A National Wetland Action Plan

for the

Republic of the Philippines

A NATIONAL WETLAND ACTION PLAN

for the

REPUBLIC OF THE PHILIPPINES

Chapter 1

Introduction

The Republic of the Philippines is richly endowed with a variety of wetland areas which include mangroves; coral reefs; seagrass beds; lakes and reservoirs; rivers, estuaries and deltas; marshes; swamps; and rice paddies. Because of the country's extensive coastline (over 18,400 kilometers in 7,107 islands) coastal wetland types prevail, though other types are well represented and are ecologically and economically significant.

Human dependence on wetlands is high. A high proportion of human settlements is located on sea coasts, the shores of lakes or beside rivers, in order to take advantage of the range of benefits that wetlands provide. Many of the communities along the coastline are dependent on fishing for their livelihood, and are thus dependent on the productivity of the mangroves, estuaries, seagrass beds, coral reefs and algal flats to maintain fish, shrimp, crab and mollusk populations. Mangrove forests and coral reefs frequently serve as sources of subsistence or income-support during hard times. Inland, the agricultural community frequently depends on the flow-regulation function of wetlands to maintain river flows during the dry season. Other communities depend on the lake fisheries for their livelihoods. With the increasing urbanization, there is a growing dependence on wetlands, whether natural or artificial, for a reliable water supply to cities.

In recent years, there has been increasing recognition in the Philippines of the importance of the country's wetlands, stemming in large part from the work of NGOs and POs with coastal fishing communities, but also deriving from the work of government agencies charged with the conservation of natural resources. The Integrated Protected Areas System Project of DENR has focused attention on the need for a comprehensive system of reserves to protect the diversity of natural features, including wetlands. Until now there has not been a corresponding focus on the need to manage those wetlands which are outside protected areas in such a way as to ensure that their benefits continue to be available.

The concepts of integrated planning and management and sustainable development are beginning to be recognized at the program development levels of government. Unfortunately this recognition is occurring even as the values of wetlands in many areas are under serious threat from a range of impacts.

The time is now ripe for the Government of the Philippines to adopt a program of actions to ensure the maintenance of wetland benefits which can contribute, through sustainable use, to the development process and the quality of life in the Philippines.

This Action Plan sets out a series of actions which will be undertaken over the next few years to enhance wetland conservation.

It should be noted that this Action Plan deals with the whole range of wetlands in the Philippines, including those which are within protected areas and those which are outside protected areas. Both can be managed in such a way as to provide an ongoing optimal range of benefits, though the priority given to a particular benefit may depend on whether the wetland has protected area status or not.

Chapter 2

Wetland Conservation in the Philippines - The Issues

This chapter explores a wide range of issues which affects wetlands in the Philippines and develops a series of actions to be taken which will contribute to wetland conservation and sustainable use.

Definition and Classification of Wetlands

The Philippines does not yet have either a nationally accepted definition of wetland or a system of classification of wetlands. This situation detracts from the ability of managers and law enforcers to present a coherent and united approach to the conservation and sustainable use of Philippine wetlands.

An accepted definition of what constitutes a wetland will help to ensure that policies and legislations that deal with wetlands will be interpreted and implemented in the same way in all parts of the country. Similarly, a national system for classifying wetlands will contribute to the success of a range of development-support activities such as land use management and environmental impact assessment.

Wetlands Policy

There is at present no overall national policy on wetlands. A variety of policies formulated by diverse agencies contain elements which relate to, or impinge on, wetland conservation and sustainable use. However, there is not necessarily any coordination or common goal. Without a national 'umbrella' policy there is little chance of a coherent approach which can ensure optimal benefit from the wide variety of wetland types which occur throughout the country.

Any wetland policy, which is developed for the Philippines, should have as basis the principle that the significant values of wetlands, and the potential impacts of proposed activities on those values, will be identified before any decision is taken to allow destruction or alteration of any wetland.

The significant values will vary from one wetland to another. For example, a protected wetland may have as its most significant value the protection of wildlife habitat, while a wetland in an agricultural setting may have as its most significant value the provision of water supply to crops. A wetland upstream of a metropolitan area may have as its most significant value reduction of flood hazards. If these

significant values are not identified, the consequences of wetland alteration or destruction can be both unexpected and costly.

International Conventions and Wetlands of International Significance

A literature review carried out in 1990 indicated that the Philippines had 63 wetlands which met the Ramsar criteria for wetlands of international significance. While there is a need for field checking to determine whether this assessment is still accurate, it is clear that the Philippines has a number of internationally significant wetlands. However, as of 1992 there are no sites listed under international conservation agreements, compared to 11 in India, 8 in China, 7 in Indonesia, 4 in Sri Lanka, 3 in Nepal, 3 in Thailand and 1 each in Korea and Vietnam.

The Ramsar Convention provides a forum for international cooperation in wetland conservation. In many cases the factors which affect the health of wetlands, such as air and water pollution, are not limited by national boundaries. In addition, much of the wetland fauna is made up of migratory species which are dependent on habitats in widely spaced regions of the world and whose conservation and management require international cooperation.

The Philippines has acceded to the Ramsar Convention effective November 8, 1994 by virtue of the acceptance and inclusion of Olango Island Wildlife Sanctuary on the List of Wetlands of International Importance especially as Waterfowl Habitat.

Inventory of Wetlands And Wetland Benefits

The only recently published inventory of Philippine wetlands is a preliminary compilation of information which was prepared by the Asian Wetland Bureau-Philippines, Haribon Foundation and the DENR. Other inventories include one contained in an atlas and GIS prepared by the Bureau of Soils and Water Management, and a 1976 inventory of Philippine rivers prepared by the then National Water Resources Council (now Board). The existence of these inventories is not widely known. There is an urgent need both to disseminate the information in these inventories to agencies with wetland-related responsibilities and to build on that information to prepare a comprehensive inventory of Philippine wetlands and their values.

Wetland Legislation

There is at this time no specific and comprehensive

wetlands legislation in the Philippines. Because of the way in which laws relevant to wetland conservation and sustainable use are scattered through the body of legislation, it can be a difficult and time consuming task to identify all the appropriate legislation which is relevant to a particular situation. A compilation of Philippine Environmental Law was published in 1983 by the National Environmental Protection Council. While that document continues to have some usefulness, this is limited because of the substantial body of new environmental legislation that has come into effect since its publication. The lack of an up-to-date compilation hinders management of wetlands, particularly law enforcement.

Identification of all the relevant laws is beyond the resources available for the preparation of this document. However, the following laws have been identified as being either significant or requiring modification, and they are sufficient to give an indication of the legal situation. It is emphasized that this represents only a small selection of the relevant legislation:

General

- The National Integrated Protected Areas System Act of 1992 Republic Act No. 7586) provides for the establishment and management of a National Integrated Protected Areas System (NIPAS), defining its scope and coverage. It sets out seven categories of protected areas, though there is provision for the creation of others. While the Act does not specifically mention any ecosystem type, it is clear that it can encompass wetlands under a variety of reserve types;

- P.D. No. 705 sets out the responsibilities of the DENR and PAWB for the protection, development and preservation of national parks, game refuge and wildlife sanctuaries, and the enforcement of laws and regulations concerning them;

- The National Irrigation Administration (under Republic Act No. 3601 and P.D. 552 of September 1974 and P.D. No. 1782 of July 1980) has the function of studying, improving, constructing and administering all national irrigation systems in the country, and of achieving the optimum and diversified utilization and control of water by undertaking integrated or multi-purpose irrigation projects including communal and pump irrigation projects. This provides considerable power to control and/or affect wetlands;

- The National Water Resources Council, created under P.D. No. 1067, regulates the utilization of all water

resources in the country.

Wildlife

× Executive orders and presidential proclamations have been issued to protect particular endangered species, though there is at this time no up-to-date legislation on wildlife protection. The Wildlife Act No. 2590 dates from 1916. It has recently been reviewed and a new draft prepared to bring it into line with current values and knowledge and the requirements of wildlife protection;

Wilderness Areas and Green Belts

× Letter of Instruction No. 917, Series of 1979 provides that all areas declared as wilderness areas or green belts shall be closed to any form of exploitation.

Mangroves

× Proclamation No. 2152, administered by the DENR, declares all mangrove swamps as forest reserves. Other legislation under the jurisdiction of the DA makes it illegal to convert mangroves to fishponds.

Fisheries

× P.D. No. 704 (Fisheries Development Decree of 1975) deals with marine resources and swampy areas identified by the landscape classification committee of the Bureau of Forest Development and released to the Bureau of Fisheries and Aquatic Resources.

  This Decree also contains a provision prohibiting fishing by vessels of more than three tons gross within seven kilometers of the coast (recently extended to fifteen kilometers), so as to reserve that zone for municipal fishing.

Catchments of Dams and Reservoirs

× Executive Order No. 224 of 16 July 1987 gave complete control over the watershed of five major reservoirs and two geothermal projects to the National Power Corporation.

Pollution

× Republic Act No. 3931, as amended by P.D. No. 983, gives the responsibility for preventing and abating air, water and other types of pollution to the National Pollution Control Commission (now the Environmental Management

Bureau);

- The Mineral Resources Development Decree (P.D. No. 463) provides for the punishment of any person who willfully causes or permits sludge or tailings and other mine wastes to accumulate or flow from a mining area so as to cause danger, injury or destruction to any public land, rivers, streams or other public property; and Republic Act No. 7942, Section 19 of 03 March 1995 expressly provides that no mineral agreement of financial or technical assistance agreements applications shall be allowed in proclaimed watersheds, mangrove forests, game refuge and birds sanctuaries and in areas expressly prohibited under the National Integrated Protected Areas System under Republic Act No. 7586, DAO No. 25, Series of 1992;

- The Philippine Water Code gives the National Pollution Control Commission (now the Environmental Management Bureau) the power to prohibit and regulate the application of agricultural fertilizers and pesticides in areas where their application may cause pollution of water sources;

- Marine Pollution Decree of 1976 and P.D. No. 979 deal with a national policy to stop marine dumping. Under this law and P.D. No. 600 the disposal of industrial effluents in marine and inland waters is prohibited. The Philippine Coast Guard is responsible for preventing and controlling pollution of the seas and other water bodies within the territorial jurisdiction of the Philippines.

Law Enforcement

One of the major factors contributing to the destruction of wetland in the Philippines is the low level of law enforcement. This situation can be traced to five factors: a shortage of manpower in the field; low levels of logistic support; a reluctance to enforce laws at the field level (both by staff of the relevant management agency and by the military and police); payment of bribes to law-enforcers; and a lack of confidence on the part of field staff that they will be backed up by higher authorities if they take law enforcement action. There are few field patrols which might apprehend law breakers, and when infringements are detected they are seldom followed up in courts. It has been reported that a number of natural resources management laws contain unrealistically low penalties and fines which are no longer a deterrent to unauthorized use or destruction of natural resources, including wetlands. Similarly, in some cases, penalties are too severe, with the result that there is a reluctance to enforce the law. For example, the

penalty for possession of explosives for blastfishing is as high as 12 to 25 years imprisonment.

Overlap of Responsibilities among Government Agencies

Although DENR-PAWB is charged with the management of the national system of protected areas, several other government agencies have control over important wetland areas. This seems to be because there is little recognition that protected areas, including wetlands, can be managed for a multitude of compatible functions, including conservation, catchment area protection, water supply, flood control, and tourism. As a result, wetlands which, because of their natural values, should logically be managed by a nature protection agency are being managed by agencies with a variety of interests generally far removed from nature protection.

In addition, yet other agencies have operational or policy-making responsibilities which impinge on wetland conservation. There is little attempt to coordinate their actions to achieve integrated management of wetlands, though some agencies are promoting integrated treatment of some wetland benefits such as water supply.

The effect of this duplication and lack of coordination is that there is a confusing fragmentation of policies and a costly duplication of manpower, equipment and administrative structures which the Philippines can ill afford. This leads to a reduction in the quality of management of wetlands overall.

The government agencies which have responsibilities (management or policy-making) directly affecting wetland areas include:

- × Department of Environment and Natural Resources;
- × Department of Agrarian Reform;
- × Bureau of Fisheries and Aquatic Resources (Department of Agriculture);
- × Bureau of Soils and Water Management (Department of Agriculture);
- × Local Water Utilities Administration;
- × Metropolitan Waterworks and Sewerage System;
- × National Economic and Development Authority;
- × National Water Resources Board;
- × National Power Corporation;
- × National Irrigation Administration;
- × Philippine Council for Agriculture and Resources Research and Development;
- × Philippine Council for Aquatic and Marine Research and Development;
- × Southeast Asia Fisheries Development Center;
- × Philippine Tourism Authority (Department of Tourism);

× The Integrated Area Development Project Offices;
× Laguna Lake Development Authority.

In addition, a considerable number of NGOs and POs are active in the fields of wetland conservation and wetland resource management. If wetlands in the Philippines are to be managed sustainably and in a manner that will yield the maximum range of benefits while supporting the development process, it is important that there be coordination in the formulation and implementation of policies which can affect wetlands.

Management of Wetlands and Areas With Wetlands

Manpower

The necessary staff needed for the management of wetland areas is insufficient. It does not only apply to DENR but to other government agencies as well.

Training

Conservation and management of wetlands requires a wide range of knowledge and skills. At present, there is lack of personnel with appropriate training or experience in the management of wetland areas. In addition, there is a national shortage of qualified instructors in relevant fields of wetland conservation and management.

Another issue is the transfer of knowledge to local staff. A recent large assistance project in natural resource management was carried out by consultants who maintained an "arm's length" distance to conservation staff, so that the transfer of knowledge was minimal.

Finance

Budgets allocated to management of important wetland areas are generally low and this is hindering the implementation of conservation and management measures. Moreover, the budgetary process generally does not reflect the real needs of protection and management of wetland values because these needs are seldom translated into financial estimates which should be included in the annual budget.

Regional/Integrated Planning

The integrated area development approach was first adopted by the Philippine Government in 1973. Since then, thirteen integrated area development projects were established with shared three major objectives: regional balance in social and economic opportunities; economic development of areas with extensive

under-utilized resources; and improvement of agricultural productivity and creation of employment to raise the income of rural populations. The various Integrated Area Development Projects were formerly coordinated by a National Council on Integrated Area Development, but this was abolished in 1989 and responsibility was transferred to the relevant provincial governors.

These integrated area development projects have cross-sector approach and typically involved a range of government agencies. While such an approach is far preferable to the sectoral planning that occurs in most countries, its success depends heavily on the willingness (and capacity) of the relevant government agencies to cooperate and on the technical capability available to the project agency. Since negative impacts on wetlands most commonly arise from sectoral planning which does not take into account the various benefits provided by wetlands, these integrated planning projects have considerable potential to contribute to conservation and sustainable use of wetland areas. However, the results have been somewhat mixed, with some projects producing development plans with a reasonable likelihood of protecting wetland values and others being less likely to do so.

Unfortunately, outside these project areas there is still a strong tendency toward purely sectoral planning. This leads to less than optimal use of wetland areas which could be overcame by the use of an integrated approach.

Significant contribution to the maintenance of wetland benefits by different government agencies could be made by the development of a set of general guidelines for the management of different categories of wetlands - e.g., ‘urban’, ‘rural’, ‘coastal’, etc.

River Basin/Watershed Management

Because wetlands are sensitive to influences arising higher in the catchment (upstream) area, and because wetlands frequently provide significant benefits to downstream areas, it is important that management of areas containing significant wetlands be carried out using a river basin or watershed approach.

Protection of Wetlands under NIPAS

In view of the threats to wetlands, it is particularly important that those wetlands which have high biodiversity values, as well as wetlands which contribute to the maintenance of non-wetland sites with high biodiversity, be identified as a matter of priority and included in the NIPAS.

Management Plans

There is no known protected wetland areas with approved

management plans, though background and draft documents have been prepared for a few sites. Management plans are an essential tool for the conservation of wetlands. The lack of such plans might end up with unclear understanding of the values of areas for which they are responsible and of their goals in managing those areas.

The usefulness of management plans for conserving wetlands is not restricted to protected areas. Management of any wetland area would be likely to benefit from the development of a management plan. This might apply particularly to areas which are the subject to multiple usage. Communities, which utilize wetland areas, should be encouraged to develop management plans for those areas in conjunction with relevant government agencies. Too often, management plans focus only on the physical characteristics of the area in question and do not take into account the socio-economic situation of the local people who may be dependent on one or more of the functions or uses of the wetland area.

Boundaries of Protected Areas

The Philippine Constitution requires that the boundaries of national parks and other protected areas and forest areas must be marked clearly on the ground and thereafter such areas may not be decreased except by an Act of Congress. The marking of boundaries in the field has recently become the responsibility of relevant Protected Areas Management Boards under the provisions of the NIPAS legislation. In the past, very few such areas have had boundaries marked. This resulted to the difficulty for the government to enforce the law and for the local people, developers and management staff uncertain of their rights and limitations in the vicinity of the areas. It is expected that the assumption of this responsibility by the Protected Areas Management Boards will lead to an improvement of this situation, though this will depend on their resources including trained manpower to undertake the task.

It is important that the identification of boundaries for wetland protected areas be done in consultation with local people and in conjunction with the delineation of buffer zones. This is to ensure that there is local commitment to, and recognition of, the boundaries, and that there is provision for adequate and viable buffer zones.

Effects on Indigenous Communities

The Philippines contains some 87 ethno-linguistic groups. Indigenous communities have a diverse culture, lifestyles, values or beliefs that cause them to inter-relate with wetlands in ways different from the majority of the population. This needs to be taken into account in framing and implementing wetland conservation measures.

Wetland Utilization by Indigenous Peoples

A number of indigenous groups in the Philippines traditionally utilize wetland areas or wetland products. Their resource management methods should be studied to determine whether they provide approaches which can be utilized by more recent settlers in wetland areas. An example is provided by the Agusan Marsh area where recent settlers are failing to benefit from the many resources of the wetland. Studies of the resource management strategies of the local Manobo people could suggest ways in which the new settlers can sustainably benefit from wetland resources.

Apo Island (Negros Oriental) and Sumilon Island (Dumaguete)

These islands are functioning as community-managed marine reserves. They are the product of a cooperative effort between Silliman University, Asia Foundation and resident communities. They are considered to be important management models which can be applied in other areas of the Philippines and Southeast Asia.

The Apo Island was proclaimed as Protected Landscape/Seascape under Proclamation No. 438 on August 4, 1994. Although, Sumilon Island is not gazetted as protected area, it was declared in 1980 as the first nationally protected Fish Sanctuary in the Philippines under BFAR Administrative Order No. 28, Series of 1990.

Artificial Habitats/Artificial Reefs

The primary function of artificial reefs is habitat enhancement, so as to provide additional areas where ecological cycles can occur, leading to an increase in biomass. Often, this is specifically aimed at increasing fish biomass, so that there is the potential for a sustained increase in fish catch.

However, at present the majority of artificial reefs, which have been constructed in the Philippines, are used as fish aggregating or attracting devices, so as to make it easier to catch the existing fish stocks. With such an approach there is no increase in biomass, and the likely result is a long-term decrease in fish catch. There is a need to teach fishermen and NGOs techniques for the proper design, management and monitoring of artificial reefs.

Public Participation

In the past, public consultation was seldom done with regard to resource management. Now, consultation with the public, the scientific and business communities is a common approach of the Philippine government. This process is

particularly important in the case of proposed government actions in relation to wetlands where, because of the range of benefits that wetlands provide, there is the potential for actions to have significant impacts on a wide cross-section of the community. Consultation with the wider community also provides the opportunity for government agencies to benefit from the expertise and special knowledge available in the community.

If the process of consultation with the community on the importance of resource use and social policy is to be carried out successfully there needs to be strategies that will ensure that all points of view can be heard and taken into account.

Role of non-government organizations

Perhaps more than any other country in Southeast Asia, the Government of the Philippines works with and through community organizations in developing and implementing its programs. This is particularly true in the area of wetland conservation and management, where a considerable number of NGOs are involved in community projects associated with resources of the marine and coastal zones. Despite this, there are no clear statement at a national level that this is an approved or preferred mode of operation. As a result, NGOs are sometimes in doubt as to their role, and perhaps more importantly, local government officials are not sure of their authority to deal with NGOs.

Community-based organizations (people's organizations)

The process of public participation in natural resource management is frequently more effective if communities have some organization which can act to focus and channel their responses and initiatives. While some communities will spontaneously form organizations, many (perhaps most) will not have the capability or knowledge to initiate this process. The role of government and NGOs is therefore to catalyze the process of forming people's organizations such as community-based resource councils.

Measures for the conservation and sustainable use of wetland resources will be more effective if they have the community-support, and will generally be most effective when they are actively managed (if not also designed and implemented) by the community. Community-based organizations provide a useful mechanism for achieving this situation.

Awareness of Wetland Values

While there is a growing awareness among government agencies of the importance of the conservation and sustainable use of wetlands, there is still no in-depth understanding of the basic ecology of wetlands, the benefits provided by wetlands, or the sensitivity of wetlands to disturbance. While the need to

remedy this situation is widespread, it is particularly important that the awareness of regional and local government staff be increased in view of the national policy of devolving decision-making to the local government level.

In general, wetlands are not high in the public consciousness. However, in the marine environment the illegal practices of fish dynamiting and *muro-ami* fishing are now being condemned by many sectors of society. Press and television reports have given attention to these issues, and there is growing public support for the conservation of marine natural resources.

Particular attention needs to be paid to raising the awareness of people in communities which utilize wetland resources. This should focus not only on the benefits, which are provided by local wetlands, but also on appropriate management objectives which can lead to sustainable utilization of the wetland resources. This will make it easier to embark on particular projects such as the establishment of marine reserves, fish sanctuaries, artificial reefs, rehabilitation and reforestation of wetland areas, alternative livelihood projects, etc.

Amongst the general public, support for and commitment to the preservation of biological diversity in protected areas is generally lacking. To most Filipinos, the term national park is synonymous with recreation area, with connotations of swimming pools, music and facilities for semi-urban recreation.

Formal Education

Few university courses in the Philippines contain specific components about wetlands other than coral reefs and mangroves. As a result there is a general lack of understanding among the policy-makers, planners and natural resource managers of the ecology of wetlands and of the principles of wetland management.

The existing courses, which deal with fisheries, marine and coastal wetlands, are very much oriented toward exploitation. That is why most graduates go into commercial fishing or aquaculture fields. There is a need to broaden these courses to ensure that the students are aware of the whole spectrum of benefit of wetlands and the need for a cross-sectoral approach in wetland resource management.

In addition, some courses tend to be fairly narrow in their approach. For instance, a forestry course will not likely contain materials on the interactions between forestry management practices and wetland benefits.

Information Base for Conservation and Management of Wetlands

Up-to-date information about wetlands is not always available to facilitate good management. Such information can be in many forms (reports, maps, air photos, magnetic tape, etc.), and includes categories such as: the location of wetlands; the habitats that occur at wetland sites and their condition; changes to the wetland over time; species present at a site, preferably linked to habitat type; movements/migrations of species and changes in their numbers over time; the life cycles of important species and their habitat requirements; the extent and depth of open water and changes in these parameters over time; locations of land uses and changes in land use over time.

Information Handling

Much of the information required for wetland management will need to be presented and manipulated as maps. Indeed, the preparation of maps is a basic component of management and planning of natural resources. Currently, PAWB and the Regional Offices of DENR have only very basic mapping capabilities. This is a serious deficiency which is hindering the development and extension of management of wetlands.

The mass of information which must be collated and manipulated in the integrated management of natural areas such as wetlands can be best handled by computers, either as a database or a Geographic Information System (GIS)(preferably both). There is no comprehensive computerized database of Philippine wetlands or wetland values. Such a database would be extremely beneficial to the preparation of proposals for protected areas and for development of management plans since it would allow immediate comparisons to be made between wetland areas, as well as checking of the status of species, habitats, etc. Similarly, a GIS is highly desirable for manipulating and synthesizing mapped data on wetland areas.

Reference Material

Though DENR-PAWB is the government agency responsible for the identification and protection of wetland reserves, its library holdings on wetland topics are rudimentary. In addition, there is no proper library facility. The library materials are housed some distance from people who require access to them. DENR-PAWB should be equipped with an up-to-date library on wetland topics.

Research

There is at present a severe lack of information relevant to the management of Philippine wetlands other than coral reefs and mangroves. While the information gap is large, it is important that scarce research funds and manpower are not

expended on research which does not contribute to answering pressing problems. Some institutionalized form of identification and prioritization of management-useful wetland research is needed.

Existing bodies such as PCARRD or PCAMRD and ERDB, might provide an appropriate forum for the development of wetland research policies and priorities. However, it is likely that there would need to be a review of membership and procedures in these bodies to ensure that the appropriate expertise and information was available to allow them to perform this function.

Whatever mechanism is adopted for developing and reviewing national wetlands research policy, this should include consultation with relevant government departments, research institutions and NGOs. The proposed National Wetland Consultative Group should be involved in the preparation of policies and programs by the research policy body.

Recreation and Tourism in Wetlands

The concept of recreation and tourism as uses of wetlands (other than coral reef tourism and bird watching) is not well understood in the Philippines. There is a general impression, among government staff as well as the general public, that wetlands are not suitable for recreation and tourism. Similarly, there is a tendency to see recreation and tourism as activities which are not compatible with other uses of wetland areas. This is inhibiting the realization of the social and economic benefits which can be derived from wetland recreation and tourism.

Two of the many factors limiting management of wetland protected areas in the Philippines are finance and manpower. Tourism has the potential in some locations to provide these inputs to management through the operation of concessions for tourist operations or facilities which have as a condition of contract the requirement that the concessionaire provide funds or management services for the site. This approach could be extended to wetlands outside protected areas once successful models have been developed.

Despite the potential for tourism to contribute to the conservation of wetland areas, there are very real risks that tourism, including ecotourism, will have deleterious impacts on wetlands. Guidelines should be adopted to ensure that benefits of tourism are maximized and impacts minimized, and these guidelines should form the basis of legally binding permits or licenses issued for tourism operations in wetland protected areas.

Aquaculture

Aquaculture developed rapidly in the Philippines after the mid-1970s, mainly because it was seen as a highly profitable business with the potential to generate large volumes of foreign exchange. The general enthusiasm among investors were fuelled by government support in the form of extension services and credit assistance to allow farmers to:

- × intensify production in existing areas;
- × expand their area of fishponds;
- × start commercial operations in new waterbodies such as lakes and reservoirs; and,
- × undertake commercial hatchery and culture of new or alternative species.

By the mid-1980s there were fourteen aquaculture credit programs of which eight were foreign-assisted and six locally funded. As will be seen from the sections below, there were negative as well as positive impacts of these programs.

Brackish Water Fish/Prawn Ponds

While, under ideal conditions, fishponds can be extremely productive and can produce considerable export earnings, there are a number of deleterious aspects of this activity.

Mangrove forests are frequently destroyed to create brackish water fishponds in the inter-tidal zone. In the drive to expand the aquaculture sector some 250,000 ha of the country's mangroves have been converted to fishponds. The highly productive mangrove ecosystem which formerly occupied these areas and provided a diversity of products has been replaced with an artificially managed system producing only one or two products. The value of these destroyed mangroves has now been recognized by the government which has prohibited the issuing of new lease agreements that would give private investors access to virgin swamplands for conversion to fishponds.

There is also a tendency for fishponds to switch from production of milkfish, which makes an important contribution to the domestically-consumed protein, to shrimp which are exported, so that there is a net loss of locally available protein.

The effluents from aquaculture ponds often contain significant concentration of nutrients, from excess food applied to the pond and from waste products of the fish stocks. In addition, there is the problem of discharge of antibiotics which are sometimes applied prophylactically to reduce the chances of disease in the closely packed ponds. Other chemicals are applied to ponds to remove unwanted forms of life before filling and stocking. Flushing of these chemicals poses a threat to the nearby wetland environments.

In order to obtain the required salinity in the fishponds, seawater is diluted with freshwater, usually taken from aquifers rather than from rivers which may be polluted. This poses a number of serious threats to the environment, including saltwater intrusion to the lowered aquifers, subsidence of the land surface, and reduced availability of freshwater to other users. The government has the ability to regulate this under the 1987 Constitution that states that "all natural resources are owned by the State".

Cage and Pen Culture

More than seven percent (7%) of the area of inland waters in the Philippines is devoted to aquaculture in pens and cages. There is little if any regulation of the area that can be used for such activities, and many development schemes have encouraged them. One of the major problems with the rapid increase in cage and pen culture, is that it tends to displace existing fishermen. These local fishermen do not have the capital to switch to cage culture, and so are either pushed out of the fishery or are left with severely diminished catches. Limits need to be placed on the cage culture for each lake, based on its carrying capacity.

Some people have proposed that under Philippine conditions lakes and reservoirs can be more sustainably used if managed or open water fishing rather than for pen and cage culture. This is a proposition that should be investigated.

Excessive use of lakes for pen and cage culture leads to accumulation of waste products and an excess of feed, eventually polluting entire lakes. It has been reported that this has already happened to Lake Laguna and is occurring in Sampaloc Lake and Taal Lake. In some cases, aquaculture projects which have adversely affected the ecology of Philippine lakes (and the livelihoods of local fishermen) have been carried out with funding from development assistance agencies.

Introduction of Exotic Species

The introduction of exotic species has already caused a decrease in native fish stocks in some areas as a result of competition between introduced species and native ones, and through predation of native species by those introduced. For example, in Lake Lanao, stocking with the white goby and other predatory fishes has caused a decrease in fish stocks and extinction of some of the eighteen endemic species. Similarly, the introduced catfish *Clarias bactrachus* has already replaced the native *Clarias macrocephalus* in some parts of the country. A national policy on introduction of exotic species to wetlands is needed.

Water Pollution

There is a well-defined national policy for the prevention and control of water pollution coordinated by the Environmental Management Bureau and administered by a large number of national and local bodies.

Solid waste disposal is the responsibility of local governments with advice from the national government.

Water pollution has become a significant problem in some areas. Of the more four hundred rivers in the Philippines, around forty were considered dead by 1986 as a result of low dissolved oxygen, and high levels of hydrogen sulfide, suspended solids and heavy metals.

Major problems arise: domestic sewage and solid wastes; animal husbandry and agriculture-based industries such as piggeries, tanneries, poultry production, sugar processing and distilleries; textile factories; pulp and paper mills; mine tailings; and cyanide from metal-recovery processes.

Environment Impact Assessment

EIA Requirements and Procedures

Environmental Impact Assessment (EIA) requirements were introduced in the Philippines in June 1977 by P.D. No. 1151 (Philippine Environmental Policy Decree). All proponents of projects which are likely to have a significant effect on the quality of the environment are required to prepare an Environmental Impact Statement (EIS).

An EIA system was formally established by P.D. No. 1586 in June 1982. This decree sets out that proponents of projects which fall within the definition of Environmentally Critical Projects, and proponents of projects located in Environmentally Critical Areas, are required to prepare an EIS.

Twelve categories of areas have been defined as Environmentally Critical Areas:

- × all areas designated by law as national parks, watershed reserves and wildlife preserves and sanctuaries;
- × areas set aside as aesthetic potential tourist spots;
- × areas which constitute the habitat for any endangered or threatened species of indigenous Philippine wildlife;
- × areas of unique historical, archeological or scientific interest;
- × areas which are traditionally occupied by cultural communities or tribes;
- × areas frequently visited and/or hard-hit by natural

calamities (geologic hazards, floods, typhoons);
- × areas with critical slopes;
- × aquifer recharge areas;
- × mangrove areas;
- × coral reefs; and,
- × water bodies.

Scoping guidelines have been developed for each type of Environmentally Critical Project. However, there are not yet any scoping guidelines for Environmentally Critical Areas. Guidelines which take into account the special characteristics of these systems are needed for scoping EIS in such areas. This would ensure that the values of sensitivities, which cause such systems to be listed as Environmentally Critical Areas, receive attention in the EIA process.

There has been dissatisfaction expressed in some Philippine agencies with the standard of evaluation and balancing of costs and benefits of proposed activities, and suggestions that the methods used by Philippine consultants, and accepted by government agencies, are not 'state of the art'.

The Environmental Management Bureau has devolved certain EIA powers to DENR regional offices in line with general government policy; however it is not planned to recruit any additional staff to undertake the specialized additional workloads involved in the scoping and assessment of EISs and in monitoring compliance with conditions of permissions. This has the potential to detract significantly from the conservation and sustainable use of wetlands.

The maximum penalty under EIA legislation is P50,000.00 for every violation. This is grossly inadequate. It is less than the cost of preparing a full Environmental Impact Statement, and a very small fraction of the cost of establishing a major project. As a result there is the potential for developers to regard the possibility of being fined this maximum amount as a reasonable risk to take to avoid both the EIA procedure and the associated risk of being refused permission to operate in a particular area or in a particular manner.

Mitigation Measures

An important aspect of control of environmental impacts is the incorporation of mitigation measures into project design. The identification of appropriate mitigation measures depends on the accurate identification of impacts, but also on a knowledge of the range of mitigation measures that might be applicable.

At present the EIA procedures in the Philippines rely on the proponent to identify applicable mitigation measures. However, not all proponents will have the expertise or breadth of

experience to be aware of the range of such measures. It is advisable for relevant government agencies to develop lists of mitigating measures which might be appropriate for reducing or eliminating impacts on different types of resources.

Development Aid Projects

By their nature, development aid projects seek, directly or indirectly, to change the socio-economic situation in the Philippines. Because of the complexity of forces at work in shaping the socio-economic environment, such efforts have the potential for serious unforseen adverse consequences. Wetlands, with their multitude of benefits to different sectors and their susceptibility to impacts from actions occurring in the watershed, are probably more prone than other ecosystems to experience unforseen negative impacts.

For this reason it is important that there be thorough and stringent environmental impact assessment of development aid projects which might affect wetlands. Philippine law already requires such impact assessment, though the results of some projects suggest that the assessment process may not have been sufficiently stringent.

Illegal Settlement/Logging/Poaching

Illegal settlement constitutes a very significant threat to wetlands. Frequently, illegal settlers make use of infrastructure (particularly roads) constructed for development projects to gain access to wetland areas which are then cleared and/or drained. This is such a frequent occurrence that it is a predictable environmental impact of any project which involves the creation of infrastructure in or near a wetland area.

There is a general national policy that project implementation agencies or corporation should be responsible for protection of the environment within project areas, including prevention of illegal settlement. This policy should be implemented and enforced, but should also be extended to a responsibility to prevent the use of project infrastructure by people carrying out illegal activities (settlement, logging, poaching, etc.) whether these are done inside the project area or outside it. This should become a condition of licenses, permits and Environmental Compliance Certificates, with appropriate penalties for non-compliance.

These constraints on the use of wetland areas by illegal operators who make use of project infrastructure should not be taken as any limitation on the rights of indigenous communities to continue their use of wetland resources where such use is sustainable and consistent with national goals.

Destruction of Wetland areas

Mangroves

The benefits provided by mangroves have probably been better described than for any other type of wetland. The most significant of these are: nutrient export to adjacent areas; breeding and nursery area for a wide range of fish, mollusk, crustacean, many of which are of economic importance; coastal protection (prevention of erosion); and source of food, fuel, building materials, and other commodities for local communities.

It is generally agreed that the mangrove areas of the Philippines have been reduced by about two-thirds. This is a cause of great concern, considering the numerous benefits that mangroves provide. It has been estimated that less than five percent (5%) of the remaining mangrove area is old-growth forest, which means that the major part of the remaining mangrove area is almost certainly not yielding the full range of benefits that would be available from mature forest.

Mangrove areas have been destroyed or degraded by a variety of impacts, the most significant of which has been conversion to brackish water fishponds. Other factors were woodchipping, charcoal and firewood production, extraction of building and construction materials, pollution from mining and industry, and changed hydrology due to earthworks behind the mangroves. Over-exploitation by local communities continues to play a significant role in the destruction of mangrove areas.

The conversion of mangrove to fishponds is no longer permitted, though this is not to say that it has been totally eliminated. All remaining mangrove areas have been declared forestry reserves, though this law has not been implemented due to the difficulty of identifying mangrove areas and then marking them in the field. Another difficulty with this approach is that it does not take into account the needs of local communities who frequently rely on mangrove areas for subsistence in difficult period. In fact, considering the important benefits that mangrove forests produce and the limited mangrove resources remaining, this community subsistence use of mangrove is probably the only exploitation of mangrove that should be allowed in the Philippines. An alternative approach to protecting mangroves needs to be found.

Estuaries and Mudflats

Estuaries are semi-enclosed bodies of water which have connections to the sea and the seawater is diluted by freshwater from land drainage. Estuaries are often particularly productive areas because of the nutrients which they receive from the land and the sheltered environments that they provide.

Mudflats occur where sediments settle out of the water body due to a decrease in currents and/or wave action. Extensive mudflats are often associated with estuaries, but also occur in low-energy coastal environments, such as in large bays or in the lee of islands. They are commonly contiguous with mangrove areas. Mudflats can be very productive systems as a result of the nutrients that are brought there along with the sediments. Typically there are high diversities of invertebrates living in and on the mud, and as a result the mudflats provide rich feeding grounds for vertebrates such as fish and waterbirds.

The productivity of estuaries and mudflats can be threatened by pollution from a range of sources. In addition, reclamation for fishponds, industrial sites and housing is reducing the area remaining. Construction activities outside mudflats can have adverse effects on them by causing changes in water flows which erode the mudflats or prevent further deposition. Little attention is generally paid to protecting such areas because of the low levels of awareness of their values.

The location, extent and significant of important areas of mudflats in the Philippines is not adequately known. Similarly, the significance of the various estuaries is not well known. Before the benefits of mudflats and estuaries can be given adequate representation in protected areas, it will be necessary to conduct an inventory of such areas. There are no protected areas which have been gazetted for their values as estuaries or mudflats. These may be included in some existing coastal protected areas, but it is unlikely that their representation in the protected areas system is adequate.

Seagrass Beds

Seagrasses are found on shallow sediments and are often well-developed on submerged reef flats, particularly on the platforms of fringing reefs where they are commonly associated with algal beds (seaweed).

Some seagrass areas have shown to have productivity approaching the theoretical maximum for natural systems.

As well as providing nursery areas, shelter and feeding sites for a large number of invertebrates and fishes, many of which are of economic significance. Seagrass beds are important feeding areas for endangered vertebrates such as *dugong* and marine turtles. Seagrasses have additional importance because a significant proportion of the nutrient produced by seagrass beds can be transferred to adjacent ecosystems such as coral reefs.

Beds of seagrass prevent erosion by establishing sediment and damping wave movements. On reef flats, they may also be

important in reducing the amount of suspended solids in the water which would otherwise smother coral reefs.

The Philippines has the second highest number of seagrass species of any country (sixteen species so far recorded). Known major seagrass areas are: parts of Lingayen Gulf (Bolinao Bay); around Palawan, particularly the northern areas around the Calamian Islands and the Cuyo Islands; the Central Visayas (Cebu-Bohol-Siquijor); and around the coasts of Zamboanga and Davao in Mindanao. There are at present no estimates for the total area of seagrass beds in the country since inventory of this resource is still at an early stage.

Without knowledge of the location, extent and significance of seagrass beds it is difficult to ensure that adequate attention is paid to their protection and sustainable use.

No areas have been set aside specifically to protect seagrasses, though some seagrass areas are protected by virtue of their being included in existing coastal and marine protected areas. While the status of seagrass conservation cannot be assessed, it is fairly certain that not all species are represented in protected areas and that there is no complete coverage of representative seagrass ecosystems.

Coral Reefs

Coral reefs occur around most of the islands of the Philippines, but are best developed in a belt that takes in Palawan, the Sulu Sea through the Visayas, and to the southeast of Luzon.

Due to their physical structure, coral reefs provide many niches for a wide variety of invertebrates and fishes, leading to a much higher abundance and biodiversity that would occur in the open water. They have a particularly high biodiversity, for example: 400 species of coral have been recorded in the Philippines; and 35 percent of the 2,300 species of fishes recorded in Philippine water are reef-associated.

Coral reefs contribute at least ten percent of the fish production of the country, and the aquarium fish industry, which is mainly centered on coral reefs, is worth more than US$1 million per year. Shells and corals from coral reefs form the basis of small-scale rural industries as well as larger commercial enterprises. Additional benefits are derived from the coastal protection function provided by coral reefs which break the force of wave action.

An extensive survey in 1981 showed that at that time, only 5.5 percent of Philippine reefs were in excellent condition, 24 percent were in good condition, 38 percent were in fair condition and 32 percent were in poor condition. The situation is now

probably much worse.

Many reefs are devoid of many of the economically important species due to sustained overfishing and the use of destructive fishing methods such as explosives, poisons and *muro-ami* fishing. Public awareness of the damage done by these methods is increasing, but more efforts needs to be put into assisting fishermen who resort to these method to find alternative sources of livelihood. Other threats come from the siltation caused by unsuitable agricultural practices, mining tailings, and logging in the water catchments which discharge onto the rivers. An example of this is the El Nido Marine Park where siltation caused by logging in the catchment is reported to have virtually eradicated the less tolerant coral species. Shell and coral extraction for sale to collectors and for manufacture of ornaments and souvenirs has had severe impacts in some regions. Significant destruction is being caused by quarrying of coral for use as building material, e.g. as a source of lime.

When Phase II of the IPAS project is completed, it is likely that the coral reefs in the Philippines will be relatively well protected in terms of area and geographical extent. However, without significant increases in the resources (finances, manpower, equipment) available for management of marine areas the condition of these protected areas will continue to decline. In addition, reefs outside protected areas will still need to be managed if their benefits are to continue to be available in perpetuity. One option, which has the potential to contribute significantly to this goal, is the involvement of local communities in the management of reef resources.

Lakes

Lakes are fairly well distributed throughout the major islands of the Philippines. Many of these lakes are formed by tectonic or volcanic activity, for example as a result of tectonic movements (Laguna de Bay), damming by lava flows (Lake Lanao and Lake Manguao) and volcanic crater lakes (Lake Maughan and Yellow Lake). Other important lakes in the Philippines are those formed in the floodplains of major rivers such as the Agusan and Mindanao Rivers of Mindanao.

Lakes are important for domestic, agricultural and industrial water supply; flood-control and flow regulation; hydro-electric power generation; fisheries (fishes and molluscs); aquaculture; wildlife habitat; and genetic resource conservation.

Very few of the lakes are in their pristine state. Impacts include water pollution by population centers, industry, agriculture and aquaculture; over-fishing; siltation caused by deforestation of catchment areas; and the introduction of exotic fish species (most of these impacts are dealt with under other headings in this document).

Eight of the lakes of the Philippines are partially or wholly contained in national parks. The degree of protection afforded by these reservations is low or non-existent because of the lack of field staff, management plans and logistic support. Four of these lakes have fisheries cage culture operations. Only one of the ten priority areas covered by the first phase of the IPAS Project contained a lake area (Mt. Apo Natural Park contains small crater lakes).

No study has yet been done by the government to develop a protected area strategy for Philippine lakes. Such a strategy would need to take into account differences in their mode of formation and the existing floral and faunal communities so as to derive a range of special features and diversity in the country's lakes.

Freshwater Swamps and Marshes

Freshwater swamps and marshes are well represented in the Philippines. Most are found on the extensive flood plains of large rivers.

Swamps and marshes have important benefits such as: flood control and water regulation, water supply, aquifer recharge, and wildlife habitat.

By far, the greatest threat to swamps and marshes in the Philippines is drainage and conversion to other uses. The Pasig River in Metro Manila is perhaps the worst example. The fish populations which formed the basis of an important fishery in Laguna de Bay have now been totally eradicated.

River Basins

There are no very large rivers in the Philippines compared with those in mainland Southeast Asia. The largest river basins occur in Mindanao and Luzon. They are the Liguasan and Agusan Marshes and the Candaba Swamp, respectively. The values of Candaba Swamp are currently being heavily impacted by the flows of lahar from the Mt. Pinatubo volcanic eruptions.

Rivers provide a wide range of benefits, both at the national and community level. Migratory fishes which enter the rivers from the sea are the most important fishery resources of inland waters and support locally important fisheries. Important examples are Lakes Taal and Naujan and their outflow rivers. Rivers also provide drinking and irrigation water to local communities and to large projects as well as constituting an important transport medium. River basins frequently perform important flood control and flow regulation functions.

The major threats to river basins are siltation, water

impoundment, water pollution, over-exploitation of fish stocks, and clearing of riverine and floodplain vegetation. Water impoundment prevents the migration of sediment banks in the lower reaches of rivers, thus affecting the habitat of fish and other riverine species. Pollution of rivers has reached a serious situation, with over forty (40) rivers which are biologically dead, mostly as a result of organic pollution. The Pasig River in Metro Manila is perhaps the worst example. The fish populations which formed the basis of an important fishery in Laguna de Bay have now been totally eradicated.

No complete river basins have been afforded protection, though some sections of major rivers such as the Agusan River are included in protected areas. Several large river basins have been targetted by integrated area development projects.

Reservoirs and Dams

All of the large reservoirs and dams in the Philippines are in Luzon. They have generally been constructed for hydro-electric power generation, although most are also used for irrigation and municipal water supply.

The water bodies behind major dams can have a range of benefits in addition to the obvious ones which are power generation and water supply. These include flood control and flow regulation fishing (open water and aquaculture), and recreation. In addition, the catchments of reservoirs can have important benefits such as conservation of flora and fauna.

The catchments of five major dams in Luzon are under the control of the NPC. These are managed in cooperation with the DENR under a Memorandum of Agreement, but DENR’s involvement is not frequent or detailed.

The major threat to the reservoirs in the Philippines is siltation from deforestation in the catchment. This can have serious economic consequences where it leads to shortening of the life of the reservoir and can also lead to public health problems (by masking pathogens during the treatment process) and increased water treatment costs.

Reservoirs are stocked with exotic fish species. However, the species introduced are not always well suited to the reservoirs. For example, the black bass (*Micropterus salmoids*), a game fish, and milk fish (*Chanos*) are introduced into many reservoirs, even though they will not breed in freshwater. It has been proposed that cage culture be introduced into some reservoirs. Apart from the potential problem of the release of excess nutrients which could cause algal blooms, there is a risk that application of antibiotics to treat the fish stocks will lead to antibiotic contamination of domestic water supplies.

Priority Sites For Action

COASTAL WETLANDS

Cabulao Bay

Known Values: Diversity of coastal ecosystems consisting of shallow reefs with offshore islands, mangroves, rivers, estuaries and mudflats. The endangered *Crocodylus porosus* is believed to occur in the area. It is one of the least disturbed coastal areas in Bohol.

Known Threats: Overharvesting of mangrove products such as nipa, and conversion of mangrove areas to prawn ponds.

Conservation Measures: There is ongoing protection and reforestation of mangrove areas with local community involvement.

Olango Island

Known Values: One of the most important staging areas identified so far for migratory shorebirds in the Philippines. The most important site recorded so far for the rare Asiatic Dowitcher (*Limnodromus semipalmatus*). A diverse coastal ecosystem consisting of extensive coralline sand flats, some mangrove, extensive seagrass beds and off-shore coral reefs.

Known Threats: Serious exploitation of the coastal resources by mangrove cutting, gleaning on reef flats and destructive fishing methods. Heavy hunting pressure on shorebirds from "sportsmen".

Conservation Measures: Gazetted as a reserve.

Inabanga Coast

Known Values: Diversity of ecosystems consisting of a shallow reef, estuary, inter-tidal sand and mud flats, and mangrove. One of the largest areas of mangrove in Bohol with high species diversity. An important wintering and staging area for the rare Asiatic Dowitcher.

Known Threats: Conversion of mangrove to aquaculture ponds; over-exploitation of mangroves and fish stocks; heavy hunting pressure.

Conservation Measures: None yet

Malampaya Sound

Known Values: One of the largest remaining areas of relatively undisturbed mangrove forest in the Philippines is found in the

inner Sound. One of the most important fishing grounds in the Philippines.

Known Threats: Very few at present. Population density is low but will increase markedly in the future.

Conservation Measures: Priority area under the European Union-funded National Integrated Protected Areas Project.

Siargao Island

Known Values: The most extensive mangrove forest remaining in Mindanao and perhaps in the Philippines which provides support to a very large human population.

Known Threats: Seriously threatened by over-cutting of mangroves.

Conservation Measures: Already included as a priority site under IPAS. A zoning plan for the mangrove areas will be implemented under Phase II of IPAS.

Balayan Bay

Known Values: A diverse range of coastal ecosystems including extensive seagrass beds, a fringing reef, and particularly extensive mudflats that are important for migratory shorebirds. Important for utilization by local communities.

Known Threats: Over-exploitation of coastal resources; pollution from coal-fires electricity generating plant at Calaca; conversion of mangrove to aquaculture ponds.

Conservation Measures: None yet.

Buguey Wetlands

Known Values: A very diverse coastal ecosystem including a brackish lagoon, freshwater marshes, mangroves and inter-tidal mudflats. An important area for migratory waterfowl, especially ducks and shorebirds.

Known Threats: There has been substantial conversion of mangrove areas to prawn ponds. There is heavy hunting pressure on waterfowl, and cases of pesticide poisoning of birds.

Conservation Measures: None yet.

Tayabas Bay

Known Values: Very good example of intact mangrove, with a high diversity of invertebrates and fishes. It has an extensive inter-tidal mudflats which is an important staging and wintering

area for migratory herons, egrets and shorebirds, including the vulnerable Chinese egret (*Egretta eulophotes*).

Known Threats: Mangrove areas conversion to prawn ponds; illegal hunting of ducks; and use of dynamite and poisons for fishing.

Conservation Measures: There is a 114 ha Fauna Sanctuary at the Agro-Forestry and Mangrove Research Center. There is on-going mangrove reforestation.

Talabong Island and Bais Bay

Known Values: A mangrove island in a bay with extensive mudflats which support many species of economically important invertebrates and fishes. Large number of ducks, herons and egrets use the island as a feeding area.

Known Threats: Pollution from sugar mill effluent; over-exploitation of resources, especially mangroves.

Conservation Measures: The DENR has proposed the declaration of the island as a protected area with the support of the local government. There is an on-going mangrove reforestation project.

Panguil Bay

Known Values: A very important area for support of local communities; extensive mangroves and inter-tidal mudflats; important for migratory shorebirds, and for Chinese Pond Heron (*Ardeola bacchus*) and the Little Egret (*Egretta garzetta*).

Known Threats: Substantial conversion of mangrove to fish ponds; over-exploitation of resources including fish stocks; domestic pollution discharge.

Conservation Measures: The DENR has implemented a mangrove reforestation project.

Ulugan Bay

Known Values: Between 1,000 and 2,000 ha of high quality mangrove which has minimal disturbance occurs in the inner part of the bay. It represents one of the very few remaining areas of old growth mangrove in the Philippines.

Known Threats: Exploitation of mangrove is low at present due to the low human population in the area. However, there is a threat from oil pollution from a naval station in the Bay.

Conservation Measures: None yet.

Manila Bay

Known Values: Of vital importance to subsistence fishing communities around Metro Manila - undoubtedly the most important wetland in terms of socio-economics in the Philippines.

Known Threats: Threats to Manila Bay are very grave; there has been massive pollution of the bay by untreated domestic waste and industrial effluents; and over-exploitation of the resources has been on-going for a very long time.

Conservation Measures: The bay was closed to active fishing in 1992, but this was challenged legally and has not been enforced.

FRESHWATER WETLANDS

Agusan Marsh

Known Values: The largest and least disturbed freshwater wetland in the Philippines. The only area in the Philippines where swamp forest and peat swamp forest are found. It holds the largest remaining population of *Crocodylus porosus* and *C. mindorensis* in the country. It performs essential flood control and sediment retention functions.

Known Threats: Not critical at present due to the low population density within the marsh, but there is clearance of swamp forest around the periphery of the marsh.

Conservation Measures: Included as one of the priority sites in IPAS I. Management will commence under IPAS Phase II.

Lake Manguao

Known Values: The only lake in Palawan, with at least three species of fishes endemic to the lake. Probably the least disturbed lake in the Philippines with a catchment area of high quality monsoonal forest.

Known Threats: Very few direct threats to the lake at the moment, but migration of settlers into the catchment area is causing destruction of forest around the lake.

Conservation Measures: PAWB is developing protection measures for the lake and its catchment. It is not yet included in the priority sites for IPAS II.

Naujan Lake

Known Values: Very high fish diversity for the Philippines, with many migratory forms which are very important for subsistence fishermen. Very good water quality has been maintained in the lake despite conversion of the catchment, with abundant growth of submerged macrophytes. An important staging and wintering area

for large numbers of ducks.

Known Threats: Overfishing may become a threat in the lake and in the outflow river.

Conservation Status: Proclaimed as a National Park in March 1956.

Sab-a Basin

Known Values: 90,000 ha of herbaceous swamp, some peaty, with small lakes and ponds and some rice fields. There is very little information on the site, but is known to be important as a staging and wintering area for egrets and ducks.

Known Threats: Drainage for rice production.

Conservation Measures: None yet.

Lake Lanao

Known Values: Important in the local economy and culture of the Maranao. Possibly with 18 species of cyprinid fish endemic to the lake. Important for hydro-electric power generation on the outflow river.

Known Threats: Destructive fishing and fish introductions have decimated the endemic fish populations. The hydro-electric plants on the outflow have caused widely fluctuating water levels which have had adverse effects on the fisheries.

Conservation Measures: None yet.

Liguasan Marsh

Known Values: The largest marsh in the Philippines, with populations of *Crocodylus porosus* and *C. mindorensis*. Very important for fisheries and aquaculture.

Known Threats: The bad peace and order situation precludes proper management; drainage for rice cultivation and fish ponds are major problems.

Conservation Measures: A portion was gazetted as a Game and Wildlife Sanctuary, but management has never been implemented.

Candaba Swamp

Known Values: Very important for flood control for the downstream of Pampanga River and as a staging and wintering area for ducks and egrets.

Known Threats: Drainage for fishponds and agriculture are the

major threats. Currently flooding by lahar from the Mt. Pinatubo eruption is a major threat.

Conservation Measures: It has been recommended to be protected under the Ramsar Convention.

Lake Taal

Known Values: Important for fisheries. Has one of the highest levels of diversity of migratory fishes of any lake in the Philippines. The main fishery is based on a clupeid (*tawilis*) endemic to the lake. The lake area has high scenic values and is important for tourism.

Known Threats: Illegal fishing by small mesh size motorized push nets; over-exploitation of migratory fishes in the outflow river by *baklad* (fish trap). Inappropriate development of tourism on Volcano Island.

Conservation Status: Proclaimed as Taal Volcano Island Protected Landscape in October 6, 1996 (Proclamation No. 906).

Lake Maughan

Known Values: A high-altitude crater lake with very high scenic values Important as it forms part of the water supply for General Santos City and for much of the Allah Valley Irrigation Project. There is probably a species of Puntius endemic to the lake. Other endemics are likely to occur.

Known Threats: Fish introductions; slash-and-burn farming in the catchment reducing the water quality. Tilapia (*Oreochromis mossambica*) has been introduced to the lake.

Conservation Measures: Has been proposed as a provincial park. Recommended for inclusion in NIPAS.

Laguna de Bay

Known Values: The most important freshwater wetland in the Philippines in terms of support to local communities. Also used for irrigation water, aquaculture and possibly for domestic water supply in the future.

Known Threats: Industrial, agricultural and domestic effluent; inappropriate development projects (aquaculture, flood control schemes, irrigation); serious over-exploitation.

Conservation Measures: The demolition of a number of fish pens in the late 1980s and in 1996 somewhat improved the situation for the subsistence fishermen.

Conservation Of Wetland Species

The flora and fauna of Philippine wetlands are not well known by the public, or indeed by most government officers. There is a need to increase public awareness of wetlands as habitat of important species so that there is more recognition of the need to conserve wetlands.

Marine Turtles

The Philippines has a number of major nesting areas for marine turtles as well as important feeding grounds of these species. These areas are not all known with certainty. While some work is being done to conserve marine turtles more effort is needed.

Management of one of the most significant turtle areas, the Turtle Islands, involves a population which is shared with Malaysia. Collaboration with the Malaysian wildlife authorities and integration of management plans has been initiated.

Dugong

The largest surviving population of dugong in the Philippines is probably found in the northern coast of Palawan. However, the distribution of the species in Philippine waters is not well known and protection measures are inadequate.

Crocodiles

Two crocodile species occur in the Philippines - estuarine or saltwater crocodile (*Crocodylus porosus*) and the Philippine Crocodile (*C. mindorensis*). Both species are classified as endangered.

The Saltwater Crocodile is a widespread species, occurring from Sri Lanka and Eastern India through Southeast Asia to the western Pacific. In the Philippines, its range has reduced drastically and it is threatened with extinction unless its habitat in the Liguasan Marsh, Agusan River drainage and northern Palawan is preserved and indigenous peoples in the areas are convienced that crocodiles should be preserved either for economic gain or conservation.

The Philippine Crocodile is endemic to the Philippines ocurring in freshwater marshes, ponds, and tributaries of large rivers. It is critically endangered, with the population in 1982 being estimated as between 500 and 1,000 individuals throughout its entire range.

Seabirds

The Philippines has a number of islands which are

significant sites for breeding seabirds. These currently are not protected. Similarly, inshore feeding areas of breeding seabird colonies are not protected so that there is a risk that food species will be depleted by over-fishing, pollution, habitat modification, etc. with consequent impacts on survival of the breeding populations.

Resident Waterbirds

The Philippines has a rich avifauna of resident waterbirds, including two endemic species (the Philippine Mallard *Anas luzonica* and the Luzon Rail *Rallus mirificus*) as well as several endemic sub-species.

The Philippine Mallard is found in low numbers throughout the Philippines in marshes, swamps, lakes and rivers. It is the only duck endemic to the Philippines. With the exception of this species and two whistling ducks the other thirteen duck species which occur in the Philippines are winter migrants.

The Luzon Rail is known to be found only in two localities in the western foothills of the southern half of the Sierra Madre in Luzon. There are no recent records and its status is unknown.

The nesting localities of most of the larger species of waterbirds (egrets and herons) are fairly well known. However many of these are not in protected areas and are vulnerable to habitat destruction and hunting.

The major threats to resident waterbirds are habitat destruction through draining and clearing of wetlands and destruction of riverside vegetation. In some areas, hunting appears to be having significant impacts on waterbirds and it is probable that the use of pesticide is also having some effect.

Migratory Waterbirds

The Philippine archipelago lies in the East Asian/Pacific Region, south of Taiwan and the People’s Republic of China and north of the Indonesian islands of Nusa Tenggara. It is 97 km south of Taiwan and 965 km from the Asian mainland, and to within a few kilometers off Borneo. This means that it is ideally placed to form an important link in pathways for migratory birds (including the East Asian Flyway). This is true for shorebirds (waders) and other species of waterbirds. Migrating birds are dependent on the availability of rich feeding grounds to allow them to accumulate the fat reserves necessary for long distance movements. The best feeding areas are rich intertidal mudflats and shallow lakes and marshlands. Mangroves play an important role in maintaining the productivity of mudflat areas.

The two most important sites identified for migratory waders are Manila Bay and Olango Island, although there are many

other significant areas. In addition, certain wetlands constitute important wintering areas for those populations of migratory waterbirds which finish their migration in the Philippines each year.

These migratory species constitute a special element in the avifauna of the Philippines. A number of other countries along the East Asian Flyway have entered into bilateral agreements to protect migratory bird species. While some efforts are already being made, an investigation should be made of initiatives which can be taken to protect migratory birds and their staging or wintering sites.

Small numbers of the threatened Speckled Reed Warbler (*Acrocephalus sorgophilus*) occur in the marshes of Luzon where it winters after migrating from its breeding grounds in China. The status of this species is unknown, but it is likely that its survival is threatened.

Most of the remaining world population of the vulnerable Chinese Egret (*Egretta eulophotes*) which breeds in North Korea and China is believed to winter in the Philippines. It is threatened there by hunting and pesticide use.

A part of the population of the Japanese Night-heron (*Gorsachius goisagi*) winters in the Philippines. Virtually nothing is known about the distribution, status or biology of this species, though its survival is probably threatened.

The PAWB has participated in the Asian Waterfowl Census which provides a very useful tool for monitoring waterfowl populations and wetland sites, and for raising awareness of wetlands. At this stage the number of sites covered is limited due to restrictions imposed by finances, manpower, and logistics.

Hunting pressure on migratory waders is reported to be severe in some areas. There is little control on this activity because of shortages of manpower and inadequate logistic support, as well as lack of awareness of the significance of the problem on the part of management enforcement staff.

Chapter 3

Program Areas

In this chapter, the actions referred in the previous chapter have been arranged under appropriate program headings. This grouping will provide a focus for development of specific activities, such as components in annual programs and development assistance projects.

I. Policy Review and Formulation

A. Wetlands Concepts and Coverage

1. To develop a national definition and classification of wetlands adopted for use by all agencies responsible for the conservation and sustainable use of wetlands.

2. To prioritize the identification and protection of wetlands which have high biodiversity values, as well as wetlands which contribute to the maintenance of non-wetland sites.

3. To review the approach adopted in selecting IPAS reserves to ensure that a full range of viable representatives of the wetland types found in the Philippines is included.

4. To formulate a general government policy on river basin or watershed development.

5. To ensure that the NIPAS, through PAWB, contains areas with viable populations of seagrass beds and types of seagrass communities in the country.

6. To make a government statement of policy that sets clearly that the Philippine government, as a general principle, supports and advocates cooperation with NGOs, POs, academe and other concerned groups in wetland conservation and management activities such as data gathering, project implementation and monitoring.

7. To legally recognize the ancestral domain of the indigenous peoples and give them preferential use of the wetland resources as long as their activities are traditional, sustainable and compatible with the management goals and objectives of the programs on wetlands and catchment areas.

8. To consider the development and implementation of wetland conservation measures based on the lifestyles, cultural values and beliefs of indigenous peoples. This should be consistent with the overall conservation of significant wetlands.

B. Review and Formulation of Policies, Laws and Guidelines for Wetland Conservation and Sustainable Use.

1. To formulate and implement a wetland conservation and sustainable use law to provide an umbrella for existing and future legislation relevant to wetlands.

2. To review Philippine legislation in order to identify and collate all legislation relevant to the conservation and sustainable use of wetlands.

   The review is intended further to:

   a) identify overlaps, deficiencies and inconsistencies;
   b) review sectoral policies that have impact on conservation and sustainable use of wetlands;
   c) ensure that government policies will result to a sustained optimal range of benefits for wetlands communities;
   d) determine whether penalties are effective deterrent to unauthorized use of destruction of such resources; and
   e) make appropriate recommendations based on the review.

3. To develop more stringent regulations for the conversion of wetland areas to other uses.

4. To revise the Wildlife Act 2590 as soon as possible in order to provide wildlife protection legislation which is based on current situation and community values.

5. To review all laws, rules and regulations on mangrove areas, including those converted to other uses or abandoned in order to:

   a) solve issues with respect to administrative jurisdiction caused by overlaps and conflicts;
   b) prohibit any action that destroy mangrove areas; and
   c) ban all cutting of mangroves except when required in the implementation of a management plan prepared by the community and in accordance with DENR guidelines.

6. For BFAR to conduct an inventory of fishpond holdings and review their legitimacy and compliance to fishery laws. Appropriate actions should be taken based on the inventory.

7. To place limits on the total fish stocks in cage and pen culture allowed in any particular lake. Such

limits should be based on the carrying capacity of the lake and could be in terms of stocking density, size and number of cages, species of fish, etc.

8. To regulate closely the extent of inland waters set aside for cage and pen culture. Limits should be established on the percentage of any water body that can be used for this purpose without causing unacceptable pollution of water bodies.

9. To develop a national policy, the process of which shall include the review of the water code and its implementation by the NWRB on the utilization of freshwater for brackish water ponds, especially in establishing and promoting a system of incentives and disincentives to the amount of freshwater that can be drawn. A licensing system must be established such that licensing fees reflect adequately the cost to communities polluting the freshwater resources.

10. To develop a national policy on the utilization of brackish water ponds, especially in establishing a ratio of domestically consumed protein crop to export crop based on biological, socio-economic and ecological criteria.

11. To place water quality control on the discharges of effluents from aquaculture ponds. This might be done through existing legislation (PD 600 and 979) or new legislation concerning salinization of soil and ground waters.

12. To closely control the introduction of exotic/alien species to Philippine wetlands. Species not naturally found within any particular body of water should be closely monitored and subjected to research before their introduction to Philippine waters to prevent adverse interaction between these and the native species. The Philippine government should adopt a policy on introductions similar to what was proposed by the IUCN which are as follow:

    a) introduction of an alien species should be considered only if clear and well-defined benefits can be expected;
    b) introduction of an alien species should be considered only if no native species seems suitable for the same purpose;
    c) no alien species should be deliberately introduced into any natural habitat (one not perceptibly altered by man), island, lake, or ocean, whether within or beyond the limits of national jurisdiction;
    d) introduction should not be made into semi-natural habitats except for exceptional reasons and only

when the operation has been comprehensively investigated and carefully planned in advance; and

e) introduction into highly modified habitats should take place after the effects on the surrounding natural and semi-natural habitats are assessed. Species introduction should also follow the protocol of the International Council for the Exploration of the Seas (ICES)

13. To ensure that the introduction of fish species into reservoirs and dams is intended for the sustainable production of the maximum yield of fish proteins with the minimum necessary inputs. Game fish and fish which do not breed in dam situation should not be used.

14. To review and revise all existing laws and rules on the taking of shells, shellfish, and aquatic or aquarian fishes to regulate their harvest. Collection of corals and other endangered marine species must also be prohibited.

15. To review the use and application of fertilizer and agricultural and aquacultural chemicals throughout the Philippines, particularly in catchments of important wetlands. Guidelines for fertilizer application rates and timing in order to reduce fertilizer run-off to wetland areas should be developed and distributed. This should be spearheaded by the Department of Agriculture.

16. To set ceilings on government credit intended for intensive prawn farming, particularly credit channeled through loans from international agencies like the World Bank and the ADB so as to limit the growth of intensive prawn farming and to promote semi-intensive and mixed culture farming.

17. To develop a policy on tourism in wetland areas that should consider the following principles:

    a) provide significant benefits to the local residents;
        × commitment to train and employ them.
        × commitment to purchase supplies locally whenever possible;
    b) design, plan and consult with local and indigenous communities to minimize negative impacts of the tourism policies on the environment and the indigenous people;
        × no reduction of the area of important habitat in the locality.
        × no diminution of the rights of the local people to use the area designated for tourism activities.

c) contribute to the sustainable management of wetland resources
   × non-collection of plants and animals in tourist spots
d) incorporate environmental education for tourists and residents
   × conduct of seminars on the appreciation and importance of healthy environment
   × promotion of environment friendly activities

18. To require concessions for certain tourism services in wetland areas inside or outside protected areas system and to use the revenues generated to maintain the integrity of the wetlands. Guidelines and criteria for awarding concessions should be formulated.

19. To ensure that the environmental and social costs of tourism (including increased water demand, pollution, displacement of local wetland users, etc.) are fully considered in environ-mental impact assessments and designs of development plans. Measures to mitigate these environmental costs of tourism should be incorporated into permits, licenses and environmental clearances for tourism operations.

20. To consider the off-site effects such as siltation of coral reef in formulating environmental impact assessment guidelines for forestry, mining and agriculture projects.

21. To increase the maximum penalties for failure to comply with the EIA legislation with the inclusion of jail terms for offenders, including companies that do not comply with the law.

22. To develop guidelines on disposal and monitoring of domestic waste to be implemented by the local government under the supervision of the regional/or national government and monitored in coordination with the NGOs and POs.

23. To formulate legislation requiring facilities for the treatment of waste from intensive animal husbandry activities.

C. Policy/Guidelines Implementation

1. To enforce this Action Plan through the coordination of DENR and other agencies in order to develop a program of high-priority wetland-related projects. Funding from various agencies/sources should be generated.

2. To develop management plans for significant wetlands

and protected areas.

3. To develop and circulate guidelines, through DENR, which indicate the likelihood of high biodiversity in wetland areas.

4. To protect entire river basins under the NIPAS. This may require the development of new categories of protected areas and the different cooperative management of these by the agencies concerned. The Management of these river basins should be responsive to the management needs of the different ranges of river systems in the Philippines and should be examples of well-developed floodplain wetlands.

5. To protect and rehabilitate rivers, dams and reservoirs by:

   a) issuing an administrative order to rehabilitate and restore dams and river banks;
   b) ban the cutting of trees in the catchments of dams and reservoirs; and
   c) strictly enforce laws prohibiting the clearing of riverbank, vegetation and encroaching of squatters.

6. To protect steep slopes by:

   a) prohibiting cutting of trees and removal of associated vegetation;
   b) implementation of existing and relevant rules and regulations; and
   c) encouraging farming systems for areas cleared for agricultural purposes.

7. To implement the policy on reverting the alienable and disposable lands which are released to BFAR but have not been developed within a 5-year period.

8. To vigorously enforce monitoring and policy functions for the prohibition on the conversion of mangrove to fishponds and other uses.

9. To stringently enforce the anti-pollution legislation, and examine whether it is adequate to protect wetland benefits.

10. To allow the continuation of fish migrations by designing water impoundment containing provisions such as fish ladders.

11. To prohibit fishing methods and fishery licensing arrangements which lead to unsustainable levels of harvesting of fish stocks from rivers, lakes and coastal waters.

12. To ensure that the introduction of fish species into reservoirs and dams is intended for the sustainable production of the maximum yield of fish protein with the minimum necessary inputs. Game fish and fish which do not breed in dam situations should not be used.

13. To prohibit the use of antibiotics to treat stocks in fish cage culture in dams.

14. To protect dugongs through the establishment of sanctuaries in areas with sizeable population and to strictly enforce existing laws, rules and regulations related to dugong conservation and protection.

15. To review the conservation status of resident waterbirds in the Philippines and to ascertain the conservation of their important habitats. Threats to waterbird populations and habitats should be identified, recommendations prepared based on the review results and submitted to relevant government agencies for appropriate action.

16. To strengthen and support initiatives to protect migratory waders and waterfowls and their staging or wintering areas in the Philippines.

17. To identify major breeding sites, nesting areas and feeding areas of seabirds, herons and egrets and protect these from habitat destruction, hunting and other forms of disturbance.

18. To increase the number of sites which are covered in the Philippines by the Asian Waterfowl Census. Additional counts should be done at selected wetland sites during periods of migration.

19. To strengthen the environmental impact assessment legislation (P.D. Nos. 1151 and 1586 and related laws) and require the proponents of projects in any category of protected areas in the NIPAS Act to prepare an Environmental Impact Statement.

20. To develop system-based guidelines for scoping Environmental Impact in each of the categories of Environmentally Critical Area types. Such guidelines should take into account the values or sensitiveness which cause such systems to be listed as Environmentally Critical.

21. To include conditions in the licenses, permits and Environmental Compliance Certificates for remote areas where the developer shall accept the responsibilities for preventing the use of project infrastructure by people carrying out illegal activities (settlement,

logging, poaching, etc.), whether these are done inside the project area or outside it. The primary, secondary and tertiary impact zones should also be considered.

22. To include as requirement the assessment of the likelihood of illegal activities such as settlements, logging, and poaching by non-locals. This should be included in the Environmental Impact Assessment of projects to be implemented.

23. To review the environmental impact assessment guidelines for dams to ensure that the whole range of benefits and adverse effects associated with rivers and the dams are considered.

24. To include all information or environmental impact in all relevant guidelines and explanatory materials to inform readers that most wetlands potentially aquifer recharge areas.

D. Concerns Related to and Supporting Implementation of Policies on Wetlands

Resource Valuation

1. To review the existing methodologies on resource valuation and impact.

2. To include cost-benefit analysis, i.e., social cost, environmental cost, and if possible, resource accounting in the EIA guidelines.

Adjacent Public Lands

3. To develop guidelines on the use of public lands which could have direct or indirect adverse effect on adjoining wetland areas with the NAWPCC spearheading the activity.

Financial Support

4. To increase appropriately the budget for the conservation and sustainable management of important wetland areas.

5. To refine the budgetary process and ensure that there is a real “bottom up” financial planning so that identified needs at the field level are considered in the budget preparation.

6. To ensure that international aids for transfer of technology and knowledge is a fundamental part of conservation assistance projects. Monitoring the

effectiveness of this transfer during the implementation of the projects should therefore be done by the Philippine Government and the international donor.

7. To facilitate the access to soft-loans by small fisher folks so they can invest in other environmentally-sound activities.

8. To seek additional funding for DENR Regional Offices to enable the Pawikan Conservation Project (PCP) to implement researches and management functions including those that are within their area of responsibility.

Participation

9. To develop a set of general guidelines for the management of wetlands with the process involving government agencies, NGOs, POs, and spearheaded by DENR.

10. To ensure that adequate and thorough consultation on fisheries development was conducted with national and international NGOs and scientific experts participating and determining the impact of fisheries development to wetlands.

Education and Research

11. For Government agencies and universities to ensure that high priority is given to management-oriented researches which can provide urgently needed information.

12. To establish a body for developing national wetlands research policies. This body should regularly identify, prioritize and review management-useful researches in order to ensure the protection and sustainable use of the country's wetlands.

13. For DENR, in coordination with DECS, to review courses at all educational level on the subjects of biology, ecology, forestry, planning, engineering, etc. to ensure that adequate attention is given to wetland ecology and sensitivity.

II. Institutional Development and Strengthening

A. Ramsar Involvement

1. On November 8, 1994, the Philippine Government became the 82nd contracting party to the Ramsar Convention upon submission of its Instrument of Accession and

inclusion of Olango Island Wildlife Sanctuary in the List of Wetland of International Importance as Waterfowl Habitats.

B. Organizational Structures and Implementing Mechanism

1. To form a National Wetlands Policy and Coordinating Committee and institutionalize this through an Executive Order to provide the mechanism for the formulation and coordination of policies affecting wetlands and to promote national cooperation in the conservation and sustainable use of these resources.

2. To immediately establish an Ad Hoc Working Group to be spearheaded by DENR to study the need for:
   - × natural resources legislation to determine whether penalties are effective deterrent to unauthorized use or destruction of wetland resources, and where necessary penalties should be increased or decreased; and
   - × development and implementation of wetland conservation measures which should take into consideration the lifestyles, cultural values and beliefs of indigenous cultural communities.

3. To form a National Wetland Consultative Group to serve as a forum for the discussion of proposed policies and actions for the conservation and sustainable use of Philippine wetlands. This should be able to provide a feed-back mechanism for government and the proposed Wetlands Policy and Coordination Committee on the results of such policies and actions. The Consultative Group can have functions based on consultations such as the following:
   - × review policies;
   - × review of national or agency programs;
   - × endorse proposals submitted to international funding agencies;
   - × analyze the impact or effectiveness of particular agencies;
   - × assist key agencies to develop networks of contacts with other agencies/individuals having similar responsibilities in the region and worldwide.

4. To implement the action plan on environmental costs of tourism through the Environmental Management Bureau. Further, a multi-disciplinary team should monitor the compliance of the concerned parties to conditions set in permits, licenses, etc.

5. To increase the number of staff with environmental responsibilities in the regional offices of DENR.

C. Inter-agency Coordination and Complementation

1. To review the roles and responsibilities of various agencies in the conservation and sustainable development of wetlands so as to resolve overlaps and conflicts between them.

2. To establish among ASEAN countries, with DENR and DFA spearheading, collaboration and integration of research and management plans and programs for the management of the share marine turtle population of the region.

3. To give the Protected Area Management Boards sustained assistance that are technical and directed to capability building such as surveying, global positioning systems, manpower and funding to carry out boundary delineation and demarcation of protected areas.

4. For relevant government agencies and NGOs to set up a cooperative project for alternative livelihood for fishermen who are using destructive fishing methods and/or are exploiting over-fished stock.

5. To involve government and NGOs in the reforestation of abandoned fishponds and other mangrove areas. Establishment of buffer zone in fishpond areas facing rivers and open seas as required by law such as P.D. No. 705, etc., should be enforced by the DENR and BFAR.

6. To develop a national consortium for wetland management, spearheaded by the University of the Philippines, which shall emphasize applied research and involve relevant agencies such as ERDB, ICLARM and PCAMRD.

D. Community Participation

1. To give attention to communities which are utilizing wetland resources. The focus should be on the benefits drawn from local wetlands and the appropriate objectives and skills that can lead to sustained utilization of the wetland resources.

2. To seek community participation and cooperation in the protection and management of wetland resources. Whenever possible such programs should be managed by, or in conjunction with, local-based community organizations. The organizations should be given the necessary support such as technical assistance and other needs.

3. To encourage communities dependent on wetland resources to establish people's organizations which can facilitate popular participation in wetland management. Encouragement and support including technical and logistic support should be given to responsible and qualified NGOs.

4. To encourage and support communities that utilize wetlands to develop and implement management plans for their areas in conjunction with relevant government and non-government agencies.

5. To assist resident small fisherfolks associations and operatives in fisheries development schemes and allocation of credit.

6. To provide assistance to small communities on the design and construction of appropriate sewage treatment facilities which have multiple uses.

7. To involve local communities in the reforestation of mangrove areas. They should be provided with incentive, knowledge and resources to enable them to undertake mangrove reforestation projects. Such projects should also ensure that the communities involved have the appropriate knowledge to undertake sustainable management of the rehabilitated mangrove areas.

E. Information, Education and Communication Support

1. To broaden courses dealing with fisheries and aqua-culture to ensure that the students are made aware of the whole spectrum of benefits from wetlands and the need for a cross-sectoral approach in wetland resource management.

2. To give high priority to the following:
   a) conduct of a training needs analysis among the agencies with objectives relevant to wetlands conservation and management;
   b) identification and assessment of the capability of institutions and individuals with relevant responsibilities or expertise to conduct trainings;
   c) development of an appropriate training program (covering both theoretical and practical matters) designed to strengthen the capacity of the key agencies to contribute to the protection and sustainable use of wetlands. The program should include "trainors training" for continuous capability building efforts;
   d) revision of the training program based on the needs arising from the result/s of the

evaluation.

3. To assess the capabilities of government agencies, NGOs and POs involved in integrated area development projects and environmental planning and management in order to identify training needs that shall be inputs to the designing of needs responsive training on wetlands for these agencies.

4. To develop seminars and training packages which are integrated in approach and intended for the planning and management of natural resources. The trainings should be attended by the staff of Integrated Area Development Projects, Wetland project staff, other government agencies, POs, NGOs communities and local government units with functions relevant to wetlands concerns.

5. To pursue staff development to upgrade the level of staff in offices covering wetland protected areas.

6. To prepare and conduct a training program for key government agencies specially the DENR regional and the local government staff on the ecology of wetlands and the benefits of the conservation and sustainable use of these;

7. To upgrade law enforcement in relation to infringement of laws related to wetland conservation and sustainable use both inside and outside protected areas. Training on the provisions of the law and in law enforcement techniques should be conducted for the concerned staff.

8. To develop mapping capability within DENR and DENR Regional Offices.

9. To provide basic training in cartographic techniques, air photo interpretation, and remote sensing data interpretation for a nucleus of PAWB staff assigned to a mapping section. This training should be extended to the staff of DENR Regional Offices, with staff from the Central Office and other agencies' staff serving as the nucleus of trainers.

10. To train and recruit staff at the regional level who are qualified to undertake the EIA responsibilities that are being transferred to the regional offices. Emphasis on the significance of the EIA in sustainable development should be made.

11. To train the DENR staff at the field level in preparing budgets and in understanding the national budgetary process.

12. To develop learning materials that consider cross-sectoral nature of wetland benefits and impact as a support to the implementation of integrated training for Integrated Area Development Projects.

13. To develop awareness materials and conduct seminars with fisherfolks and relevant NGOs and POs on proper site selection, design, management and monitoring scheme for artificial reefs. This is intended to encourage practices that can promote long term increase in fish catch and biomass.

14. To launch a multi-faceted, professionally designed and implemented public awareness campaign of groups concerned in wetlands such as the DENR offices. Other GOs, NGOs and POs with wetland related functions on the following:

    a) basic aspects of ecology of major wetlands types in the Philippines, the benefits that outdoors provide and the sensitivity of wetlands to disturbance;
    b) wetlands as habitat for plant and animal species and on the species that inhabit wetlands. The possibility of identifying "flagship" species as focus of the campaign should be considered.

15. To initiate joint efforts among GOs, NGOs, POs and other private groups to implement public awareness campaigns on:

    a) different categories of protected areas, their importance protection and maintenance;
    b) national heritage and natural resources issues specially those on wetlands; and
    c) specific concerns as benefits of estuaries and mudflats.

III. Projects

A. Information Resource Generation and Management

1. To come up with an updated library in DENR/PAWB on wetland topics. The library should be in an appropriate and easily accessible facility.

2. To establish a computerized (PC-based) Philippine Wetlands Database to store current information on wetlands, such as the values of wetlands. This should be held and maintained by DENR, with access-only databases installed in the regional offices of DENR and made available to all relevant government agencies, NGOs and POs.

3. To prepare a comprehensive inventory of Philippine wetlands and their benefits, building on the information in the PAWB Directory of Philippine Wetlands and the GIS of the Bureau of Soils and Water Management.

4. To prepare an annotated listing of all existing databases and GISs which hold information relevant to wetland conservation and management.

5. To develop through the Environmental Management Bureau a catalogue of mitigation measures which are applicable for reducing or eliminating impacts on the range of benefits provided by wetlands. The catalogue should be made available to developers and other government agencies.

6. To distribute to all agencies, NGOs and POs with wetland related functions the Directory of Philippine Wetlands and the Atlas prepared by the Bureau of Soils and Water Management.

B. Research

1. To identify boundaries for wetland protected areas considering the delineation of buffer zones and people. This is to ensure that there is local commitment to, and recognition of the boundaries and provisions for adequate and viable buffer zones.

2. To mark the boundaries of protected areas and old growth/primary forests containing significant wetlands.

3. For DENR, in coordination with other agencies, to commission an inventory of the lakes of the Philippines. A description of each lake in terms of geomorphology, limnology, and floral and faunal communities, as well as the benefits provided by each lake, shall be the output of the inventory. This should be the basis of developing protected lake areas that constitute a comprehensive representation of the country’s lakes.

4. To conduct a comprehensive survey of dugong populations and its habitat to determine the

distribution, population status and extent of exploitation of this species in the Philippines.

5. To conduct survey to determine the distribution, status and biology of the Luzon Rail (*Rallus mirificus*) and the Philippine mallard (*Anas luzonica*) and protect their habitats.

6. To study the socio-economic aspects and identify uses and benefits of wetlands. This should be part of the management planning process and should be intended to provide opportunities and sources of raw materials for alternative employment of community members who shall be affected by the implementation of the proposed management actions.

7. To conduct studies on the resource management strategies of indigenous people who utilize wetland areas or wetland products to determine whether their practices can assist recent settlers in wetland areas in benefitting sustainably from wetland resources.

8. For the DENR to carry out on commission a study on the community-based management approaches used at Apo and Sumilon Islands and other similar innovative approaches to resource management in order to determine which can be applied to other locations and other ecosystems.

9. To conduct a research to determine whether some or all Philippine waterbodies can be more sustainably used for open water fishing than for cage and pen culture.

10. To determine the applicability of alternative aquaculture/silviculture systems with minimum environmental impact and the relationships of these on problems of social equity.

11. To exert increased efforts to assess the extent of the hunting of migratory waders and other waterbirds and the levels of hunting. Steps should be taken to reduce this.

12. To undertake a study on the recreational and tourism potential of Philippine wetlands with emphasis on ecotourism. The study should take a general approach, focusing on classes of wetlands, with some specific examples. Such a study should include a component, the compatibility of the different forms of recreation and tourism activities with other uses of wetland areas. The results of the study should be made available, especially to regional government agencies and tourism industries.

C. Community-based Projects

1. To take the following actions in relation to Cubulao Bay, Bohol:

   a) extend mangrove reforestation schemes with stewardship certificates to local communities;
   b) develop a zoning plan which provide for sustainable use of certain areas by local communities, with other areas zoned for strict protection;
   c) prohibit commercial operations by outsiders.

2. To take the following actions in relation to Olango Island:

   a) prioritize development and implementation of conservation measures, and a management plan;
   b) ban hunting of shorebirds; and
   c) implement mangrove reforestation measures and alternative livelihood projects to take pressure off coastal resources.

3. To take the following actions in relation to the Inabanga Coast:

   a) extend mangrove replanting schemes;
   b) prevent further conversion of magrove areas for prawn ponds;
   c) implement protection measures for the remaining tracts of intact forest;

4. To take the following actions in relation to Malampaya Sound:

   a) strictly protect the undisturbed mangrove areas to ensure that they continue to function in support of coastal fisheries;
   b) allow only subsistence level gathering and cutting of mangroves on a sustainable basis under a community-based management plan;
   c) design a management plan for the utilization of the mangrove areas with some provisions for reforestation in certain areas if natural regeneration is insufficient.

5. To take the following actions in relation to Siargao Island:

   a) develop and implement a zoning plan which will allow areas of mangrove to recover;
   b) reforest those areas where mangroves are depleted.

6. To take the following actions in relation to Balayan Bay:

a) initiate a local awareness campaign on the importance of sustainable use of coastal resources;
b) reforest denuded mangrove areas;
c) control pollution from the Calaca power plants; and
d) prohibit hunting.

7. To take the following actions in relation to Buguey Wetlands:

a) initiate an awareness campaign on the correct use of pesticides;
b) stop destruction of mangrove for prawn ponds;
c) develop a zoning plan that protect areas important for waterfowls; and
d) implement mangrove reforestation schemes.

8. To take the following actions in relation to Tayabas Bay:

a) develop guidelines for reforestation with mangrove species in aquaculture areas;
b) prevent hunting and destructive fishing methods; and
c) stop destruction of mangrove for prawn ponds.

9. To take the following actions in relation to Talabong Island and Bais Bay:

a) reforest denuded mangrove areas in the bay; and
b) control organic pollution from sugar mills.

10. To take the following actions in relation to Panguil Bay:

a) prohibit further conversion of mangroves to prawn ponds;
b) prohibit commercial fishing operations in the bay;
c) continue mangrove reforestation; and
d) control amounts of domestic sewage flowing into the bay and install sewage treatment plants.

11. To take the following actions in relation to Ulugan Bay:

a) declare as protected area the mangrove area in the inner bay;
b) develop a fisheries management plan for the remaining parts of the bay with provision for fish sanctuary zones; and
c) control discharges of oil from the naval station in the Bay.

12. To take the following actions in relation to Manila Bay:

a) implement an integrated management programme for the Bay with concerns for the control of industrial effluents in the Pasig River;
b) treatment of sewage flowing into the bay;
c) possible solutions to the problems of rural to urban migration and population increase; and
d) unemployment and provision for alternative livelihood opportunities.

13. To take the following actions in relation to Agusan Marsh:

a) strictly protect core areas of undisturbed swamp forest and herbaceous swamp; and
b) introduce sustainable resource management projects for local communities around the periphery to take the pressure off the marsh.

14. To take the following actions in relation to Lake Manguao:

a) provide alternative areas for settlers;
b) introduce sustainable agricultural projects for settlers already in the catchment;
c) strictly protect the remaining forest;
d) ban aquaculture schemes in the lake; and
e) ban fish introductions.

15. To take the following actions in relation to Naujan Lake:

a) maintain good water quality by implementing appropriate land-use management in catchment;
b) closely monitor the level of fishing in the outflow river to ensure that over-fishing of migratory forms does not occur;
c) implement management controls under the protected area status; and
d) rationalize the boundaries of the protected area to exclude areas outside the catchment.

16. To take the following actions in relation to Leyte Sab-a Basin:

a) to undertake a survey to ascertain the present status of the wetland; and,
b) to develop an appropriate management strategy based on the survey results.

17. To take the following actions in relation to Lake Lanao:

a) attempt to stabilize lake levels to protect littoral zone by:

× reforestation of the catchment; and,
× modification of the operation of the proper plants;

b) establish the conservation of the endemic species;
c) investigate the feasibility of captive breeding and reintroduction of endemic species.

18. To take take the following actions in relation to Liguasan Marsh:

a) establish and enforce limits for areas to be drained; and,
b) introduce sustainable resource management projects on the periphery.

19. To take the following actions in relation to Candaba Swamp after the extent of destruction by lahar has been established:

a) implement an awareness campaign for the value of marshland for flood control and silt retention;
b) limit conservation activities;
c) protected core areas for waterbirds; and,
d) introduce sustainable resource management projects on the periphery.

20. To take the following actions in relation to Lake Taal:

a) initiate more researches on the ecology of *tawilis* and the migratory fishes;
b) develop a zoning plan involving establishment of fish sanctuaries in areas identified as important spawning areas of *tawilis* (i.e. *Vallisneria* beds), since it is not certain that the present fish sanctuary protects the most important spawning areas; and
c) limit fishing pressure on migratory fishes in the outflow river;
d) develop community-based tourism projects on the Volcano Island, rather than develop this for commercial purposes.

21. To take the following actions in relation to Lake Maughan:

a) prohibit slash-and-burn farming in the catchment;
b) develop fish ponds lower in the catchment to take pressure off the lake; and
c) protect the Allah Valley Irrigation Project, together with a wide strip of ridge forest westwards to Mount Busa as a vital watershed.

22. To take the following actions in relation to Laguna de Bay:

a) strictly control all types of pollution;
b) closely monitor development projects and modify them as necessary to ensure that the benefits tackle down to subsistence fishermen;
c) develop alternative livelihood possibilities for local fishermen; and
d) prohibit commercial fishing operations in the lake.