

The National Wetlands Action Plan for the Philippines 2011-2016



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PART 1 THE STATE OF PHILIPPINE WETLANDS

1.0 Introduction

The Philippines is endowed with a variety of wetlands that provide a wide range of products and services critical to human survival. Wetlands provide products such as food, building materials for shelter, genetic pool for food and medicine, and medium for mobility, among others. They are also important because of their ecological functions and services such as for flood control, groundwater replenishment, water purification, shoreline stabilization and climate change mitigation.

Box 1 Definition of Wetlands

Wetlands are areas of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including area of marine water the depth of which at low tide does not exceed six (6) meters.

(Ramsar Convention on Wetlands)

Wetlands are ecosystems that support biodiversity. They are home to one of the largest assemblies of microorganisms, reptiles, amphibians, fish, birds and mammals that live within or near waters. Wetlands are also responsible for a number of natural processes, products and services that are critical to the development and survival of human communities. Wetland ecosystems are also rich in cultural value because of their religious, historical, archaeological or other cultural significance.

Wetlands, however, are experiencing a myriad of issues and concerns that poses great challenges in maintaining the integrity of these important ecosystems. Foremost of these are degradation of wetlands and their conversion to other land/water uses. These are in turn caused by human and natural actions such as drainage, dredging and stream channelization, damming, poor agricultural practices, introduction of alien invasive species, subsidence, drought, and severe storms, among others. These actions often result to siltation and sedimentation, release of toxic chemicals, air and water pollution, runoff, changing nutrient levels, subsidence, sea level rise and loss of biodiversity.

One of the major driving forces behind the unprecedented loss of biodiversity on Earth can be attributed to climate change. This was made clear in the report on impacts, adaptation, and vulnerability to climate change of the International Panel on Climate Change. Species extinction rates increased by a factor of 1,000 over the last century, paving the way to the greatest wave of mass extinction of animal species in 65 million years. Unless action is taken now, two thirds of the Earth's remaining species are likely to be extinct by 2100. Thus, climate change clearly poses a major security to the very foundation of life on earth.

Climate change is likely to have a severe impact and compromise the wetlands ability to provide these benefits. Sea-level rise, coral bleaching, changes in hydrology and in the temperature of water bodies will lead to reduction in the goods and services provided by these wetlands. On the other hand, efforts to respond to climate change may have equally negative, and compounding, effects on freshwater and coastal zone ecosystems.

The goals of wetland conservation and wise use are unlikely to be achieved without taking climate change into account. It is generally understood and accepted that removing the existing pressures on wetlands, and improving their resiliency is the most effective method of coping with the adverse effects of climate change.

Further, wetlands are known to play an important role in the global carbon cycle, and are a significant storehouse of carbon. When wetlands are converted, they emit large quantities of carbon dioxide and other greenhouse gases. Conserving, maintaining, or rehabilitating wetland ecosystems, therefore, can be a viable element to an overall climate change mitigation and adaptation strategy.

At present, there is no overall national policy on wetlands in the Philippines. The 1992 Philippine Wetlands Action Plan needs to be reviewed to determine what has been done, what has not been done, and what has to be done. It is imperative to assess its implementation for the past 10 years and update and revise it to address the present needs of the Filipino people as well as globally.

2.0 Wetlands in the Philippines

Profiling even just the major wetlands of the Philippines is a major undertaking that will take considerable time and resources. The 1993 compilation that accompanied the National Wetlands Action Plan is already more than a decade old and has to be updated. Although there are a number of studies that generated information about selected wetlands, these are sporadic and fragmented. This section attempts to put together available information from various sources i.e. as compiled from the 2002 Philippine Biodiversity Conservation Priorities (PBCP), Fourth Philippine National Report to the Convention on Biological Diversity data from the Key Biodiversity Areas study, the Philippine Development Plan 2011-2016 (draft), reports from the Integrated Coastal Resources Management Project (ICRM), and various other relevant documents.

The Philippines is endowed with 216 lakes; 22 major marshes, swamps and reservoir; and 421 principal rivers. About 34 inland wetlands have been identified as priority sites for research and conservation by the Philippine Biodiversity Priority Setting exercise. Seven (7) of these are now considered Key Biodiversity Areas (KBAs) while another 14 lakes are considered as Candidate Key Biodiversity Areas (CKBA). There are four (4) Philippine wetlands of international importance recognized under the Ramsar Convention, namely: Tubbataha Reef Natural Park in

Palawan, Olango Island Wildlife Sanctuary in Cebu, Naujan Lake National Park in Oriental Mindoro, and Agusan Marsh Wildlife Sanctuary in Northeastern Mindanao.

2.1 Freshwater/Inland Water Ecosystems

The Philippine hosts a wide range of wetland types both freshwater or inland, as well as marine and coastal. Inland water ecosystems are aquatic-influenced environments located within land boundaries. Examples of these are lakes, swamps and marshes, peatlands, river basins, reservoirs and dams. The PBCP includes 211 lakes varying from .01 sq km to 900 sq km, 18 major rivers and 22 marshes, and swamps and reservoirs. Table 1 shows the 34 priority inland water bodies for research and conservation (*Ong et al 2002*).

Table 1: List of conservation and research priority areas for inland waters

Name of Inland Wetland	Location	Name of Inland Wetland	Location
Abulog River	Apayao and Cagayan	Bulusan Lake	Sorsogon
Cagayan River	Cagayan and Isabela	Jalaud River	Capiz, Antique and Iloilo
Abra River	Abra, Mt. Province, Benguet, Ifugao and Ilocos Sur	Lake Danao	Leyte
Agno/Amburayan River	Mt. Province, La Union, Benguet, Ifugao, Tarlac, Nueva Vizcaya, Pangasinan and Ilocos Sur	Ilog River	Negros Oriental and Occidental
Candaba Swamp	Pampanga and Bulacan	Twin Lakes	Negros Oriental
Umiray River	Aurora, Quezon and Bulacan	Lake Mainit	Agusan del Norte and Surigao del Norte
Kaliwa-Kanan River	Quezon	Lake Duminagat	Misamis Occidental
Laguna de Bay	Laguna, Manila and Rizal	Olangui River	Lanao del Norte and Lanao del Sur
Pasig River	Manila and Rizal	Lake Lanao	Lanao del Sur
Tadlak Lake	Laguna	Lake Napalit	Bukidnon
Taal Lake	Batangas	Agusan Marsh	Agusan del Sur
Pansipit River	Batangas	Pulangi River	Bukidnon, Maguindanao and North Cotabato
Seven Lakes of San Pablo City	Laguna	Agusan River	Agusan del Norte and del Sur, Compostela
Lake Nabua	Camarines Sur	Ligawasan Marsh	North and South Cotabato, Maguindanao, Sultan Kudarat
Lake Buih/Lake Manapao/ Lake Katugday	Albay and Camarines Sur	Lake Sebu and Mt. Three Kings	South Cotabato
Coron Lakes	Palawan	Lake Maughan	South Cotabato
Lake Naujan	Mindoro Oriental	Lake Manguao	Palawan

Source: *Ong et al, 2002*.

These inland water ecosystems hosts a multitude of organisms including 316 fish species of which 121 are endemic and 76 are threatened and numerous species of waterbirds, aquatic plants and a majority of amphibians and semi-aquatic species such as the highly endangered Philippine crocodile (*Crocodylus mindorensis*).

It is believed these are the most threatened of all ecosystem types. Threats to inland water ecosystems include pollution, habitat loss and degradation, resource use and exploitation, proliferation of alien invasive species, diversion of rivers for irrigation and dam construction, and the effects of climate change. Pollution largely comes from domestic and other non-point sources with considerable contribution from industrial and agricultural sources.

Lakes

Lakes are among the most important of wetlands. Laguna de Bay, the largest freshwater body in the country provides an assortment of products and services for the more than 13 million people that live in its lake basin. Taal Lake is important for tourism because of its high scenic value while Lake Lanao has a number of endemic fish species contributing to the overall biodiversity of the basin. Lake Buhi is among these important bodies of water having the distinction of being home to the smallest commercial fish in the world, the *Sinarapan* (*Mistichthys luzonensis*). Naujan Lake in Oriental Mindoro is an important staging and wintering area for a large number of tufted duck species.

Lakes in the country are mainly used for aquaculture with Laguna de Bay providing 65-70 per cent of the fish requirement of Metro Manila. Laguna de Bay yielded 37,000 – 47,000 MT of fish from 1997-2000 (LLDA). Lakes also provide other functions and services such as means of mobility for lakeshore communities, source of water for domestic, industrial and agricultural uses, source of food and materials for shelter, among others.

Among the major lakes in the country are Laguna de Bay (Box 2), Lake Lanao, Taal Lake, Lake Naujan, Lake Mainit, Lake Buluan, Lake Bato, Lake Pagusi, Lake Labas and Lake Lumao.

Over time, these lakes have been subjected to various pressures resulting from the increasing need of people and communities for food, fuel, water and many other products and services. They are also subjected to siltation and flooding. As a result, most of the country's lakes are in various stages of deterioration. In Batangas, for example, the Taal Lake's Bull sharks (*Carcharhinus leucas*), which used to be part of the lake's once-diverse ecosystem were exterminated by the locals in the 1930s. In January 2008, the Bureau of Fisheries and Aquatic Resources - Philippines (BFAR) announced that a fishkill in Taal Lake occurred affecting 50 metric tons of cultured tilapia and 6,000 maliputo fishes due to pollution contamination and low oxygen levels in the waters of several lake barangays. For about a decade now, Lake Lanao in Lanao del Sur province was found to have massive algae contamination by the Mindanao State

University and BFAR due to poor sewage and agricultural waste management and soil erosion from indiscriminate logging and extensive land use and farming in its watershed area.

A holistic approach has been adopted in the management of some of the major lakes in the country. Taal Volcano Protected Landscape which includes Taal Lake has a Management Plan which was unanimously approved by the Protected Area Management Board on November 26, 2009. The 10-year Management Plan features among others activities to maintain and monitor water quality, zoning for forests, fish sanctuary and agro-tourism, a reliance on counterpart contributions by stakeholders, better law enforcement, keeping current population levels, disaster preparedness, and solid waste management (<http://taal-lake-blog.blogspot.com/2009/12/taal-volcano-protected-landscape.html>).

The Taal Lake Task Force created by the Governor to implement local government agreements under the Unified Rules and Regulations for Fisheries is wrapping up efforts at dismantling excess cages. The Task Force reported the dismantling of over 5,000 cages in a year and a half of continuing operations. It is expected that new registrations and PAMB clearances in 2010 will further clean up the lists of allowed fish cages and operators. (<http://taal-lake-blog.blogspot.com/2009/12/taal-volcano-protected-landscape.html>).

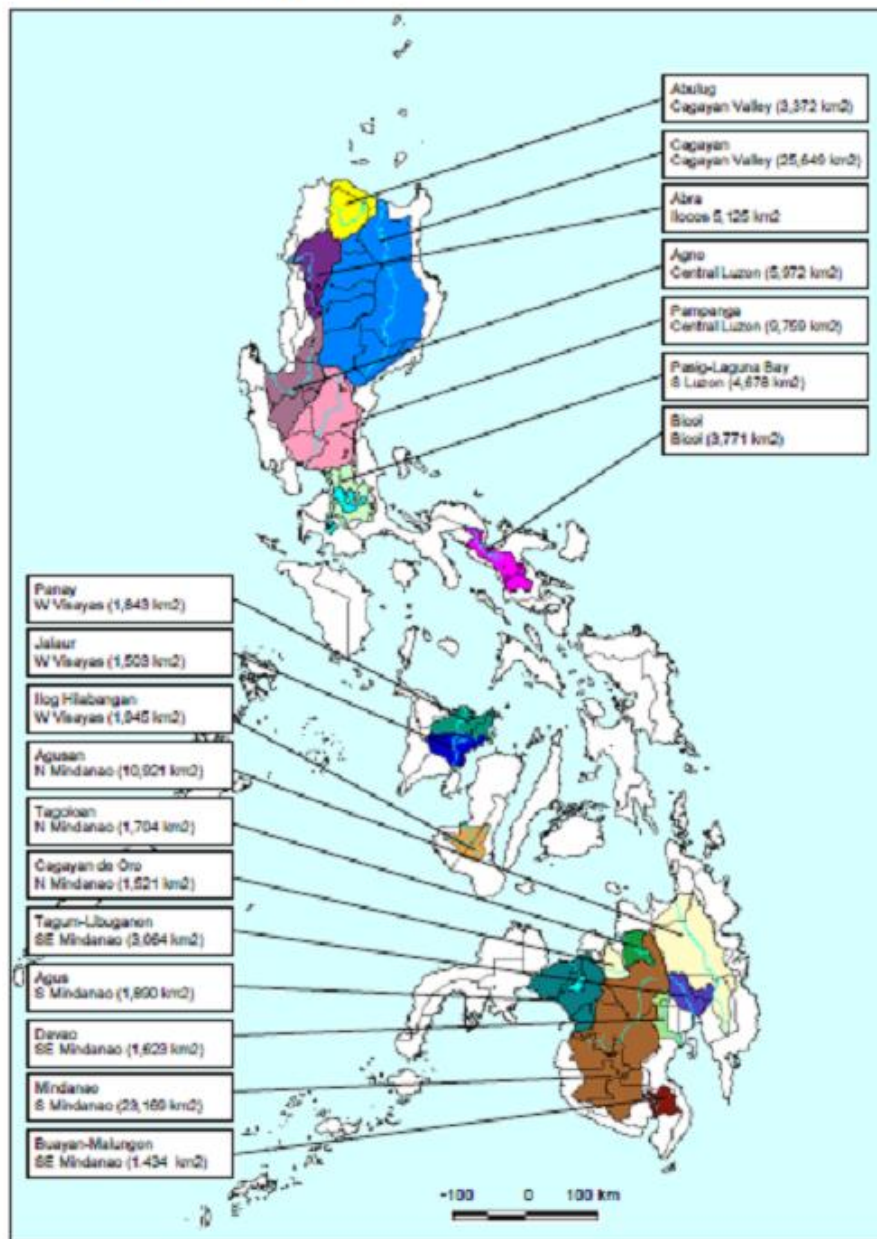
Box 2 Laguna de Bay

- The largest inland water in the Philippines with a surface area of about 900 square kilometers.
- Divided into 24 hydrological sub-basins and receives water from 25 major tributaries and drains through Pasig River to Manila Bay.
- Class C waters fit for fisheries
- Decreasing trend in transparency and net productivity in the lake.
- Fish production has declined: The fisheries of Laguna de Bay have been affected by human, industrial, and environmental factors which resulted in a 64 percent decline in production levels from 1980 to 1996 and this has profound effects on the 16.3M people living in the lake basin.
- Species diversity has also significantly declined; of the total 33 species reported to have thrived in the lake at different times, only 5 out of the 9 indigenous species have remained. All the 5 migratory species have disappeared and the catch at present is dominated by the exotic aquaculture species
- Major threats in the Laguna de Bay include: a) pollution from wastewater discharges; b) siltation/sedimentation; c) watershed habitat alteration and urbanization; d) proliferation of IAS such as janitor fish; e) conflicts between fishpens and cages and open water fisheries
- Policy and program responses: development of ZOMAP; formation of multi-sectoral river rehabilitation councils; development of a new Laguna de Bay Master Plan.

Rivers and River Basins

There are 421 principal river basins that provide various services such as means for mobility and transport of people and goods, hydropower, recreation, and irrigation, among others. Twenty of these are larger than 1,000 square kilometers in size while 18 are larger than 1,400 square kilometers. Cagayan River Basin is the largest at 25,649 square kilometers. Shown in Figure 1 below are the 18 major river basins (DENR-RBCO, 2007).

Figure 1: Major river basins in the Philippines



The figure shows basins with an area of at least 1,400 km²

Many of the major rivers in the country are silted due to upstream deforestation and unsuitable land uses including bank destabilization activities. The main sources of water pollution are domestic wastewater, industrial wastewater, surface water runoff from urban areas, and chemicals from agricultural fertilizer and pesticides. Agusan River receives silt from erosion and mining activities upstream which ultimately ends up in the coastal areas of Butuan Bay. Urban rivers such as Pasig, Paranaque, San Juan, Marikina and Meycauayan all have dissolved oxygen (DO) and Biological Oxygen Demand (BOD) levels below the standard for Class C waters. According to DENR Administrative Order (AO) 34, main water quality criteria for Class C waters are: DO at 5 milligrams per liter (mg/l) minimum; BOD at 10 mg/l, maximum; and total coliforms at 5,000 most probable number per 100 milliliters (MPN/100 ml), maximum. Class C standard river water is capable of sustaining aquatic life, is suitable for secondary contact sports such as boating, and after treatment, may be used for industrial processes. Water quality monitoring shows that the pollution concentrations exceed the levels required to meet the water quality standards for Class C as designated by the Department of Environment and Natural Resources (DENR) for these rivers.

Although still below Class C water criteria, improvement of water quality has been observed in the Pasig River due to recent relocation of informal settlers in key areas of the river. Meanwhile, all 25 rivers draining to Laguna de Bay fail to pass Class C criteria which would have categorized them as fit for fisheries and secondary contact recreation.

River basin issues are closely interlinked with water-related management challenges. These challenges cover a wide range of concerns including provision of safe water and sanitation, increasing trend of floods and other water-induced disasters, inadequate river control and drainage facilities, pollution of surface water and groundwater as a result of urbanization, industrialization, indiscriminate land use and land development, and governance concerns due to overlapping functions among agencies working on water and water-related projects and programs (*Tuddao, 2009*).

The country is divided into 12 water resource regions coordinated by Water Resources Regional Councils (WRRCs). A large number of central and local agencies are involved in the governance of water resources with the following key institutions supporting it: a) National Economic Development Authority (NEDA), the country's premier social and economic development planning and policy coordinating body; b) National Water Resources Board (NWRB), the national apex body for water resources management and development; c) Department of Environment and Natural Resources (DENR), responsible for the conservation, management, development and proper use of the country's environment and natural resources; and, d) the River Basin Control Office (RBCO) (under DENR), responsible for management and development of priority river basins.

The Philippines adopts an IWRM as a process and approach to water resources management with broad emphasis to basin level management in general and for specific priority basins in particular. The IWRM framework employs integrated and holistic strategies in order to harmonize and rationalize river basin plans and programs. It also covers river basin in

scope and strategies in order to achieve manageable spatial boundaries for effective planning and river basin management. The framework is supported by four supplemental framework components, namely: a) Water quality protection and monitoring; b) information and decision support systems; c) river and coastal area protection and rehabilitation; and d) river basin organizations and governance.

At the basin level, the national *Integrated River Basin Management and Development Framework Plan* has been prepared by RBCO to provide guidance and directions for the action-oriented planning at the basin level. Examples of IWRM-based projects and programs are described in Table 2 below.

Table 2 : Some IWRM-based programs and projects

River Basins	Programs
Agusan River Basin	The Master Plan for the Agusan River Basin Project was completed in early 2009 by DENR with support from ADB. One of the objectives was to review options for formation of an RBO.
Bicol River Basin	The Bicol River Basin Water Management Office has been formed in order to address the persistent problem of rural poverty, with particular regard to recurrent flooding and other issues. Tasks include flood control and mitigation; water-related institutional development and support to inter-sector coordination; upgrading of irrigation systems; and watershed management.
Bohol Island	Issuance of a Provincial Executive Order Establishing the Bohol IWRM Board with representatives of a multitude of sectors.
	Creation of Watershed and Management Council – which expanded the existing structure to cover the whole river basin (upstream down to the coastal area)
	Preparation of Water Supply Master Plan Study for Bohol Island – to identify potential water supply source
Cagayan River Basin	The Cagayan River Basin Project Management Office is being established under DENR, with responsibilities related to environmental management, flood management, and economic development
Cebu Island	No RBO at present
	IWRM-based master planning initiated in 2009.
	IWRM-based investment roadmap preparation initiated in 2009 on a pilot basin for Central Cebu watersheds
Laguna Lake Development Authority	<p>LLDA was formed in 1966 and is the oldest river basin organisation in the Philippines. The Authority is responsible for the preservation, development and sustainability of the Laguna de Bay and its tributary rivers. It undertakes resource-related and environmental</p> <ul style="list-style-type: none"> • policy formulation and planning; • development; and • related regulation. <p>Its Board of Directors convenes representatives from central and local</p>

	government bodies and the private sector.
Manila Bay	Formation of the Manila Bay River Basin Coordinating Committee
Mindanao River Basin	Creation of a Presidential Task Force for the Mindanao River Basin Rehabilitation and Development
Negros Island	Study of Raw Water Pricing piloted in two municipalities in Negros Oriental. The objective is to test raw water pricing modalities. It has been found that implementation is difficult at the LGU level but less so at the basin level.
	Creation of Negros Island IWRM Council in agreement between the two provinces in order to manage the water resources in the whole Negros Island.
Pampanga River Basin	Implementation of the ' <i>Study on IWRM for Poverty Alleviation and Economic Development in the Pampanga River Basin</i> ' – aiming to prepare an IWRM plan and to recommend on an institutional structure to manage the basin

Source of basic data: RBCO-DENR, 2009.

Priority Rivers

Tables 3 and 4 show 19 priority rivers that have been selected for monitoring under the Sagip Ilog Program. Using DO and BOD levels as indicators, these rivers are expected to show improved water quality through a 30 per cent increase in DO levels by 2010 using 2003 levels as baseline.

Data for DO in 2010 show that 10 (roughly 50%) of the priority rivers have levels conforming to the standard for the classification assigned to them. Note that in 2003, only Cagayan de Oro River passed the standard for DO for Class A waters. In 2005, eight of the 19 priority rivers had DO levels within the standard. San Juan and Pasig Rivers had no monitoring data for 2009 and 2010.

In terms of BOD, only four out of the 19 priority 19 rivers conformed with the standards. These are Anayan River and Malaguit River in Region V and Luyang River and Sapangdaku River in Region VII.

It should be noted that any improvement in DO and BOD levels will benefit aquatic organisms which in turn benefit other wildlife that are dependent on them.

Table 3 Dissolved Oxygen Levels for the 19 Priority rivers under the Sagip Ilog Program

Region	Waterbody	Average DO (mg/L)								
		Class	2003	2004	2005	2006	2007	2008	2009	2010
III	Meycauayan	C	-	1.23	0.45	0.00	5.05	2.48	4.15	2.61
	Marilao River	C	0.8	1.79	1.09	0.96	5.39	2.39	4.98	3.55
	Bocaue River	C	1.9	1.98	2.73	1.94	5.78	4.96	7.92	5.78
IV-A	Imus River	C	3.0	5.65	5.18	4.70	5.16	4.13	4.75	5.15
	Ylang-ylang River	C	4.5	4.11	4.83	5.07	4.47	3.97	4.57	5.13
IV-B	Mogpog River	C	4.9	5.67	7.15	7.85	7.49	-	8.02	5.89
	Calapan River	C	3.1	2.31	2.85	2.16	3.86	3.07	2.91	1.60
V	Anayan River	D	-	5.44	5.65	6.67	5.92	6.50	6.28	5.09
	Malaguit River	C	4.6	4.12	5.75	6.29	6.56	7.43	7.49	6.88
	Panique River	C	2.7	5.52	5.60	7.85	7.08	6.87	7.37	6.92
VI	Iloilo River	C	4.2	4.51	4.88	5.30	5.36	4.47	3.91	4.01
VII	Luyang River	C	-	7.88	7.57	7.50	7.86	6.86	4.08	5.75
	Sapangdaku River	C	-	7.56	7.14	7.63	6.84	6.83	4.33	5.13
X	Cagayan de Oro River	A	8.6	-	8.13	-	8.27	8.13	8.76	8.15
CAR	Balili River	-	4.6	5.48	4.92	6.89	6.17	4.55	6.72	4.49
NCR	Marikina River	C	3.1	3.60	3.37	2.17	2.20	2.62	-	3.19
	San Juan River	C	2.4	2.88	2.69	1.05	1.63	1.85	-	-
	Parañaque River	C	2.5	2.00	1.32	1.62	1.39	1.57	0.36	0.29
	Pasig River	C	3.1	1.56	2.14	2.50	2.41	3.15	-	-

Source: EMB, 2011.

Table 4 Biological Oxygen Demand levels of the nineteen priority rivers under the Sagip-Ilog Program

Region	Waterbody	Average BOD (mg/L)								
		Class	2003	2004	2005	2006	2007	2008	2009	2010
III	Meycauayan	C	38.2	50.58	119.73	144.07	56.00	35.55	48.95	59.00
	Marilao River	C	32.3	22.50	41.47	21.92	21.17	11.09	8.21	24.00
	Bocauae River	C	12.2	8.75	6.40	7.19	8.83	11.84	6.31	11.00
IV-A	Imus River	C	5.65	7.50	9.47	9.10	10.13	11.09	18.68	12.00
	Ylang-ylang River	C	24.4	22.50	8.32	8.67	29.79	63.76	126.27	119.00
IV-B	Mogpog River	C	-	-	-	-	-	-	-	-
	Calapan River	C	4.1	7.32	15.46	5.14	5.88	3.83	5.33	14.00
V	Anayan River	D	-	9.37	2.34	1.46	3.85	2.81	2.91	4.28
	Malaguit River	C	-	5.69	0.74	3.00	2.73	-	-	4.00
	Panique River	C	-	4.41	2.64	1.47	1.05	-	-	-
VI	Iloilo River	C	2.4	4.29	3.36	2.13	3.64	4.35	6.40	12.00
VII	Luyang River	C	-	2.38	2.04	1.13	2.31	1.36	2.48	4.00
	Sapangdaku River	C	-	1.88	0.86	0.72	0.54	1.14	3.18	6.00
X	Cagayan de Oro River	A	-	-	1.26	-	4.00	2.00	1.14	-
CAR	Balili River	-	-	14.75	31.83	23.33	25.36	37.44	7.04	37.00
NCR	Marikina River	C	18.2	19.30	12.13	15.03	25.43	18.18	-	31.46
	San Juan River	C	54.8	46.75	33.48	33.40	40.42	44.19	-	-
	Parañaque River	C	42	45.67	29.46	40.96	39.90	38.20	53.31	38.00
	Pasig River	C	10.7	17.38	24.17	13.55	15.45	20.49	-	-

Source: EMB, 2011.

- Note:*
- 1) DO Standard: > 5 mg/L for Class "AA to C" waters
3 mg/L for Class "D" waters
 - 2) BOD Standard: < 5 mg/L for Class "A and B" waters
< 7 mg/L for Class "C" waters
10 mg/L for Class "D" waters
 - 3) Priority rivers frequency of sampling: monthly

Marshes and Swamplands

Table 5 lists the major swamps and marshes in the country with Ligawasan Marsh in Cotabato province as the largest in area at 220,000 hectares. Aside from Ligawasan Marsh, the other more popular wetlands in this category are Agusan Marsh in Agusan del Sur and Candaba Marsh in Central Luzon.

Table 5 Major Swamps/Marshes in the Philippines

Swamp/Marsh	Location	Area (has)
Candaba Swamp	Bulacan and Pampanga Provinces, Central Luzon	32,000
Lalaguna	Lamon Bay, Quezon Province, Luzon	400
Manlubas Swamp	Camarines Norte, Southern Luzon	unknown
Leyte-Sab-a Basin	Leyte Island, Leyte Province	90,000
Hinunagan Rice Paddies	Southeastern Coast of Leyte, Southern Leyte Province	5,000
Agusan Marsh	Agusan del Sur Province	90,000
Ligawasan Marsh	North and South Cotabato Provinces	220,000
Aju, San Dionisio & Sara Wetlands	Panay Island, Iloilo Province	45,000

Ligawasan Marsh

Ligawasan Marsh is actually a conglomeration of three marshes: Ligawasan, Libungan and Ebanan. It lies in the basin of Mindanao River in south-central Mindanao spanning the provinces of Sultan Kudarat and North Cotabato in Central Mindanao and Maguindanao in the Autonomous Region Muslim Mindanao (ARMM). Fishing is the primary means of livelihood of families in the marsh during periods of heavy rainfall when most of the area is underwater. During dry season however, some 140,000 hectares dry out and are cultivated

Ligawasan Marsh is an important bird area and is also a Key Biodiversity Area (KBA 198). About 30,000 hectares of the Marsh has been declared as a game refuge and bird sanctuary.

For many years, the main threat to the marsh was the conversion of marshes to rice paddies and other agricultural uses. The Liguasan Marsh Freshwater Fisheries Project, a project intended to increase fish production by constructing fish pens and cages in the area also involve the conversion of large areas of marsh into aquaculture ponds and fish pens. Moreover, quarrying activities for the production of fertilizers are likely to cause considerable disturbance to this wetland.

In 1998, NEDA-Region XII prepared a Ligawasan Marsh Development Master Plan (1999-2025) and recommended the designation of Ligawasan Marsh as a protected area. Conservation efforts in the past were funded by donor organizations such as the UNDP-GEF Small Grants Program (SGP) and the Foundation for the Philippine Environment (FPE) through its Ligawasan Marsh Integrated Conservation and Resource Management Project. Current efforts include the National Program Support–Environment and Natural Resources Management Project (NPS-ENRMP) for Ligawasan Marsh which aims to enhance ecosystem services for global and local benefits through financing of integrated ecosystems management. Although

conservation initiatives are ongoing, initial research has not generated adequate information to determine progress and outcomes of these efforts (PAWB, undated).

Candaba Swamp

The Candaba Swamp in Central Luzon is a vast complex of freshwater ponds, swamps and marshes with surrounding areas of seasonally flooded grassland, arable land and palm savanna on a vast alluvial flood plain. The entire area is usually flooded in the wet season, but most of it dries out during the dry season (late November to April) and is converted into rice fields and plantations of water melons. It is an important area for agricultural and fisheries production, water for irrigation, and natural flood retention.

This marshland is a Key Biodiversity Area (KBA #31) and is an extremely important staging and wintering area for ducks, especially in October and November when the swamp regularly supports thousands of birds. Annual waterbird census in Barangay Candating, Arayat from 1990 to 2008 shows a considerable number of migratory species in the area. The two most abundant species are *Anas luzonica* and *A. querquedula*; *A. acuta* is common, and *Dendrocygna arcuata*, *Anas _orphyri*, *A. clypeata*, *Aythya ferina* and *A. fuligula* occur in significant numbers. The reed-beds at Candaba and in the surrounding areas are one of the few known wintering areas of the Speckled Reed Warbler *Acrocephalus sorghophilus*, a very local species which breeds in northeastern China. The marshes support breeding populations of several Rallidae, notably *Rallus zorzatus* and *Porphyrio _orphyria*, and some ducks may breed. In all, about 60 species of birds use the marsh for feeding and roosting.

The main area for waterfowl is an impoundment of about 300 ha, with a mixture of open shallow water, small islands, and rafts of floating vegetation, adjacent to the Pampanga River about nine km north of Baliuag. The impoundment is used as a fish pond during the rainy season, and then drained in January or February to be used for agriculture. Candaba Swamp acts as a natural flood retention basin holding wet season overflow from the Maasim, San Miguel, Garlang, Bulu and Penaranda Rivers, and draining into the Pampanga River. The natural retention capacity is estimated at approximately 1.5 billion cubic metres. The average depth of water is 1-2m, and the maximum about 5m.

Candaba Swamp continues to be drained or converted to wet agriculture severely limiting habitat for waterfowls. Others have been converted into fishponds causing the vegetation cover to be patchy. Siltation is apparent but can be controlled by ensuring that the upland vegetation cover is adequate especially in the Sierra Madre Range. These wetlands are mostly privately-owned with very a small part that is state-owned but has been classified as "alienable and disposable" land thus posing a peculiar concern for conservation. Although a small portion of the swamp had been declared as a Bird Sanctuary and has become a popular site for bird watching, there is a need to establish some overall protection (strategies) and to manage water levels in order to maintain the services derived from this wetland.

2.2 Coastal and Marine Wetlands

Coastal and marine wetland ecosystems consist of coral reefs, mangroves, beach and beach forest, soft bottom communities including tidal flats, estuaries and seagrass beds, and open water areas.

Mangrove Forests

Forty of the 54 mangrove species in the world are found in the Philippines. As of 2009, mangrove cover is pegged at 282,044 hectares (still subject to ground validation). There are current efforts to expand the coverage and strengthen the protection of mangrove areas in the country. This may suggest improvement of habitats for species that are mangrove dependent and consequently contribute to increase in fisheries stock and livelihoods.

Coral Reefs

Only 5 per cent of the estimated 27,000 square kilometers of coral reef cover in the country is in excellent condition. A recent study indicated that although better reefs can still be found in Celebes Sea, Sulu Sea and the Visayas Biogeographic Region, Philippine coral reefs as a whole may be experiencing a steady state of decline (from 5% to 3% to >1%). (*Nañola, 2006*)

Recent biophysical monitoring data from selected MPA (Marine Protected Area) and non-MPA sites in 52 municipalities/cities in 31 provinces using hard coral cover, fish abundance and biomass as indicators showed an overall declining trend. This is especially true in non-MPA areas. In the South China Sea Region, average hard coral cover for both MPA and non-MPA sites did not show much change, albeit there was a higher percentage of coral cover observed in MPA sites. The Visayan Sea and Sulu Sea Regions showed a slightly decreasing trend in fish abundance while the South China Sea region showed an increasing trend. Outside MPAs, however, there was a general decrease in trend except for Sulu Sea and Celebes Sea regions, which remain stable. Using fish biomass, the Sulu Sea MPA sites showed a decreasing trend, the Visayan Sea showed an increasing trend while the South China Sea region remained stable. Many of the non-MPA sites in this study site remained stable. (*Gonzales et al, 2008*)

Seagrass Beds

The Philippines has the second highest seagrass diversity in the world contributing about 19 species or about 55 percent of the number of species in East Asia. In the past five decades, about 30-40 percent of seagrass areas in the Philippines have been lost. Recent data shows that seagrasses in the country are distributed over an area of about 27, 282 sq km (Fortes, 2008). Seagrass beds are important wetlands as they are habitats to important species like the Dugong *dugong*. Although they are believed to be the least studied among tropical coastal

ecosystems, efforts to showcase successful conservation strategies are showcased in a demonstration site established in Bolinao, Pangasinan and in a seagrass sanctuary in Narra, Palawan. Moreover, the Philippine National Seagrass Conservation Strategy and Action Plan, an integrated approach to address seagrass-related issues and concerns was published, by the Philippine National Seagrass Committee in 2007.

Challenges

Major threats to marine ecosystems and resources include: 1) human-induced and direct stresses on species and ecosystems such as deforestation, expanding human settlements, water pollution, overfishing and the use of destructive fishing methods; 2) those that can be attributed to climate change such as coral bleaching, eutrophication, dredging, siltation and sedimentation, nutrient loading, and sea level rise.

Below are some of the major gaps in addressing the threats to coastal and marine wetlands:

- a) Biodiversity Data Gaps
 - Lack of comprehensive data to better understand the state biodiversity of the selected coastal and marine ecosystems
- b) Poor implementation of national laws and policies affecting the species and ecosystem diversity
- c) On ICM
 - disparity in the capacity among government agencies and coastal municipalities on the implementation of ICM plans: LGUs are expected to bear the cost of ICM implementation. Conflicts arise when some LGUs refused to allocate funds for ICM plan preparation and implementation
- d) Capacity Building on ecotourism planning and management ; adaptation to climate change;
- e) Poor enforcement of coastal laws
- f) Lack of land-based livelihood projects to limit extraction/utilization of marine products thereby giving chance for coastal habitats to recover

Conservation Measures Implemented

One of the major strategies being implemented to manage threats to coastal and marine resources is Integrated Coastal Management (ICM). ICM addresses the interlinkages among associated watersheds, estuaries and wetlands, and coastal seas by all relevant national and local agencies, civil society and the private sector. ICM involves strategies on habitat, fisheries, shoreline, and waste management, enterprise and livelihood development, sustainable coastal tourism, coastal zoning, legal and institutional development, and risk/coastal hazard management.

As of 2009, mangrove cover is pegged at 282,044 hectares (still subject to ground validation). Under the Mangrove Nursery Establishment and Reforestation Program, identification of areas for rehabilitation in priority municipalities have been undertaken. In 2009, 2,000 hectares have been identified under the Upland Development Program. In 2010, 7,500 have been identified under the DENR-GPOA. PAWB-CMMO, together with the other concerned bureau/agencies, is currently reviewing existing policies and laws concerning mangrove. Guidelines for proper and effective mangrove rehabilitation and validation are also currently being developed.

Another major initiative is the establishment of Marine Protected Areas (MPA) to increase fish stock and prevent overfishing. These are established via a local ordinance through R.A. 7586 or the NIPAS Act or through RA 8550 or the Fisheries Code. This serves as an important strategy for ICM in the Philippines.

The importance of preserving coastal habitats and other marine resources is also a priority strategy for managing threats to coastal wetlands. Initiatives towards this end include the Sulu-Sulawesi Marine Ecosystem and the Verde Island Passage Corridor. To conserve seagrasses, a Philippine National Seagrass Conservation Strategy and Action Plan was prepared by the Philippine Seagrass Committee.

The DENR-PAWB Pawikan Conservation Project (PCP) proposes that foraging habitats of marine turtles should be declared as Critical Habitats pursuant to Republic Act 9147 or the Wildlife Resources Conservation and Protection Act of 2001.

There are also interventions to enhance adaptation of coastal and marine sector to climate change. Of note is the UNDP-managed joint program on Strengthening the Philippines' Institutional Capacity to Adapt to Climate Change (2008-2010) which aims for the Development of national framework strategies for climate change. It also proposed full protection and management of at least 30 per cent of the coastal and marine ecosystems to increase resilience of coastal environment against climate change.

On 18 December 2008, the Supreme Court issued a mandamus that ordered all concerned agencies to coordinate in the clean-up, restoration, and preservation of Manila Bay, in line with the country's development objective to attain economic growth in a manner consistent with the protection, preservation, and revival of marine waters. The issuance of the mandamus stemmed from the complaint filed by the Concerned Residents of Manila Bay on the alleged inaction of government to improve the bay's condition. The petitioners include the Metropolitan Manila Development Authority (MMDA), Department of Environment and Natural Resources (DENR), Department of Education (DepEd), Department of Health (DOH), Department of Agriculture (DA), Department of Public Works and Highways (DPWH), Department of Budget and Management ((DBM), Philippine Coast Guard (PCG), the Philippine National Police Maritime Group, and the Department of the Interior and Local Government

(DILG) (<http://sc.judiciary.gov.ph/news/courtnews%20flash/2008/12/12180801.php>) Posted: December 18, 2008. Jay B. Rempillo). The Supreme Court recently ordered the immediate clean-up and rehabilitation of Manila Bay upon the resolution dated 15 February 2011 through the “continuing mandamus” to clean up and conserve the bay. Quarterly progress reports from the concerned agencies were required by the Supreme Court. As a result, more projects were implemented to address the three urgent concerns for Manila Bay rehabilitation: 1) informal settlers along waterways; 2) solid waste management; and 3) liquid waste management

The development of eco-tourism in the country contributed to the wetland conservation efforts.

Recommendations

- Harmonization of efforts, sustained management interventions and stakeholder support are keys to save the aquatic ecosystem
- Comprehensive monitoring and evaluation of protected area management and other policies
- Integration of biodiversity conservation and sustainable use in the school curricula at all levels
- Efficient and effective information dissemination
- Exploration of innovative financing options
- Reduction of coastal and marine emerging pressures through adaptive management

Examples of Critical Coastal Habitats

Las Piñas – Parañaque Critical Habitat and Ecotourism Area (LPPCHEA)

The *Las Piñas – Parañaque Critical Habitat and Ecotourism Area (LPPCHEA)* is located on the western side of the Aguinaldo Highway (Coastal Road) and is bounded on the north by the Parañaque River and on the South by the Las Piñas River. LPPCHEA is a small portion of Manila Bay which is one of the most important bodies of water in the country. The area is about ___ square kilometers (175 hectares) consisting of mangroves, mudflats and diverse avifauna. Its declaration as a critical habitat was based on the findings that it harbors a diverse species of birds both migratory and residents.

The importance of LPPCHEA transcends beyond its physical and geographical boundaries. The area has around 30 hectares of mangroves with eight species which is the most densely distributed patch within Manila Bay. Adjacent to the mangroves are mudflats of about 114 hectares. These mangroves serve as roosting and nesting of birds while the mudflats serve as feeding grounds. As such, it is an attraction to bird enthusiasts both local and foreign. This makes the area a suitable ecotourism site. It is the only area of such ecological integrity within an urban setting in the country.

The area hosts at least 5,000 heads of migratory birds and an important component of the East Asian – Australasian Flyway. Most significant is the presence in the area of at least 1 per cent of the population of Greenshank and 10 per cent of the population of Black-winged Stilt within the East Asian – Australasian Flyway. Recent data recorded by the DENR indicates 52 species of birds in the area while the Wild Bird Club of the Philippines has recorded more than 100, also in the same area. Both records show the presence of the Philippine Duck, a vulnerable species and Chinese Egret, an endangered species.

In the 2004 Asian Waterbird Census (AWC), the area ranked ninth nationwide in terms of number of individuals and ranked second in terms of number of species. At that time, it was known as Parañaque Wetlands to birdwatchers.

LPPCHEA is the first critical habitat established in the country by virtue of Presidential Proclamation No. 1412 entitled "Establishing a Critical Habitat and Ecotourism Area within the Coastal Lagoon of Las Piñas and Parañaque" dated April 22, 2007. It was amended on January 31, 2008 by Presidential Proclamation 1412-A which directs all relevant departments and instrumentalities under the executive branch to ensure the preservation of existing mangrove, mudflats and ecosystems in the area that supports natural ecological functions. It also directs the DENR to convene and chair a Manila Bay Critical Habitat Management Council.

Consistent with Proclamation 1412-A, an Interim Manila Bay Critical Habitat Management Council was created with a corresponding Technical Working Group (TWG). The Council and Technical Working Group are chaired by the RED and RTD for PAWCZMS of DENR - National Capital Region respectively. The Council is interim in nature since it had to be created through an Administrative Order by the DENR Secretary.

The area has a Framework Plan that is envisioned to guide its development. Among the planned development in the area are the following: a) Enrichment Planting with Mangroves and Beach Type Species; b) Construction of View Towers; c) Infrastructure Development for Offices; d) Construction of Observation Hides; e) Establishment of Nature Trails; f) Construction of Boardwalks; and g) Provision of Access Road. Priority activities that are planned to be undertaken include: a) Operationalization of the Manila Bay Critical Habitat and Ecotourism Management Council; b) Conduct of Ecological Profiling and Characterization; c) Conduct of Vulnerability Assessment; d) Drafting of a Management/Development Plan; e) Conduct of Capability Building; f) Biodiversity Enhancement of the Area; g) Continuous Clean Up and Maintenance of the Area; and h) Setting Up of Directional Signs.

Being a peri-urban wetland, commercial interests to develop the area is one of the most pressing threats to LPPCHEA. On top of this, the national government through the Philippine Reclamation Authority plans to reclaim 635 hectares in front of the sanctuary. This has created a stir among concerned citizens who opposed the project saying that the lagoon will be cut off from Manila Bay should its surroundings be reclaimed. Mangroves would eventually die due to lack of saltwater which may lead to the breakdown of the ecosystem in the area. Should the reclamation project push through and obstruct the area where Manila Bay and the rivers meet,

it is feared that flooding might be experienced in the nearby communities (<http://www.worldweatherpost.com/2011/05/29/floods-feared-from-reclamation-project-in-las-pinas-paranaque-lagoon/>). Another grave concern is the relentless dumping of solid and liquid wastes which continues to worsen the condition of Manila Bay including the LLPCHEA. (<http://www.earthislandph.org/content/article/coastal-clean-911-freedom-island-las-pinas-paranaque-critical-habitat-eco-tourism>).

Cabusao Wetland Critical Habitat

The Cabusao Wetland Critical Habitat was declared by virtue of DENR Administrative Order 2011-10 issued on August 23, 2011 to protect the habitat and population of the endemic and threatened *Anas luzonica* (Philippine duck) along with the other species of wild fauna and flora. The area covers 26.93 hectares located in Barangays Pandan and Biong in the municipality of Cabusao, Camarines Sur.

DAO 2011-10 tasks DENR-Region 5 to delineate the boundaries of this critical habitat. It also provides that the area will be managed by the DENR-Region 5 in partnership with the local government of Cabusao and/or other concerned organizations. DENR-Region 5 DENR will also ensure the preservation of existing ecosystems and safeguard the area's ecological integrity to support the existence of the Philippine duck. They are also mandated to jointly prepare and implement a Critical Habitat Management Plan to address management issues and strategies, including the enforcement of applicable environmental laws and prohibited acts under RA 9147 such as waste dumping, mineral extraction, quarrying, burning and logging.

The declaration is a timely intervention considering the many threats to this critical habitat including a proposed magnetite sand mining that in the same area by a Korean-American Mining firm.

2.3 Other Wetland Types

Peatlands

Peatlands are wetland ecosystems characterized by the accumulation of organic matter called "peat" which derives from dead and decaying plant material under high water saturation conditions (CC-GAP, 2005). Peatlands have been confirmed in Sab-a basin in Leyte and Agusan Marsh in Mindanao. Information indicates that peat is also probably present in Ligawasan Marsh in Mindanao, Dolongan area in Basey, Samar, Southern Leyte, Mt. Pulag in Northern Luzon, Surigao del Norte, Northeastern Mindanao, and Naujan Lake Marshland (National Action Plan on the Sustainable use and Protection of Peatlands. DENR 2008). These areas are being assessed, validated and mapped as part of the the targeted activities for CY 2010 and 2011 under the Philippine Component of the ASEAN Peatland Forests Project, being facilitated by Protected Areas and Wildlife Bureau.

The Sab-a Basin is a west-east elongated basin close to the north coast of Leyte separated by a metamorphic ridge. The total area is approximately 3,088 ha, about 44% of which has been reclaimed for agriculture. The remaining unutilized peatland (1,740 ha) in the eastern half of the basin consists of small remnant areas of swamp forest and sedge/grass peat swamp (ADB 2000). The two smaller peat basins in the area (Daguitan, 210 ha) and Kapiwaran (430 ha) have mostly been converted to agricultural land.

The Agusan Marsh may hold the largest area of peatland in the Philippines. At present, there is no reliable estimate of the area as well as the distribution of peat within the marsh. Two areas of peatland within the marsh have been confirmed – the first one is found at the northern part of Bunawan, where most of the vegetation have been cleared and burned. The other is found at the west of Caimpugan and exhibits the characteristics of a peat dome where the forest is mostly intact except those near the Gibong River. There may be other areas of peat within the marsh, especially in the *Terminalia copelandii* *Metroxylon sagu* forests at the northwest portion of the marsh.

A National Action Plan for the Sustainable Use and Protection of Philippine Peatlands have been prepared in 2009 under the framework of the ASEAN Peatland Management Strategy focusing on 1) awareness raising and capacity-building; 2) protecting peatlands with high conservation values; 3) setting-up of appropriate institutional structure; and 4) developing sustainable peatlands management strategies. This document is integral to the National Wetland Action Plan for the Philippines.

Caves

Caves are natural underground voids, cavities or systems of interconnected passages large enough to permit a human to enter. They also include smaller spaces like rock shelters, sea caves, and grottos. Enriched with important historical, cultural, biological and ecological values, they are home to specialized mineral formations, as well as unique and diverse flora and fauna. They also provide habitat to some of the country's endangered animals which make them crucial for biodiversity conservation. In the Philippines, there's a total of 44 species of bats, birds, reptiles and frogs recorded dwelling in caves wherein at least 23 species are endemic.

In the country, there are more than 1,500 identified caves, although experts believe there are still more that are yet to be explored and mapped. Some of the impressive and exotic caves in the world are located in the country. Listed under the World Heritage Site, the St. Paul Subterranean River in Puerto Princesa, Palawan, has a spectacular limestone karst landscape and an 8.2 kilometer navigable underground river. The Tabon Caves Complex, on the other hand, is where fossilized human remains were excavated, with the other artifacts that are believed to have existed during the Ice Age dating to 47,000 years ago. Four caves were also proclaimed under the National Integrated Protected Areas System (NIPAS) Act with the Protected landscape category. These are: Peñablanca Protected Landscape (Tuguegarao,

Cagayan), Pamitinan Protected Landscape (Rodriguez, Rizal) Calbiga Protected Landscape (Northern Samar) and Banahaw San Cristobal Protected Landscape (Quezon and Laguna).

Due to increased collection of cave resources and different human intervention, caves are critically in danger despite their significance. Formation of such caves takes centuries which makes them worth protecting.

Under Republic Act 9072, otherwise known as the "National Caves and Cave Resources Management and Protection Act of 2001", the Department of Environment and Natural Resources is tasked to formulate, develop and implement a national program for the management, protection and conservation of caves and cave resources, with the cave coordinating agencies; the National Museum, National Historical Institute, the Department of Tourism and Local Government Units concerned.

In support of RA 9072, several policies were issued which include: a) Cave Act Implementing Rules and Regulations (DAO 2003-29); b) Cave Classification Guidelines and Manual (DMC 2007-04); and, c) Guidelines in Treasure Hunting in Caves (DAO 2007-34). Draft policies on Cave Ecotourism and Edible Birds Nest Collection are also being reviewed jointly with other cave coordinating agencies.

Additionally, there is an annual event called the National Caving Congress organized by the Philippine Speleological Society Incorporated (PSSI). Being participated in by the DENR and concerned organizations, the Cave Congress has been an important venue for sharing of ideas and information exchange among the organizations involved in cave conservation and management. After the 11th National Caving Congress, a management plan for the caves has already been submitted to the Department of Environment and Natural Resources. The next step is to start following it in order to ensure the conservation of the caves and their natural features.

2.4 The Ramsar Sites of the Philippines: Wetlands of International Importance

Agusan Marsh

The Agusan Marsh is located almost at the center of the Agusan River Basin between 8°0' and 8°30' north latitude and 125°40' and 126°05' east longitude. It is the catchment basin for waters flowing from the surrounding areas of Compostela Valley, Agusan del Norte and Agusan del Sur, and Bukidnon. It is comprised of a vast complex of freshwater marshes and water courses including 59 lakes that collectively act as holding water basin for floodwaters that regularly inundate the Agusan Valley during the northeast monsoon. It covers eight (8) municipalities in the province of Agusan del Sur namely: Talacogon, San Francisco, Rosario, Bunawan, Sta. Josefa, Veruela, Loreto and La Paz.

The Agusan Marsh Wildlife Sanctuary (AMWS) is one of the most significant wetlands in the Philippines. It was one of the initial components of the National Integrated Protected Areas System (NIPAS) and is listed as a wetland of international importance under the Ramsar Convention (site No. 1009, effective Nov. 12, 1999). The AMWS has a total area of about 658 sq. km. of which only about 192 sq. km. had been declared as a protected area. An additional 409 sq. km. is presently being proposed for protection pending approval by the Philippine Congress under House Bill No. 176 and Senate Bill 1071.

The AMWS is one of the most important biodiversity sites in the country and is considered as a Key Biodiversity Area (site #180). Key Biodiversity Areas are identified so that site-scale conservation- focused investment targets can be implemented for globally significant ecosystems and species. This particular KBA covers 1.6 percent of the total land area of the province of Agusan del Sur. The AMWS is the habitat of several species of wild ducks, herons, egrets and other migratory waterfowls as well as other rare and threatened bird species, the Philippine crocodile and other endemic animal and plant species. It harbors threatened species of flora and fauna including 31 endemic and 7 threatened species (*Conservation International, 2010*)

As a wetland ecosystem, the AMWS provides a wide range of ecological functions and services that benefits the Agusan River Basin as well as the greater global ecosystems. The AMWS serves as holding area for waters that flow into Agusan River and its tributaries that are in turn are used for domestic, agricultural and power generating purposes. Wetlands such as the AMWS also play a big role in recharging of aquifers and as natural flood control mechanisms. There are numerous sources of food both for humans and the animals that live in the marshlands. AMWS is an important habitat for wildlife including threatened species and is an important nesting site for migratory and resident birds. Nutrients from the AMWS are transported via the Agusan River to Butuan Bay benefiting coastal and marine organisms in the biodiversity corridors of global significance within the Coral Triangle. Wetlands such as the AMWS are important carbon sinks, but when disturbed, releases large amounts of greenhouse gases to the atmosphere. This underscores the importance of managing the peat forest at Caimpugan which is found within the AMWS and is one of the very few known peat forest in the country.

Unfortunately, this unique ecosystem is being threatened by a wide range of issues and problems that compromise the ability of the AMWS to sustain these important ecological functions and services. Among these are: pollution from mining operations upstream and the introduction of exotic and invasive species such as janitor fish (*Pterygoplichthys spp.*), the Golden Apple Snail (*Pomacea canaliculata*) and water hyacinth (*Eicchornia crassipes*); erosion and siltation due to mining operations and deforestation occurring largely upstream; illegal destructive practices such as hunting and trapping of wildlife species; timber poaching; conversion of marshlands to paddy cultivation and palm oil plantation; poor agricultural practices such as monocropping; poor management of solid waste; lack of proper sanitation

facilities and potable water supply in the floating communities in the Marsh. On top of these, there are serious management and institutional concerns that have to be addressed so that AMWS will be able to maintain or improve its ecological integrity. Examples of these are improving the capacity of the PAMB and the IPs and other key stakeholders in managing this important ecosystem, and provision of alternative livelihood to reduce pressure on the resources of the AMWS, among others.

To date, the AMWS has not delineated the prescribed management zoning for Protected Areas which is a basic management tool for resource allocation. In-migration has likewise increased adding more pressure to the marsh ecosystem. There is low awareness about the importance of the AMWS among the stakeholders, thus participation in management and decision-making is also compromised. The effects of climate change is fast becoming an emerging issue since it is already affecting weather patterns that makes it difficult for the locals to decide when to plant and to predict and adopt to flooding in the marsh.

These threats therefore have to be addressed in the most urgent manner to ensure the ecological integrity of the AMWS in order that the functions and services it provides will be sustained.

There are several interventions that are aimed towards the conservation of wetlands in the country and some are directly related to AMWS. These are in the form of legislations, rules and regulations, management and development plans, projects and activities. The centerpiece legislation for the conservation of AMWS is embodied in the NIPAS Law. Other important legislations include the Wildlife Conservation and Protection Act (R.A. No. 9147,) the Indigenous Peoples Rights (IPRA) Law (RA 8371), the Philippine Clean Water Act of 2004, and the Water Code of the Philippines (Presidential Decree No 1067). There is also the Agusan del Sur Environment Code of 2007 and the Agusan Marsh Wildlife Sanctuary Management Plan for 2005-2010 provides the blueprint for the conservation activities in this Protected Area.

In the recently completed Agusan River Basin Integrated Water Resources Management (ARBIWRM) Project funded by the Asian Development Bank, a sub-project focused on biodiversity enhancement in the AWMS attempted to identify the components of an updated AMWS as follows:

- Species and Habitat Protection and Rehabilitation
- Nature Tourism Activities and Community Livelihood
- Communication, Education, Participation and Awareness
- Capacity Building
- Health, Water and Sanitation
- Community-Based Solid Waste Management
- Climate Change Mitigation and Adaptation
- Project Management and Sustainable Financing

Naujan Lake

Naujan Lake is the fifth largest lake in the Philippines. It is found in the northeast coast of the province of Oriental Mindoro on Mindoro Island; the island is in itself considered a discrete biogeographical region. The lake is 14 kilometers long and 6 kilometers wide and is bounded by the municipalities of Naujan, Pola, Victoria and Socorro. The lake is home to rich ethnic and cultural diversity. The population is composed of the Mangyans, indigenous people of Mindoro including the Tadyawan tribe in the area of the lake, and the “damuong” or non-Mangyans.

Naujan Lake is a wetland known for its rich biodiversity. Protected fish species such as *Mugil dussumieri*, *Caranx sexfasciatus* and *Lutianus argentimaculatus*, and harvestable species such as *Chanos chanos*, *Ophicephalus striatus*, *Glossogobius giurus*, *Clarias batrachus*, *Tilapia mossambica* and *Gourami spp* are found here.

The lake is an important feeding or wintering ground for large numbers of ducks and other waterbirds such as herons, egrets, terns, rails and bitterns. The rare *Amaurornis olivaceous* is a resident-breeding species found in the area. There are three bird (sub) species endemic to the island, namely *Ninox mindorensis*, *Sarcops calvus* and *Penelopides panini mindorensis*. Other important species that thrive here include *Tachybaptus ruficollis*, *Ardea purpurea*, *Dendrocygna arcuata*, *Ixobrychus cinnamomeus*, and *Sterna albifrons*. Wintering waterfowl include *Ixobrychus sinensis*, *Aythya fuligula* and *Fulica atra*. The raptors, *Haliaeetus intermedius*, *Haliaeetus leucogaster*, and the kingfisher *Halcyon chioris collaris* are also seen in this lake.

The endemic Philippine Crocodile *Crocodylus mindorensis*, a critically endangered freshwater crocodile, was recorded, but may now be extinct on Mindoro. Other endemic species found in Naujan Lake are the amphibian *Rana magna*, and the mammal *Ptenochirus jagori*. A total of 5 amphibians, 12 reptiles, 68 birds (of which at least 15 are waterbird species), 13 mammals and 14 fish species have been recorded. Five fish species have been identified as migratory fishes.

Naujan Lake supports 17 lakeshore communities that surround it. The local community primarily uses the lake as a communal fishing ground, where fishing is the primary source of livelihood. Milkfish, mullet, goby and mudfish (*Chanos chanos*, *Mugil sp*, *Glossogobius giurus* and *Ophicephalus striatus*) and tilapia (*Tilapia mossambica*, *T. nilotica*), carp *Cyprinus carpio* are harvested here. Other species caught are freshwater prawn *Macrobrachium sp*, and the freshwater snails *Ampullaria luzonica*, *Vivipara angularis*.

Some of the marshes are cleared for rice plantation. Some adjacent marshlands remain under grass and sedge, wherein the dense growth of *Scirpus sp.* is being collected as used for weaving baskets. Duck-raising industry is a profitable business that thrives in the surrounding area, along with some cultivation of fruit trees and coconuts.

The lake is also an essential source of water for drinking, laundry, bathing and irrigation. The lake has a great potential for tourism. The dense cover serves as habitat for resident and migratory waterfowls; the presence of such wildlife adds to the value of the lake as a recreational area.

The lake is a productive freshwater fishing site. It is also the central feature of <http://www.britannica.com/memberlogin> Naujan Lake National Park established in 1956, which comprises a 2,175-hectare area of marshes and forest. It has been included as one of the initial components of the National Integrated Protected Areas System (NIPAS) pursuant to the NIPAS Act of 1992.

The lake is a designated Ramsar Site, a wetland of international importance, because of its biodiversity, its substantial numbers of waterfowls and its critical role in the migratory birds flyway path.

However, the increasing human population has put a stress on the natural resources of the lake. Intensive fishing continuously comes in conflict between preserving the National Park for wildlife and development of the area for commercial and subsistence level activities by the local residents. Further, large animals continue to be caught, including the small population of crocodiles.

Lake Naujan has its share of problems with respect to safeguarding the ecological integrity of the basin. Because of the increasing human population in the area, the demand on the lake's natural resources has grown rapidly. Fishing is intensive and there is continuing conflict between preserving the lake for wildlife and development of the area for commercial and subsistence level activities by the local residents. The privately owned fish corral built at the mouth of the Butas River with Government approval constitutes a major threat. Its massive door is opened during high tide and then closed, blocking the exit of marine species in their migration to the sea to breed. The small population of crocodiles, although protected by law, continues to be exploited; fishermen catch young crocodiles on fishing lines and large animals are killed in nets.

Tubbataha Reef Natural Park

Tubbataha Reefs Natural Park (TRNP) lies in the middle of the Sulu Sea and covers an area of almost 100,000 hectares of high quality marine habitats containing three atolls and a large area of deep sea which contains about 10,000 hectares of coral reef. It is located at the apex of the Coral Triangle. The reef ecosystem support over 359 species of corals (equivalent to about 80% of all coral species in the Philippines), 600 species of fish, seven species of seagrass, 66 species of algaea , two species of marine turtles, 13 species of sharks, and 13 species of cetaceans. Rays and skates are likewise commonly seen around the reefs. Pelagics

such as tuna, mackerel, jacks and barracudas are commonly observed in schools near the reef crests. (RIS 2009-2012) Its white-tip reef shark population is comparatively denser than that of the Great Barrier Reef and the reefs of Cocus Keeling Islands (*Walker and Palomar-Abesamis, 2005*).

Included in the Park is the 1.1-hectare Bird Islet which is also the rookery and breeding ground of seven seabird species. In the Southeast Asian context, TRNP represents the only known breeding area of the Philippine endemic subspecies of Black Noddy (*Anous minutus worcestri*), one out of about four major remaining breeding areas of Sooty Tern and Brown Noddy, and it was the last known breeding area of Masked Booby in the Philippines, and probably in Southeast Asia. Most of the seabird species breeding at the Tubbataha Reefs can be considered threatened at national or regional levels. One globally critically endangered migratory seabird species also occur, namely the Christmas Island Frigatebird *Fregata andrewsi* (*Jensen, 2008*).

TRNP plays a key role in the process of reproduction, dispersal and colonization by marine organisms in the whole Sulu Sea system, and helps support fisheries outside its boundaries. Campos et al. (*2007*) showed that the TRNP serves as an important source as well as sink for both fish and coral larvae. The connectivity study further noted that these larvae eventually feed the fisheries of various communities lining the Sulu Sea. Moreover, a study done by Villanoy et al. (*2002*) describes the Sulu Sea as a type of transition area between the South China and Sulawesi Seas. Strong horizontal wind variations from the Mindoro Strait, Balabac Strait and Sulu archipelago, at times, create upwelling and downwelling events that influence primary productivity and thus has a large effect on the concentration and distribution of fishes and other marine life including cetaceans inside the TRNP.

TRNP is state-owned and there are no communities living within Park boundaries. However, marine park rangers stationed at the Park stay at the ranger station on a 2-month rotation. With relatively abundant marine life, the park fell victim to fishing overexploitation and abuse in the late 1980's because of the decline of fisheries in other parts of the country. This coincided with the increased use of motorized boats and destructive fishing techniques to maximize catch. These prompted the late President Corazon Aquino to declare Tubbataha Reef as the Philippines' first national marine park on August 11, 1988. It was later expanded to include Jessie Beazley reef through Presidential Proclamation 1126. The park was also listed as the country's only marine park and has been designated as a UNESCO World Heritage Site. TRNP is under the jurisdiction of the Province of Palawan, which is a Man and Biosphere Reserve. The TRNP Act of 2009 or Republic Act 10067 has been passed into law last 6 April 2010 specifically recognizing the outstanding universal value of the park by upholding the no-take policy and providing stiffer penalties for violators. Recently, TRNP was nominated to be in the new seven wonders of nature.

TRNP falls within the jurisdiction of the Department of Environment and Natural Resources (DENR) and the Palawan Council for Sustainable Development (PCSD). It is covered by the TRNP Act of 2009 supplemented by two national statutes, the National Integrated Protected Areas System Act of 1992 under the DENR, and the Strategic Environmental Plan Law for Palawan of 1992 under the PCSD.

TRNP is managed under a no-take policy. The only uses allowed are tourism, for revenue generation, and research. The surrounding areas of TRNP are open to fishing. Despite this, a decline in species population in the Park was continuously observed. Research showed that from 2006 to 2008, there was a decline of about 80 per cent in the population of *Trochus niloticus*, a protected shell species. There was also a decline in coral cover of about 18 per cent observed between 1998 and 1999 as a result of the El Niño phenomenon which ravaged coral reefs around the world. Coral cover increased somewhat in the succeeding years and despite decreases in some years, the trend remains positive. However, in 2007, crown-of-thorns starfish infestation was observed and continues to this day. An infestation of this duration has not been observed before and fears of climate change-related factors increase the apprehension of park managers. Manual removal and sodium bisulfate injections are methods used to control the population.

The first management plan for the TRNP was first developed in 1995 and has completed the cycle three times. In view of the recent passage of the TRNP Act of 2009 (Republic Act 10067, the current management plan is due for updating this year (January 2011) and will include management considerations for the 10-nautical mile buffer zone.

To effectively conserve and protect the park, the Tubbataha Protected Area Management Board (TPAMB) and the Tubbataha Management Office (TMO) were established. Established in 1999, TPAMB is composed of members from the national and local government and private sector and serves as the policy-making body for the Tubbataha Reefs. The TMO on the other hand serves as the TPAMB's executive arm, carrying out day-to-day park administration. Their programs include conservation management and awareness, ecosystem research and monitoring, and sustainable resource management.

An NGO-member of the PAMB, WWF-Philippines has conducted an Annual Ecosystem Research and Monitoring for the past 10 years. Other research initiatives include a monthly seabird census, turtle tagging and monitoring, and recording of sightings of large predators such as sharks and cetaceans. These are all being conducted by marine park rangers who have been trained to undertake such activities.

Olango Island

The Olango Island Group is a group of islands found in the Central Visayas region of the Philippines composed of Olango Island and six islets. The six neighboring islets are: Sulpa,

Gilutongan, Nalusuan, Caohagan, Pangan-an, and Camungi. They are bounded by continuous fringing reefs (steep reef wall on the west and sloping reef at the east coast of Olango) and reef flats.

Located five kilometers east of Mactan Island, Olango Island and its satellite islets lies between the Bohol Strait to the south and the Camotes Sea to the north. To the east is the Olango Channel while to the west is the Gilutongan Channel. The islands are low-lying with elevation reaching no more than 10 meters above sea level.

Olango Island Group has a total land area of approximately 10.3 square kilometers (1,030 hectares). The reef flat-lagoon surrounding the island of Olango is considered one of the most extensive reef areas in the Central Visayas. A total of 4,482 hectares of extensive sandy beach, rocky shoreline, inshore flats, seagrass beds, coral reefs, mangrove forest, mudflats, and salt marsh grass surround Olango and its satellite islets.

At the center of these islands is a vast tidal flat, which includes the 920-hectare area of the Olango Island Wildlife Sanctuary (OIWS). Mangroves are the primary vegetation in the sanctuary with about 537 hectares. There are 33 species of true mangroves and associates found in the area with *Rhizophora*, *Avicennia*, *Lumnitzera* and *Osbornia* as the most dominant species. The sanctuary hosts about 8 species of seagrasses and 72 species of macrobenthic algae with *Cymodocea* and *Thalassia* as the most abundant species. There are 103 species of scleractinian (reef building) corals, 4 non-scleractinian (non-reef building) species and 4 soft coral species that are recorded in Olango Island. Although it is believed that live coral cover is still 50 per cent in the deeper portions of the Reef in Barangay Pang-an, monitoring data by DENR-7 revealed that the surrounding coral reefs in the sanctuary is assessed as "poor" with estimated live coral cover of just about 20.75 percent. CRMP in 2001 reported a total count of 144 species of fish distributed among 25 families.

Olango Island is also one of the Important Bird Area (IBA) in the Philippines (*Mallari, 2001*). The OIWS is a critical stopover of thousands of birds traveling the East Asian Migratory Flyway. Included in these "travelers" are a number of endangered and threatened bird species. These birds come to this waterfowl haven to escape the fierce winters in northern Asia. There are 97 species of birds in Olango, 48 of which are migratory species, while the rest are resident birds of the island. OIWS hosts more than half of the 77 species of migratory birds that use the East-Asian Austral-Asian flyways. Among the frequent guests are Chinese egrets, Asiatic dowitchers, Eastern curlews, plovers, sanpipers, Black-tailed Godwit and Red Knot.

Also sharing with them the sunshine and mild climate of the island are the human residents of ten barangays. Mainly farmers and fishermen, the community has been active in their involvement in the conservation program of the government and the management of the island. The island group is part of the Cebu Province and is under the jurisdiction of the City of

Lapu-Lapu and the Municipality of Cordova. The OIWS is within the Barangays of Lapu-lapu City namely San Vicente, Sabang, Santa Rosa and Pangan-an.

The unique biodiversity of life on and around Olango has made President Corazon Aquino declare the 920 hectares area in Olango (at an approximate center point: 10°16' N 124°03' E) a protected area under Proclamation No. 903 on May 14, 1992. It was also included in the list of wetlands recognized by the Ramsar Convention as Wetlands of International Importance - designated on 01 July 1994, Ramsar Site No. 656.

The prolonged use of cyanide and blast fishing, as well as overfishing, has all but decimated that fishery resource base of Olango. As a result, fishers there have to travel farther and farther out to catch anything of substantial value. This has earned them the ill reputation of being nomadic fishers prone to wanton use of destructive fishing methods, particularly cyanide, in nearby islands of Negros, Siquijor, Samar and as far as northern Indonesia.

Another major issue cited by residents, especially around Pangan-an Island, is the encroachment of trawlers in their municipal waters. Fishing boats larger than 3 gross tons can reap in one evening a month's worth of fish catch to a small-scale fisher.

In early 1997, the Olango Synergy Group was organized to share information to prevent overlapping of activities and to determine the best plan of action for development in Olango. With members from different sectors, the group conducted "information caravan" in all barangays.

In the same year, International Marinelife Alliance (IMA) introduced to the community alternative method of catching fish. This technology transfer had reduced the practice of blast fishing and the use of cyanide in fishing.

2.5 Some Best Practices in Wetland Conservation

Bani, Pangasinan: Bangrin Marine Protected Area

The Bangrin Marine Protected Area is being transformed into a 42 hectare mangrove plantation located at Sitio Abunciang, San Miguel, Bani, Pangasinan. Before the establishment of the area into a mangrove plantation, it is a bare tidal flat with few remaining mangrove stands. It serves as breeding ground for marine life, a sanctuary for 37 identified species of indigenous and migratory birds, and a research and learning site for Coastal Resource Management. Stretching about a kilometer long and about 200 meters wide, the estimated 20 hectares of reforested mangroves is dominated by *Rhizophora spp.* while the riverine side covers 3 hectares of more diverse species including *Avicennia* and *Sonneratia spp.*

Though there is an increase in fish abundance over the last 5 years and a decrease in siltation within up to 600m from the plantation, there is a low survival rate of mangroves with

an average of 50%. Hence, adaptive management in mangroves which incorporates lessons learned from previous experiences need to be followed to improve the survival rate of newly planted mangroves.

Amlan, Negros Oriental

The Municipality of Amlan has institutionalized comprehensive program aimed at protecting , conserving, and rehabilitating wetlands. This includes the Coastal Management Program, the Ecological Solid Waste Management Program, and the Reforestation Program.

Realizing that lack of upland care is harmful to the wetland systems and there is less than 5% of the original forest cover remaining in the island, the LGU is taking active steps in the protection of upland areas. These efforts include forest patrolling by the *Bantay Lasang* (Forest Watch), ongoing tree planting activities, and establishment of an Eco-Park.

Wetlands protection is also part of the conservation program of the municipality. Efforts have been made to plant and replant mangroves in selected estuaries especially in barangay Bios-os and Tandayag. Lead by Bantay Dagat (Sea Patrol), coastal cleanups followed by speeches and presentations about wetlands conservation are held in cooperation with different sectors including the youth as participants. Amlan has important wetland systems which include the well-recognized 'cleanest river' in the region, the Amlan river. It also has mangrove areas, estuaries, beaches, and coral reefs. Maintenance of these waters, especially the Tandayag Marine Sanctuary, is a major aspect of the Coastal Resource Management program.

For the activities and programs on environmental conservation, the LGU of Amlan works with different local and regional groups and organizations including the Municipal Fisheries and Aquatic Resource Management Council (MFARMC), the Siliman University Angelo King Center for Research and Environmental Management (SUAKCREM), Negros Oriental Environment and Natural Resources Division (ENRD), and St. Paul's University of Dumaguete. Students, church groups, and environmental watch groups in Amlan also contribute and assist in these programs.

Bais City, Negros Oriental

In April 2004, the LGU of Bais City, in partnership with Peace Corp Volunteer, World Wildlife Fund for Nature, and Silliman University Marine Laboratory, conceptualized and implemented the Bais Bay Reforestation Project. The project aimed to expand Bais City mangrove area through a multi-pronged and multi-sectoral mangrove management approach.

To start with, baseline assessment and validation by data gathering and surveys (Knowledge, Attitude, and Perception surveys) were conducted. After getting generally positive results, studies about substrate composition, mangrove species zonation and reforestation mapping were conducted in order to obtain higher survival rate of mangrove seedlings. Information, education and communication campaign is also a major component of the project wherein massive information drive through series of trainings and seminars were conducted. Brochures and other learnings materials were also produced and distributed accordingly.

Through the establishment of Talabong Mangrove Nursery, also known as the “submarine nursery”, the project was able to pot and rear a total of 175,292 seedlings (June 2004-November 2005) of 19 species of mangrove including *Avecinnia* and *Rhizophora spp.* The actual mangrove planting took place from 2005 to 2006 in Barangays Capiñahan, Canlargo, San Isidro, Tangcologan, Biñohon, and Olimpia. When the collaborative project was terminated, the LGU of Bais City continued the reforestation program and maintenance of the plantation sites thereafter. As of 2009, an estimated area of 51 hectares were planted with different mangrove species in North and South Bais Bays.

The efforts engaged by the LGU and other concerned agencies garnered positive impacts to the stakeholders where most of them appreciated the presence of mangrove forests.

Prieto Diaz, Sorsogon

The municipality of Prieto Diaz is identified as one of the priority wetland areas in Sorsogon. Being such, the LGU has been conducting environmental conservation and sustainable management programs. One critical program is the conservation education and public awareness in which series of IEC strategies were conducted for communities and other sectors. Researches and studies were also conducted by academes and agencies in the area. Aside from IEC, conservation policies were being implemented in the area. These include the resolutions preventing and/or regulating collection of associates and selected marine species that might indirectly endanger the birds existence in the area, and ordinances pertinently supporting the coastal and wetland resources.

Community empowerment and livelihood programs have been introduced and conducted to divert the stakeholders’ dependency on the coastal and marine resources. Restoration and rehabilitation programs were also implemented by the LGU to address mangrove forests degradation in the area. Other activities for wetland conservation are the Avian Census and Eco-tourism.

3.0 Relevant Laws and Policies Affecting the Management of Philippine Wetlands

A review of legislations and policies on Philippine wetlands was commissioned in 2005. It mentioned that many of the regulations with direct impact on wetlands do not make direct reference to them but instead regulate access to natural resources, jurisdictions over territory and management, or prohibit certain acts relating to the areas themselves. On the other hand, those with indirect application are an assortment of environmental regulations that affect wetlands allowing or restricting actions that eventually impact may ecosystems as well. (*Luna, 2005*)

The study also noted that legal provisions may not have any impact on wetlands unless implemented. It emphasized that the best policies can only see proper implementation when there is a management structure that a) “is locally based but nationally endorsed, b)

understands the flexibility required in policy application thereby having the ability to focus on certain regulations with the greatest impact, and c) has consensus-building mechanism and participation among the multiple users of the resource." (*Luna, 2005*)

Finally, it posits that a National Wetlands Policy might help rationalize laws and policies on access to wetland resources, management jurisdiction and enforcement. However, it should also consider including all menu of options for institutions as close to the ground as possible which can be used appropriately and in timely manner, in order to protect specific wetland areas and their associated ecosystems. (*Luna, 2005*)

Below are some of the recent policies and legislations that are relevant to wetlands.

Table 6 Some Recent Policies and Legislations Relevant to Philippine Wetlands

Policy/Law	Title/Description
Republic Act 8550	Philippine Fisheries Code of 1998 (An Act Providing for the Development, Management and Conservation of the Fisheries and Aquatic Resources, Integrating All Laws Pertinent Thereto, and for other Purposes)
Republic Act 7586	National Integrated Protected Areas System Act of 1992 (An Act Providing for the Establishment and Management of National Integrated Protected Areas System, Defining its Scope and Coverage, and for Other Purposes)
Republic Act 9147	Wildlife Resources Conservation and Protection Act (An Act Providing for the Conservation and Protection of Wildlife Resources and Their Habitats, Appropriating Funds Therefore and for Other Purposes)
Republic Act 9072	National Caves and Cave Resources Management and Protection Act. (An Act to Manage and Protect Caves and Cave Resources and For Other Purposes)
Republic Act 7160	Local Government Code of 1991. (An Act Providing for a Local Government Code of 1991)
Republic Act 9275	Philippine Clean Water Act of 2004 (n Act Providing for a Comprehensive Water Quality Management and for Other Purposes)
Republic Act 9003	Ecological Solid Waste Management Act of 2000 (An Act Providing for an Ecological Solid Waste Management Program, Creating the Necessary Institutional Mechanisms and Incentives, Declaring Certain Acts Prohibited and Providing Penalties, Appropriating Funds Therefore, and for Other Purposes)
Executive Order 533	Adopting Integrated Coastal Management as a National Strategy to Ensure the Sustainable Development of the Country's Coastal and Marine Environment and Resources and Establishing Support Mechanisms for its Implementation (2006)
Executive Order 578	Establishing the Policy on Biological Diversity, Prescribing its Implementation Throughout the County, Particularly in the Sulu Sulawesi Marine Ecosystem and Verde Island Passage Marine Corridor (2006)
Executive Order 797	Adopting the Coral Triangle Initiative National Plan of Action
Executive Order 9729	Climate Change Act of 2009 (An Act Mainstreaming Climate Change into Government Policy Formulations, Establishing the Framework Strategy and

	Program on Climate change, Creating for this Purpose the Climate Change Commission, and for other Purposes
Executive Order 111	Establishing the Guidelines for Ecotourism Development in the Philippines
Executive Order 798	Transferring the Philippine Reclamation Authority from the Department of Public Works and Highways to the Department of Environment and Natural Resources (May 29, 2009)
Executive Order 672	Defining and Clarifying the Responsibilities of the Department of Environment and Natural Resources (DENR) and Philippine Reclamation Authority (PRA) in the Approval and Implementation of Reclamation Projects Nationwide.

The NWAPP is linked to and supportive of national, regional and international initiatives. At the national level, it is linked to the Philippine Development Plan 2011-2016 and is cognizant of the thrusts of the Philippine Government. At the international level, it supports the implementation of the commitments to the following Conventions and Treaties, among others:

- Convention on Biological Diversity (CBD)
- Convention on Wetlands (Ramsar Convention)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention)
- Convention on International Trade of Endangered Species of Wild Flora and Fauna
- Convention on Combating Desertification
- United Nations Framework Convention on Climate Change (UNFCCC)