon recommendation of the Secretary of the Department of Environment and Natural Resources and pursuant to the provisions of Presidential Decree 705, otherwise known as the Forestry Code of the Philippines and Act 3915, dated February 01, 1932, and by virtue of the powers vested in me by law, I, CORAZON C. AQUINO, President of the Philippines, do hereby amend Proclamation 1081, dated November 10, 1978, which established certain islands, coves and peninsulas in the Philippines as tourist zones and marine reserves under the administration and control of the Philippine Tourism Authority, by excluding certain portions within the Olango Island, Lapu-Lapu City, Cebu and reserving the same as Wildlife Sanctuary, as shown on the plan, which is more particularly described as follows:

Beginning at a point marked cor. I on the PAWB Map, which is identical to cor. 15, A&D, Project 37-D, L.C. Map 2963. Thence...

N. 72° E. 03<sup>o</sup>, 123.37 m. to cor. 2, identical to cor. 16, A&D, Proj. 37-D, L.C. Map 2963;

N. 34° E. 24<sup>o</sup>, 357.52 m. to cor. 3, identical to cor. 17, A&D, Proj. 37-D, L.C. Map 2963;

N. 47° E. 27<sup>o</sup>, 99.09 m. to cor. 4, identical to cor. 18, A&D, Proj. 37-D, L.C. Map 2963;

N. 74° E. 39<sup>o</sup>, 113.05 m. to cor. 5, identical to cor. 19, A&D, Proj. 37-D, L.C. Map 2963;

N. 09° E. 46<sup>o</sup>, 182.64 m. to cor. 6, identical to cor. 20, A&D, Proj. 37-D, L.C. Map 2963;

Due East, 29 m. to cor. 7, identical to cor. 21, A&D, Proj. 37-D, L.C. Map 2963;

N. 30° E. 15<sup>o</sup>, 69.46 m. to cor. 8, identical to cor. 22, A&D, Proj. 37-D, L.C. Map 2963;

W. 06° W. 33<sup>o</sup>, 87.57 m. to cor. 9, identical to cor. 23, A&D, Proj. 37-D, L.C. Map 2963;

N. 24° E. 03<sup>o</sup>, 72.07 m. to cor. 10, identical to cor. 24, A&D, Proj. 37-D, L.C. Map 2963;

N. 30° W. 56<sup>o</sup>, 132.12 m. to cor. 11, identical to cor. 25, A&D, Proj. 37-D, L.C. Map 2963;

N. 25° E. 37<sup>o</sup>, 80.96 m. to cor. 12, identical to cor. 26, A&D, Proj. 37-D, L.C. Map 2963;

N. 48° E. 05<sup>o</sup>, 197.55 m. to cor. 13, identical to cor. 27, A&D, Proj. 37-D, L.C. Map 2963;

N. 70° E. 21<sup>o</sup>, 74.33 m. to cor. 14, identical to cor. 28, A&D, Proj. 37-D, L.C. Map 2963;

N. 52° E. 35<sup>o</sup>, 132.20 m. to cor. 15, identical to cor. 29, A&D, Proj. 37-D, L.C. Map 2963;

N. 63° E. 21<sup>o</sup>, 106.19 m. to cor. 16, identical to cor. 30, A&D, Proj. 37-D, L.C. Map 2963;

N. 44° E. 11<sup>o</sup>, 591.26 m. to cor. 17, identical to cor. 31, A&D, Proj. 37-D, L.C. Map 2963;

N. 36° E. 21<sup>o</sup>, 155.20 m. to cor. 18, identical to cor. 32, A&D, Proj. 37-D, L.C. Map 2963;

N. 81° E. 25<sup>o</sup>, 80.14 m. to cor. 19, identical to cor. 17, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

N. 81° E. 25<sup>o</sup>, 241.46 m. to cor. 20, identical to cor. 18, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

N. 65° E. 11<sup>o</sup>, 88.14 m. to cor. 21, identical to cor. 19, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

N. 47° E. 39<sup>o</sup>, 167.78 m. to cor. 22, identical to cor. 20, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

N. 87° E. 42<sup>o</sup>, 174.14 m. to cor. 23, identical to cor. 21, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

S. 75° E. 33<sup>o</sup>, 78.16 m. to cor. 24, identical to cor. 22, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

N. 82° E. 34°, 266.12 m. to cor. 25, identical to cor. 23, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 82° E. 24°, 118.20 m. to cor. 26, identical to cor. 24, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 89° E. 19°, 168.01 m. to cor. 27, identical to cor. 25, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 68° E. 51°, 146.90 m. to cor. 28, identical to cor. 26, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 86° E. 15°, 122.26 m. to cor. 29, identical to cor. 27, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 81° E. 40°, 134.31 m. to cor. 30, identical to cor. 28, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 82° E. 40°, 70.58 m. to cor. 31, identical to cor. 29, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 64° E. 06°, 185.63 m. to cor. 32, identical to cor. 30, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 44° E. 10°, 97.59 m. to cor. 33, identical to cor. 31, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
Due South. 110.60 m. to cor. 34, identical to cor. 32, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 29° W. 16°, 237.29 m. to cor. 35, identical to cor. 33, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 42° W. 18°, 157.36 m. to cor. 36, identical to cor. 34, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 13° W. 13°, 75.84 m. to cor. 37, identical to cor. 35, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 87° W. 06°, 23.57 m. to cor. 38, identical to cor. 36, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 10° E. 00°, 82.69 m. to cor. 39, identical to cor. 37, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 80° E. 35°, 26.67m. to cor. 40, identical to cor. 38, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 42° E. 18°, 157.34 m. to cor. 41, identical to cor. 39, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 52° W. 32°, 308.83 m. to cor. 42, identical to cor. 40, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 42° W. 30°, 72.43 m. to cor. 43, identical to cor. 41, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 44° W. 13°, 8.26 m. to cor. 44, identical to cor. 42, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 24° E. 49°, 152.40 m. to cor. 45, identical to cor. 43, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 26° E. 07°, 24.10 m. to cor. 46, identical to cor. 44, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 15° W. 50°, 72.93 m. to cor. 47, identical to cor. 45, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 52° E. 32°, 308.83 m. to cor. 48, identical to cor. 46, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 03° E. 15°, 440.71 m. to cor. 49, identical to cor. 47, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 40° W. 06°, 49.63 m. to cor. 50, identical to cor. 48, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 16° E. 42°, 92.96 m. to cor. 51, identical to cor. 49, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 02° E. 17°, 100.08 m. to cor. 52, identical to cor. 50, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 43° W. 14°, 38.29 m. to cor. 53, identical to cor. 51, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 73° W. 55°, 54.12 m. to cor. 54, identical to cor. 52, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 26° W. 34°, 156.53 m. to cor. 55, identical to cor. 53, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 67° W. 05°, 74.97 m. to cor. 56, identical to cor. 54, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 17° W. 49°, 28.85 m. to cor. 56, identical to cor. 55, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 15° W. 37°, 30.56 m. to cor. 58, identical to cor. 56, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 08° E. 40°, 69.50 m. to cor. 59, identical to cor. 57, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 24° W. 08°, 59.15 m. to cor. 60, identical to cor. 58, Timberland, Proj. 37-D, Block C, L.C. Map 2963;

S. 37° E. 43°, 54.50 m. to cor. 61, identical to cor. 59, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 10° W. 39°, 32.20 m. to cor. 62, identical to cor. 60, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 33° E. 46°, 126.14 m. to cor. 63, identical to cor. 61, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 67° E. 05°, 74.97 m. to cor. 64, identical to cor. 62, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 65° W. 23°, 132.00 m. to cor. 65, identical to cor. 63, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 06° E. 54°, 191.39 m. to cor. 66, identical to cor. 64, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 29° E. 49°, 426.45 m. to cor. 67, identical to cor. 65, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 01° W. 28°, 78.20 m. to cor. 68, identical to cor. 66, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 20° W. 33°, 102.82 m. to cor. 69, identical to cor. 67, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 07° W. 20°, 211.74 m. to cor. 70, identical to cor. 68, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 29° E. 06°, 111.02 m. to cor. 71, identical to cor. 69, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 34° W. 03°, 146.20 m. to cor. 72, identical to cor. 70, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
  
S. 52° W. 02°, 125.32 m. to cor. 73, identical to cor. 71, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 18° W. 44°, 66.31 m. to cor. 74, identical to cor. 72, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 74° E. 20°, 136.66 m. to cor. 75, identical to cor. 73, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 50° E. 20°, 51.65 m. to cor. 76, identical to cor. 74, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 36° E. 57°, 93.61 m. to cor. 77, identical to cor. 75, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 56° W. 37°, 123.00 m. to cor. 78, identical to cor. 76, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 34° E. 03°, 146.20 m. to cor. 79, identical to cor. 77, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 88° E. 05°, 60.04 m. to cor. 80, identical to cor. 78, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 19° E. 37°, 92.36 m. to cor. 81, identical to cor. 79, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 33° E. 48°, 142.00 m. to cor. 82, identical to cor. 80, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 57° E. 03°, 430.20 m. to cor. 83, identical to cor. 81, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 75° E. 50°, 162.27 m. to cor. 84, identical to cor. 108, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 57° W. 27°, 281.66 m. to cor. 85, identical to cor. 109, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 36° W. 02°, 311.38 m. to cor. 86, identical to cor. 110, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 10° W. 15°, 478.10 m. to cor. 87, identical to cor. 111, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 52° W. 20°, 440.06 m. to cor. 88, identical to cor. 112, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 89° W. 12°, 240.09 m. to cor. 89, identical to cor. 113, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 58° W. 20°, 260.11 m. to cor. 90, identical to cor. 43, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 77° W. 44°, 1,264.06 m. to cor. 91, identical to cor. 38, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
S. 60° W. 01°, 325.11 m. to cor. 92, identical to cor. 37, Timberland, Proj. 37-D, Block C, L.C. Map 2963;  
N. 81° W. 30°, 280.00 m. to cor. 93, identical to cor. 6, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
S. 62° W. 44°, 394.08 m. to cor. 94, identical to cor. 7, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 27° W. 14°, 280.46 m. to cor. 95, identical to cor. 8, A&D, Proj. 37-D, Block C, L.C. Map 2963;

N. 28° W. 00°, 498.16 m. to cor. 96, identical to cor. 9, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 30° W. 15°, 340.25 m. to cor. 97, identical to cor. 10, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 02° E. 59°, 175.19 m. to cor. 98, identical to cor. 11, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 01° W. 01°, 235.45 m. to cor. 99, identical to cor. 12, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 01° W. 28°, 250.92 m. to cor. 100, identical to cor. 13, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 01° W. 32°, 175.04 m. to cor. 101, identical to cor. 14, A&D, Proj. 37-D, Block C, L.C. Map 2963;  
N. 33° W. 25°, 140.65 m. to cor. 1, identical to cor. 15, A&D, Proj. 37-D, Block C, L.C. Map 2963;

Containing an approximate area of Nine Hundred Twenty (920) hectares.

The management of the subject area shall be under the administrative jurisdiction of the Department of Environment and Natural Resources.

The herein established area shall serve as feeding ground and temporary shelter both for migratory and resident wildlife species.

IN WITNESS HEREOF, I have hereunto set my hand and caused the seal of the Republic of the Philippines to be affixed.

DONE in the City of Manila, this 14<sup>th</sup> day of May in the year of our Lord, Nineteen Hundred and Ninety Two.

(Sgd.) CORAZON C. AQUINO  
President of the Philippines

By the President:

Executive Secretary

## *Appendix 7.*

MALACANAN  
Manila

PROCLAMATION NO. 1801

DECLARING CERTAIN ISLANDS, CAVES AND PENINSULAS IN THE PHILIPPINES AS TOURIST ZONES AND MARINE RESERVES UNDER THE ADMINISTRATION AND CONTROL OF THE PHILIPPINE TOURISM AUTHORITY.

WHEREAS, the Philippines abound with natural beauty and potentials for aquatic sports, tourism and marine life conservation;

WHEREAS, these natural marine resources offer great potential and tremendous advantage in the growing worldwide interest in aquatic sports;

WHEREAS, lack of proper government control resulted in ecological imbalance to the marine environment;

WHEREAS, said islands require the concentrated efforts of both the government and private sectors in the development of their tourism potential;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the constitution do hereby declare the following islands, caves and peninsulas as tourist zones and marine reserves under the administration and control of the Philippine Tourism Authority (PTA) pursuant to Section 5(D) of 564:

- I. Whole of Batangas Coastline and the Offshore Islands of:
  1. Fortune Island
  2. Maricabao Island
  3. Gaban Island
  4. Sombrero Island
  5. Ligpo Island
  6. Malahibong Manok
  7. Verde Island
  
- II. Fuga Island, Cagayan Province
  
- III. Oriental Mindoro
  1. Puerto Galera
    - a. Port Galera
    - b. Balatero Cave
    - c. Medio Island
  
  2. Bulalakao
    - a. Bayayao Island
    - b. Asion Island
    - c. Bating Peninsula
    - d. Maasim Island
    - e. Balatasan Cave
    - f. Pocanel Island
    - g. Opao Island
    - h. Buyallao Peninsula
    - i. Suguicay Island
    - j. Libago Island
    - k. Sibalat Island
    - l. Pambaron Island
    - m. Apo Reef Island and Islands
  
- IV. Boracay Island, Aklan
  
- V. Dumaguete
  1. Apo Island
  2. Siquijor Island
  3. Selinog Island (between Negros and Cebu)
  4. Aligway Island
  
- VI. Cebu
  1. Gaubian Island and vicinity (SE of Mactan Island)
  2. Olango Island, Sulpa Island, Gilutongan Island, Nalusuan Island, Caohagan Island, Pangan-an Island (SE of Mactan)
  3. Buyog Beach (Maribago, Mactan Island)

4. Sogod (North of Cebu City)
- VII. Tagbilaran (Bohol)
1. Panglao Island
  2. Cabilao Island
  3. Balicasag Island
- VIII. Tacloban
1. Guian, Eastern Samar
  2. Gigantangan Island, NW tip of Leyte
- IX. Palawan
1. Busuanga Island
  2. Coron Island
  3. Puerto Princesa & surrounding areas
  4. Malampaya Sound and islands
  5. Canaran Island
  6. Solitario Island
  7. Bacuit Bay Island
  8. Balabac Island
  9. Port Barton
- X. Cagayan de Oro, Misamis Oriental
1. Al-Sulnuan (west of Cagayan de Oro City)
  2. Camiguin Island
- XI. Zamboanga
1. Big and small Sta. Cruz Island
  2. Sangali Cave
  3. Socol Island
  4. Ayala/San Ramon
  5. Malanipa Island
- XII. Davao
1. Maliputo Island – Talicud Island
  2. Ligig Island
  3. Eastern side of Samal Island

No development projects or construction for any purposes be introduced within the zones without prior approval of the President of the Philippines upon recommendation of the Philippine Tourism Authority.

The PTA shall delineate well-defined geographic areas within the zones with potential tourism value, promulgate rules and regulations subject to the approval of the President, and coordinate the integrated development of these areas for the optimum use of natural assets and attractions, as well as existing facilities.

All proclamations, decrees or executive orders inconsistent herewith are hereby revoked or modified accordingly.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the Republic of the Philippines to be affixed.

Done in the City of Manila, this 10<sup>th</sup> day of November in the year of our Lord, Nineteen Hundred and Seventy-Eight.

(SGD.) FERDINAND E. MARCOS  
President  
Republic of the Philippines

For the President:

(SGD.) JUAN C. TUVERA  
Presidential Assistant

***Appendix 8. List of government agencies and non-governmental organizations***

1. AWBPFI – Asian Wetland Bureau Philippines Foundation Inc.
2. BFAR – Bureau of Fisheries and Aquatic Resources
3. DA – Department of Agriculture
4. DENR – Department of Environment and Natural Resources
5. DILG – Department of Interior and Local Government
6. DOT – Department of Tourism
7. DTI – Department of Trade and Industry
8. EA – Environment Agency of Japan
9. LGU – Local government unit
10. PTA – Philippine Tourism Authority
11. PAWB – Protected Areas and Wildlife Bureau
12. USC – University of San Carlos
13. WBSJ – Wild Bird Society of Japan