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NATIONAL REPORT

on

Wetlands in the South China Sea

INDONESIA



Ir. Antung Deddy Radiansyah
Focal Point for Wetlands

Assistant to the Deputy Minister
For River and Lake Degradation Control, Ministry of Environment
Jl. D.I. Panjaitan, Kebon Nanas
Jakarta 13410, Indonesia

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1. INTRODUCTION

1.1 Coastal Wetlands of Indonesia

Wetlands based on Ramsar Convention's definition are "Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Based on Ramsar's definition, Indonesia possesses at least 40 millions hectares of wetlands, excluded rivers. Of those 40 millions, at least 281 sites recognised as wetlands as international importance (Table 1).

Table 1 Types and Extent (ha) of Indonesian Wetlands.

| Type | Extent (ha) | | |
|--|---------------------------|---------------------------|--------------------------|
| | Original Area | Remaining Area | Protected Area |
| 1. Peatswamp | 16.266.000 ⁽¹⁾ | 13.203.000 ⁽²⁾ | 1.882.000 ⁽³⁾ |
| 2. Freshwater Swamp ⁽³⁾ | 11.544.000 | 5.185.500 | 984.250 |
| 3. Mangrove Forest ⁽⁴⁾ | 9.248.038 | 5.326.870 | 3.720.187 |
| 4. Coral Reef ⁽⁵⁾ | ≥ 5.102.000 | 5.102.000 | n.d |
| 5. Seagrass ⁽⁶⁾ | ≥ 3.000.000 | 3.000.000 | n.d |
| 6. Coastal Vegetation ⁽³⁾ | 180.000 | 78.000 | 33.000 |
| 7. Mud/sand flat ⁽³⁾ | n.d | n.d | n.d |
| 8. Lake ⁽³⁾ | 774.894 | 308.000 | 73.800 |
| 9. Estuary ⁽³⁾ | n.d | n.d | n.d |
| 10. Rivers ⁽³⁾ | n.d | n.d | n.d |
| 11. Freshwater pond ⁽⁷⁾ | 155.216 | 80.995 | - |
| 12. Dams ⁽³⁾ | n.d | n.d | n.d |
| 13. Paddy Field ⁽⁷⁾ | 8.393.290 | 7.787.339 | - |
| 14. Brackish Water Pond ⁽⁸⁾ | 304.623 | 435.000 | - |
| 15. Salt Pans | n.d | n.d | n.d |
| Jumlah | 54.968.061 | 40.506.704 | 6.693.237 |

One of major types of wetlands is coastal wetlands which are consisting of 11 types of ecosystems i.e.: coral reef, mangrove, seagrass, estuary, tidal flat, lagoon, and coastal swamp. The South China Sea Project limited its definition for coastal wetlands to 5 ecosystems type only namely: Estuary, intertidal flat, lagoon, coastal lake, and peat/non peat swamp.

Based on South China Sea Project's definition, coastal wetlands of Indonesia bordering South China Sea can be found stretching alongside coastal area in 11 provinces. The result of South China Sea Project's study revealed that 39 wetlands sites in those 11 provinces are coastal wetlands of international importance, based on Ramsar Convention's definition.

Management system for coastal wetlands of Indonesia being implemented today has not sufficient yet to secure its sustainability function. As a developing country, that still highly depends on natural resources for its economic growth, exploitation efforts and function conversion is massive and in many cases exceeds its self-recovery capability. One indication of such coastal wetlands degradation is the data published by Ministry of Forestry in 1999. The data revealed that total area of mangrove had been damage was 57 percent, mostly located at the coastal area bordering South China Sea.

1.2 Database Development of Coastal Wetlands Bordering SCS

Information related to status and distribution of coastal wetlands that bordering South China Sea is rare. The best available data mostly informed coastal wetlands as a whole, which are, consist of ecosystems like mangrove, coral reef and seagrass. There is no specific information about coastal wetlands as defined by South China Sea Project.

Related to the gathering data and information about coastal wetlands bordering South China Sea, National Wetlands Committee for SCS Project agreed to recommend the National Focal Point to co-operate with National Conservation Information Centre (PIKA) of Ministry of Forestry. The chosen of PIKA as partners in data collection was based on PIKA's data reliability that more comprehensive compare to others.

Up to now, PIKA has successfully identified 39 coastal wetlands site that bordering South China Sea which are internationally importance based on Ramsar Convention's criteria. The data and information provide by PIKA, and then reviewed by NWC based on criteria developed by South China Sea Project.

The best available data of coastal wetlands site bordering South China Sea that provide by PIKA mostly based on survey conducted before year of 2000, except data of Sembilang National Park that updated in the recent year. The situation caused by minimum the lack of capability and operational support for field operator in doing regular survey and inventory. The information on coastal wetlands site bordering South China Sea is attached.

2. LEGAL AND INSTITUTION ASPECTS IN THE MANAGEMENT OF COASTAL-WETLANDS IN INDONESIA

Since 1999 Indonesia has starting to reform its natural resources management by giving high portion of power to local authorities which are Province authority and District/Municipality Authority. However, the management of area that ecologically linked but shared by two or more local authority must be manages by higher-level authority co-ordination.

Above mentioned condition is also occurring in coastal wetlands bordering South China Sea that stretch across 10 provinces. Therefore, in term of institutional, integrated management of coastal wetlands bordering South China Sea require co-ordination from central government as superior level of provincial authority.

There are many laws and regulations pertaining management of coastal wetlands bordering South China Sea. Related to the condition, NWC suggested reviewing laws, regulations and institutions that directly affecting coastal wetlands bordering South China Seas. The level of laws and regulations also limited to the LAWS, Government Regulations, and Presidential Decrees.

The National Wetlands Committee for South China Sea Project also recommended PIKA as partner in developing Institutional and Legislation Review. The result of the Review then studied by NWC for South China Sea Project before published. The Review attached in this report.

2.1 National Legislations

2.1.1 Acts

Act No. 6 of 1994 Concerning Ratification of Climate Change Convention

Indonesia has ratified United Nations Framework Convention on Climate Change (UNFCCC) through Act No. 6 of 1994. This Act becomes an umbrella regulation mitigation and adaptation activities to combat global climate change.

The Convention is one efforts of global community to find solution for global climate change problems. However, the Convention is the minimum effort that could be afford by the whole nation on earth, since many political and economical consideration of each nation is likely impede such progress to combat global climate change.

Main concern of the Convention is to stabilise concentration of green house gases in the atmosphere to such level that safe for climate system. The concentration level should be achieved in stipulated period to such extent could provide sufficient time for ecosystem to naturally adapt with climate change, assuring that food production is not interrupt, and economic development is work properly.

The Act is not directly shape the management system of coastal wetlands of South China Sea. However, the Act that aimed to mitigation and adaptation will encourage activities to enhance coastal wetlands condition.

Act No. 24 of 1992 Concerning Spatial Planning

Act No. 24 of 1992 for Spatial Planning is one of important references in coastal wetlands management since the Act's aim is to utilise in environmental sound based on Archipelagic Sense and National Resilience. The Act of Spatial Planning divide the area into two main function categories, they are Protected Area and Cultured Area.

The Act is also aimed to regulate spatial utilisation between protected area and cultured area. Protected area is consist of protected forest, peatlands and peatswamp, catchments area, coastal are, river's border, the area surrounding lake and dam, area surrounding spring, nature reserve, mangrove, national park, recreational park, cultural and science reserve area, and area which prone to disaster.

Cultured area is the area that stipulated mainly for culture, based on the condition of area and human resources availability. Cultured area consist of forest production area, agriculture area, settlement, industrial area, integrated economic area, tourism area, praying area, education area, and defense and security area.

Act for Spatial Planning is important basis for developing regional spatial planning for coastal wetlands bordering South China Sea, since South China Sea has various functions and utilise by various stakeholder. Therefore, without clear regional spatial planning, quality of coastal wetlands of South China Sea will become worst. Unfortunately, until now, most of coastal wetlands area bordering South China Sea still has no spatial planning.

Act No. 41 of 1999 Concerning Forestry

Act No. 41 of 1999 about Forestry is one of legislation product that mostly influence pattern of natural resources management in national level. This comes from the fact that total forestry area in Indonesia is 109.96 million hectares, half of total area of Indonesian land (Departmen Kehutanan, 2002). Therefore, management of that area should be based on Act of Forestry.

The Act is also one of Act that developed under the spirit of decentralisation of natural resources management. Some of the spirit can be seen on the Act's intent to accommodate the right of local community.

Despite bright implementation progress from decentralisation of natural resources, the Act is possibly abused by local authority in exploiting forest in their area. Weak position of central government in Act of Forestry in some cases has lead to the ignorance of national and international interest on forest since local authority has it own agenda on the forest.

There are at least 39 sites of coastal wetlands bordering South China Sea that internationally importance, of which 19 sites are forestry area (for conservation and production) where management authority falls to central government based on Act No. 41 of 1999. Moreover, most of coastal wetlands bordering South China Sea bear impact of land based activity from forestry area far away from coastal wetlands. Therefore, Implementation of Act No. 41 of 1999 about Forestry is a paramount importance for the health of coastal wetlands bordering South China Sea.

Act No. 22 of 1999 Concerning Regional Government

Act No. 22 of 1999 concerning local government is the turning point on natural resources management paradigm in Indonesia that previously centralised on central government. Through this Act, local stakeholders now play important role in managing natural resources compare to central government. The Act that fully came into force on 2000 in many cases caused confusing in authority distribution between central and local government and between two ore more neighbouring local government. However, enforcement of this Act has grown hope for the betterment of environmental condition as well as prosperity of local community that once abandoned.

Management of coastal wetlands in decentralisation era has emerged a new challenge. This came from reality that the number of coastal wetlands lying through two or more local authority area. As the result, the wetland is possibly managed partially based on administrative boundary. Whereas wetlands should be managed integratedly based on its ecological boundary.

Act No. 22 of 1999 has wide implication on the condition of coastal wetlands bordering South China Sea. The Act has caused weaken position of central government in managing natural resources. Therefore national policies can not directly applied on local level, for example national policy on the management of South China Sea. Solving this problem can only be done through close consultation and co-ordination between central and local government.

Act No. 23 of 1997 Concerning Environmental Management

Act No. 23 of 1997 concerning Environmental Management is aimed to create sustainable development that environmentally sound. Therefore, objectives environmental management is to protect Republic of Indonesia from impact of such activities that cause pollution and/or damaging environment.

One important part of this Act is obligation to apply Environmental Impact Assessment (EIA) prior to the development activities that possibly have impacted to the environment. The obligation is arrange in detail in Government Regulation No 72 of 1999. Implementation of EIA is not always achieving the goal of EIA itself, to protect environment from possible impact. However, EIA in many cases proved effective to avoid environmental damage caused by various activities.

Related to the protection of wetlands environment, there are several lower level of regulation that aimed to protect wetlands by stipulate standard for pollution as well as provide specific EIA for wetlands. This Act has strong link to the coastal wetlands of South China Sea, since many spots on the area are occupied by industrial activity.

Act No. 5 of 1990 Concerning Living Resources Conservation and Its Ecosystem

Act No. 5 of 1990 concerning Conservation of Living Resources and Its Ecosystem is developed to achieve sustainability of living resources and balance ecosystem to such extent could support human well-being and quality of life. Act of Conservation consist of phrase "life supporting system" that can be defined as natural process of various living and non living component to assure continuation the life of organism. Living resources conservation and its ecosystem can be done by protecting life supporting system to maintain ecological process, preservation of biodiversity, and wise utilisation.

Conservation area based on this Act consists of two types namely:

- a. Strict Nature Reserve Area to preserve flora (so called Cagar Alam) and fauna (Suaka Margasatwa).
- b. Conservation Area to protect life supporting system. Conservation Area consists of three types namely: National Park, Natural Recreational Park, and Grand Forest Park.

Based on criteria mentioned in Act of Conservation, Indonesia has about 23 millions ha of conservation area, where about 4.7 millions are wetlands (including deep ocean waters). Along South China Sea, there are 19 conservation areas, of which, 5 are National Park. Coastal wetlands conservation areas along South China Sea are important assets since they have capability to maintain and restore quality of South China Sea. Therefore protection of the conservation areas is a paramount importance for the region of South China Sea.

Coastal wetlands as life supporting system have not being optimally protected under Act of Conservation as the Act tend to protect coastal wetlands that lying inside "conservation area". Where as, most of wetlands areas are located outside conservation areas. Therefore, local stakeholders are key player that should be encouraged to protect coastal wetlands in their areas.

2.1.2 Other Acts related to Coastal Wetlands Management

There are many other Acts that pertaining management of coastal wetlands bordering South China Sea. However, the Acts are not explained in detail in this paper as the Acts has no direct implication on the effort to reverse degradation trend in coastal wetlands bordering South China Sea. Some other Acts are:

- a. Act No. 6 of 1996 concerning Indonesia Waters: The Act describe concept of Archipelagic Sense to explain the sovereignty of nation on archipelagic waters.
- b. Act No. 7 of 2004 concerning Water Resources: The Act explain about management of water resources including the role government, private sector, and civil society on water resource. During public consultation in preparation of The Act, many controversial issues were arisen especially on indication that public will no longer have right on water resources due to privatisation.
- c. Act No. 5 of 1994 regarding ratification of Convention on Biodiversity. The Convention is basis for all activities pertaining protection, research, trade, and bio-engineering of biodiversity.

2.1.3 Other Government Regulations

Government Regulation is regulation that made to explain paragraph, article mentioned on Act's. Following is government regulation pertaining coastal wetlands management.

1. PP No. 82 of 2002 concerning Water Quality Management and Water Pollution Control
2. PP No. 4 of 2001 concerning Environmental Degradation and Pollution Control caused by Forest Fire
3. PP No. 150 of 2000 concerning Land Degradation Control for Biomass Production
4. PP No 25 of 2000 concerning Central Government Authority and Provincial Government Authority as Autonomous Region
5. PP No. 19 of 1999 concerning Pollution and/or Degradation of Marine Environment
6. PP No. 8 of 1999 concerning Utilization of Wildlife Flora and Fauna
7. PP No. 68 of 1998 concerning Nature Reserve Area and Conservation Area
8. PP No. 47 of 1997 concerning National Spatial Plan.
9. PP No. 28 of 1985 concerning Forest Protection
10. PP No. 2 of 1982 concerning Water Resources Utilization
11. PP No. 27 of 1991 concerning Swamp Management
12. PP No. 35 of 1991 concerning Riverine Management
13. PP No. 27 of 1999 concerning Environmental Impact Assessment (AMDAL)

2.1.4 Presidential Decree

Presidential Decree is a decree issued by president, based on its authority of original power. Presidential decree should not contradict with above level legislation. Following are two Presidential Decrees that most related to coastal wetlands management.

Presidential Decree No. 48 of 1991 Concerning Ratification of Convention on Wetlands of International Importance Especially as Waterfowl Habitat

Ramsar Convention is the only convention that has holistic approach in protecting ecosystem on earth. The Convention is the first multilateral agreement in the world that introduce the need to combine conservation and wise use on managing natural resources. Countries that ratify the Convention should designate at least one wetlands area that internationally importance as Ramsar Site. Today, there are 111.9 millions ha of wetlands area listed as Ramsar Site (Ramsar Secretariat, 2003).

Indonesia is one of important signatories among other countries member of Ramsar Convention, as Indonesia has at least 40 millions ha of wetlands, second largest after china. Coastal wetlands of Indonesia are also important area as resting area for migratory bird.

Along coastline of Indonesia bordering South China Sea, there are at least 39 internationally important sites of coastal wetlands. However, up to now, there is only one that designated as Ramsar Site, which is Berbak National Park.

Presidential Decree No. 32 of 1990 Concerning Protected Area

Presidential Decree No. 32 of 1990 concerning Management of Protected Area is one of important policy emphasize the need to protect wetlands for its capability as water resource, life supporting system, and disaster mitigation. The Presidential Decree of Protected Areas explains criteria of protected area as well as limitation of activity on the areas.

The Decree doesn't specifically describe protection of coastal wetlands, but stipulated that 100 metres from shoreline at highest level of tide is green belt and should be protected. Whereas, if coastal wetlands occupied by mangrove, the area that should be protected is the area from shoreline toward upland as long as 130 times the range of highest and lowest tide. Figure 1 shows the Hierarchy of National Legislation of Indonesia.

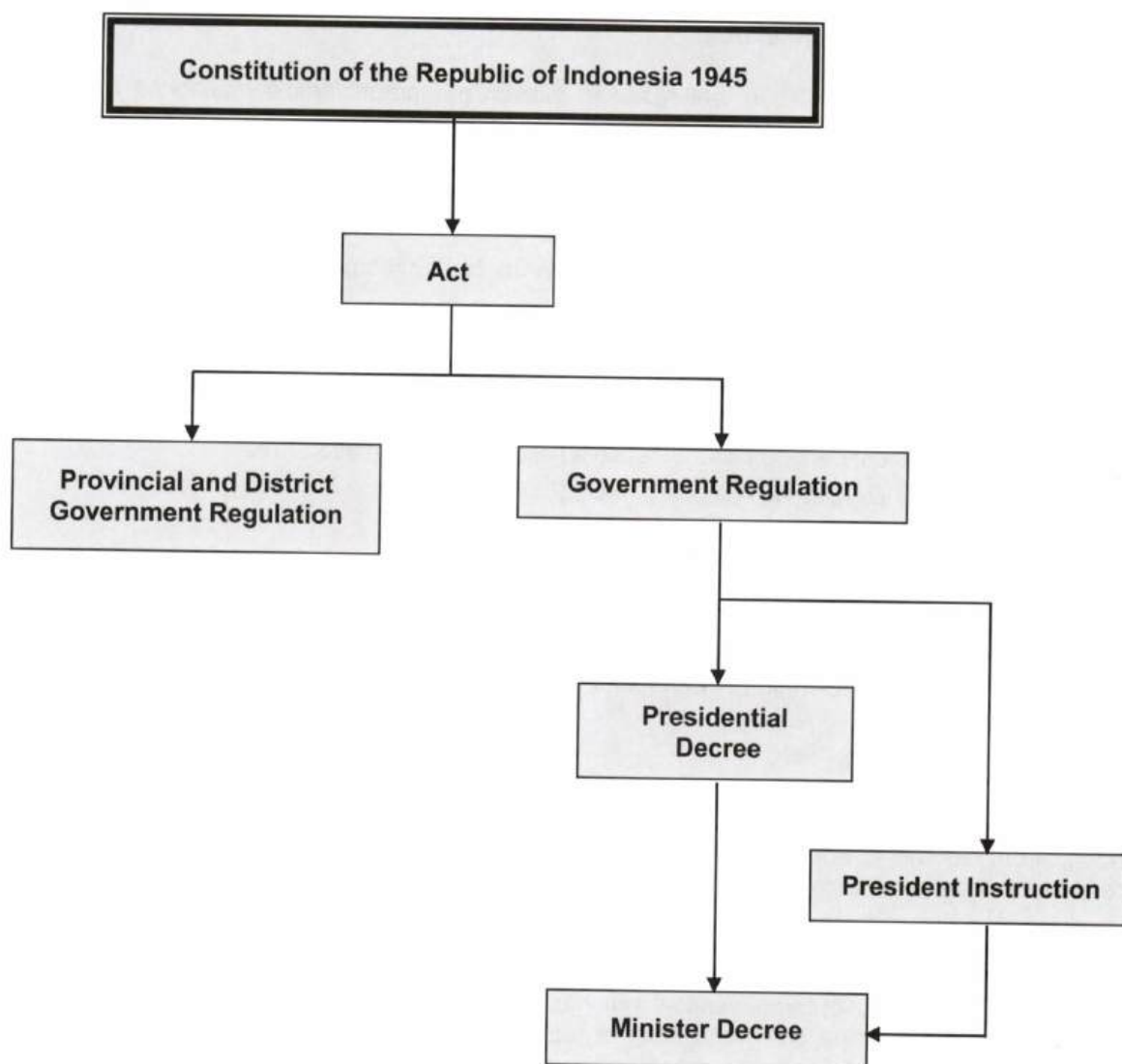


Figure 1 Hierarchy of National Legislation of Indonesia.

2.2 Institutional Aspects

Nowadays there is no single authority in managing the whole coastal wetlands bordering South China Sea. Therefore, there is no single government institution that possesses more power over the other. To deal with the situation some sectoral ministerial in central government has established a kind of commission or national committee in co-ordinating their activities pertaining wetlands management issues in national level, not specifically for South China Sea.

The established committee/commission to co-ordinate management issue, in many cases, is powerless and ineffective. The member of committee is representative of high rank officer in sectoral ministerial, where the change of ministerial structure is persist due to turmoil of political situation in the last 8 years.

Management of coastal wetlands bordering South China Sea, in general, carries out, partially by government institution (central, provincial, district, municipality). Table 2 below shows some institutions that responsible on the management of coastal wetlands.

2.2.1 Government Institutions

Table 2 Institutions are Responsible on the Management of Coastal Wetlands.

| Central Government | Tasks and Responsibilities | Province | Related Agency on the Province |
|--|---|------------------|--|
| Ministry of Environment – KLH – Kementerian Lingkungan Hidup (Ministry of Environment, 1996) | Responsible in co-ordination of regulation, direction, monitoring, and evaluation. Ministry of Environment is national focal point in international agreement and convention such as climate change and biodiversity. | Riau | Agency for Environmental Impact Control (BAPEDALDA) |
| | | Jambi | Agency for Environmental Impact Control (BAPEDALDA) |
| | | Sumatera Selatan | Agency for Environmental Impact Control (BAPEDALDA) |
| | | Bangka Belitung | Agency for Environmental Impact Control (BAPEDALDA) |
| | | Lampung | Agency for Environmental Impact Control (BAPEDALDA) |
| | | Banten | Agency for Environmental Impact Control (BAPEDALDA) |
| | | DKI | Agency for Environmental Management (Badan Pengelola Lingkungan Hidup Daerah) |
| | | Jawa Barat | Agency for Environmental Control (Badan Pengendalian Lingkungan Hidup Daerah) |
| | | Kalimantan Barat | Agency for Environmental Impact Control (BAPEDALDA) |
| Ministry of Forestry – DEPHUT – Department Kehutanan | Responsible in utilisation and conservation of forestry area including wetlands within forestry area. In local level, the tasks fall to Forestry Office or Natural Resources Conservation Unit (BKSDA). Ministry of Forestry is National Focal Point for Ramsar Convention. | Riau | Forestry Office (Dinas Kehutanan) |
| | | Jambi | Forestry Office (Dinas Kehutanan) |
| | | Sumatera Selatan | Forestry Office (Dinas Kehutanan) |
| | | Bangka Belitung | Agriculture and Forestry Office |
| | | Lampung | Forestry Office (Dinas Kehutanan) |
| | | Banten | Forestry and Plantation Estate Office (Dinas Kehutanan dan Perkebunan) |
| | | DKI | Agriculture and Forestry Office (Dinas Pertanian dan Kehutanan) |
| | | Jawa Barat | Forestry Office (Dinas Kehutanan) |
| | | Kalimantan Barat | - |
| Ministry of Marine and Fisheries Affairs – DKP – Department Kelautan dan Perikanan (Department Kelautan dan Perikanan, 2003) | Responsible in the management of fisheries resources in upland and marine. The Ministry possesses authority in regulating fisheries activity coastal wetlands. | Riau | Fisheries Affair Office (Dinas Kelautan dan Perikanan) |
| | | Jambi | Marine and Fisheries Affair Office (Dinas Kelautan dan Perikanan) |
| | | Sumatera Selatan | Marine and Fisheries Affair Office (Dinas Kelautan dan Perikanan) |
| | | Bangka Belitung | Marine and Fisheries Affair Office (Dinas Kelautan dan Perikanan) |
| | | Lampung | Marine Affair Office (Dinas Kelautan) |
| | | Banten | Marine and Fisheries Affair Office (Dinas Kelautan dan Perikanan) |
| | | DKI | Husbandry, Fisheries, and Marine Affair Office (Dinas Peternakan, Perikanan, dan Kelautan) |
| | | Jawa Barat | Fisheries Affair Office (Dinas Perikanan) |
| | | Kalimantan Barat | Marine and Fisheries Affairs Office (Dinas Perikanan dan Kelautan) |
| Ministry of Public Works – DEP PU – Department Pemukiman dan Prasarana Wilayah | Possess authority to co-ordinate and direct local government in water resource utilisation as well as provide infrastructure for the management of water resources. | Riau | Office of Settlement and Regional Infrastructure (Dinas Pemukiman dan Prasarana Wilayah) |
| | | Jambi | Office of Public Works (Dinas Pekerjaan Umum) |
| | | Sumatera Selatan | Office of Public Works (Dinas Pekerjaan Umum) |
| | | Bangka Belitung | Office of Public Works (Dinas Pekerjaan Umum) |
| | | Lampung | Office of Public Works (Dinas Bina Marga) |
| | | Banten | Office of Public Works (Dinas Pekerjaan Umum) |
| | | DKI | Office of Public Works (Dinas Pekerjaan Umum) |
| | | Jawa Barat | Office of Spatial Planning and Settlement (Dinas Tata Ruang dan Pemukiman) |
| | | Kalimantan Barat | Office of Settlement and Regional Infrastructure (Dinas Pemukiman dan Prasarana Wilayah) |

Table 2 *cont.* Institutions are Responsible on the Management of Coastal Wetlands.

| Central Government | Tasks and Responsibilities | Province | Related Agency on the Province |
|---|--|------------------|---|
| Indonesian Institute of Science – LIPI – Lembaga Ilmu Pengetahuan Indonesia | LIPI is scientific authority of Indonesia, including responsible in conducting research regarding wise use and conservation of wetlands. | Riau | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Jambi | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Sumatera Selatan | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Bangka Belitung | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Lampung | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Banten | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | DKI | Agency for Research and Development (Badan Penelitian dan Pengembangan) |
| | | Jawa Barat | Agency for Provincial Research and Development (Badan Penelitian dan Pengembangan) |
| | | Kalimantan Barat | Agency for Provincial Research and Development (Badan Penelitian dan Pengembangan) |
| Ministry of Tourism and Culture – Menparsecbud – Kementerian Pariwisata dan Kebudayaan | Responsible in the development tourism activity in coastal wetlands area. Bertanggung jawab untuk mengembangkan pariwisata di kawasan lahan basah, termasuk daerah pesisir. | Riau | Office of Culture, Arts, and Tourism (Dinas Kebudayaan, Kesenian, dan Pariwisata) |
| | | Jambi | |
| | | Sumatera Selatan | Office of Culture and Tourism (Dinas Kebudayaan dan Pariwisata) |
| | | Bangka Belitung | Office of Culture, Arts, and Tourism (Dinas Kebudayaan dan Pariwisata) |
| | | Lampung | Office of Culture and Tourism (Dinas Kebudayaan dan Pariwisata) |
| | | Banten | Office of Culture and Tourism (Dinas Kebudayaan dan Pariwisata) |
| | | DKI | Office of Tourism (Dinas Pariwisata) |
| | | Jawa Barat | Office of Culture and Tourism (Dinas Kebudayaan dan Pariwisata) |
| | | Kalimantan Barat | Office of Culture and Tourism (Dinas Kebudayaan dan Pariwisata) |
| Ministry of Health – Depkes – Departemen Kesehatan | Responsible in maintain health standard of community by controlling water quality, drugs quality, and disease related coastal wetlands. Degradation trend of South China Sea could ignite various disease, Ministry of Health possess responsibility to avoid the event. | Riau | Health Office (Dinas Kesehatan) |
| | | Jambi | Health Office (Dinas Kesehatan) |
| | | Sumatera Selatan | Health Office (Dinas Kesehatan) |
| | | Bangka Belitung | Health Office (Dinas Kesehatan) |
| | | Lampung | Health Office (Dinas Kesehatan) |
| | | Banten | Health Office (Dinas Kesehatan) |
| | | DKI | Health Office (Dinas Kesehatan) |
| | | Jawa Barat | Health Office (Dinas Kesehatan) |
| | | Kalimantan Barat | Health Office (Dinas Kesehatan) |
| National Board for Development Planning – Bappenas - Badan Perencanaan Pembangunan Nasional | Responsible in co-ordinating programs planning of government including budget plan related to coastal wetlands. | Riau | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Jambi | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Sumatera Selatan | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Bangka Belitung | Provincial Development Board (Badan Pembangunan Daerah) |
| | | Lampung | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Banten | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | DKI | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Jawa Barat | Provincial Development Planning Board (Badan Perencanaan Pembangunan Daerah) |
| | | Kalimantan Barat | Provincial Development Planning and Controlling Board (Badan Perencanaan dan Pengendalian Pembangunan Daerah) |

Table 2 cont. Institutions are Responsible on the Management of Coastal Wetlands.

| Central Government | Tasks and Responsibilities | Province | Related Agency on the Province |
|---|---|------------------|--|
| Ministry of Energy and Mineral Resources – Dep ESDM – Departemen Energi dan Sumberdaya Mineral | Responsible in regulating mining activity around coastal wetlands area, including post mining rehabilitation. | Riau | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | Jambi | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | Sumatera Selatan | Office of Mining and Energy Development (Dinas Pertambangan dan Pengembangan Energi) |
| | | Bangka Belitung | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | Lampung | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | Banten | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | DKI | Office of Mining (Dinas Pertambangan) |
| | | Jawa Barat | Office of Mining and Energy (Dinas Pertambangan dan Energi) |
| | | Kalimantan Barat | Office of Energy and Mineral Resources (Dinas Energi dan Sumberdaya Mineral) |
| Ministry of Agriculture – DEPTAN – Departemen Pertanian | Responsible in provide technical direction related to agriculture activity within and around wetlands. | Riau | Office of Food Agriculture (Dinas Tanaman Pangan) |
| | | Jambi | |
| | | Sumatera Selatan | Office of Food Agriculture and Hroticulture (Dinas Tanaman Pangan dan Hortikultur) |
| | | Bangka Belitung | Office of Agriculture and Husbandry (Dinas Pertanian dan Peternakan) |
| | | Lampung | Office of Agriculture (Dinas Pertanian) |
| | | Banten | Office of Agriculture and Husbandry (Dinas Pertanian dan Peternakan) |
| | | DKI | Office of Agriculture and Forestry (Dinas Pertanian dan Kehutanan) |
| | | Jawa Barat | Office of Agriculture (Dinas Pertanian Tanaman Pangan) |
| | | Kalimantan Barat | Office of Agriculture (Dinas Pertanian Tanaman Pangan) |
| Army, Police, and Attorney (TNI, Polri, dan Kejaksaan) | Responsible in securing and enforcing laws regarding wise use and conservation of wetlands'. | Riau | Authority of Central Government |
| | | Jambi | |
| | | Sumatera Selatan | |
| | | Bangka Belitung | |
| | | Lampung | |
| | | Banten | |
| | | DKI | |
| | | Jawa Barat | |
| | | Kalimantan Barat | |

2.2.2 Non-Governmental Organizations

1. *Community* in several area of coastal wetlands bordering South China Sea play important role in controlling coastal wetlands utilisation through collective rules, custom, and norms. Community also participates in rehabilitation efforts such as in Tembilahan, Berbak National Park, Jakarta, and West Java.

2. *Non-Governmental Organizations (NGOs)* actively participates in doing non formal education to community regarding wise use and conservation of coastal wetlands. Supporting the development of policy and management and conducting rehabilitation action. Some of the NGOs are Laksana Samudera of Riau Province, Yayasan Pinse of Jambi Province, Yayasan Wahana Bumi Hijau of South Sumatera, and Yayasan Mangrove of Bogor. Usually, NGOs form a network to strengthen their bargaining position to other stakeholder. Two of the most prominent networks are WALHI (Indonesian Environment Forum) and Jaring Pela (Coastal and Marine NGOs Network).

3. *Private Sectors* play important role in harvesting coastal wetlands resources as well as support development local community's economic activities. However, in many cases private sector activities in coastal wetlands tend to neglect ecosystem services. The most prominent cases are the conversion of coastal wetlands of Muara Angke Jakarta into luxurious housing complex has caused regular flooding around the housing complex.

3. CONCLUSION

The management of coastal wetlands bordering South China Sea has to be unique compare to other waters in Indonesia since South China Sea is stretch through various countries. Therefore, transnational issues as well as issues mentioned in many International Conventions are important part that should be consider in developing legislation and regime of Indonesian coastal wetlands bordering South China Sea.

There is no single legislation that covers and/or co-ordinates all aspects of management of coastal wetlands bordering South China Sea. Each management issues regulate by sectoral Act and execute by related sectoral institution. Therefore many of sectoral legislation are overlap and not compatible with other legislation as happened on status of mangrove wetlands on Act of Fishery, Act of Conservation and Act of Forestry.

In general, legislations for management of coastal wetlands bordering South China Sea is sufficient to deal with current issues. However, weak enforcement efforts and co-ordination among sectors has lead to inefficient implementation of the legislation.

Institutionally, there are no specific management institutions for coastal wetlands bordering South China Sea. However each institution usually has activity or programme related to coastal wetlands bordering South China Sea. Unfortunately, as happened on sectoral legislation, co-ordination among institutions is usually weak.

Indonesia had possessed National Strategy and Action Plan (NSAP) for wetkands management, developed in 1996. Along with the change of natural resources management's paradigm and the change of Government's structure, the NSAP of 1996 become irrelevant and require immediate revision.

Efforts to revised NSAP of 1996 had been starting since the end of 2002, simultaneously with the starting of South China Sea Project. The effort facilitated by Ministry of Environment (Ministry of Environment, 1996). The result of NWC for South China Sea Project's meeting related to Strategic Plan for Coastal Wetlands Management recommended that the development of Strategic Plan should not be separated from the process that facilitated by Ministry of Environment. Separation would risk the creation of confronting strategy between NSAP for Wetlands that developed by Ministry of Environment and the Strategy for Coastal Wetlands that developed by NWC for South China Sea.

In order to avoid above situation, through Wetlands International – Indonesia Programme, some of the member of NWC for South China Sea Project actively participated in discussion and consultation facilitated by Ministry of Environment. In March 2004, after series national consultations, Ministry of Environment and Ministry of Forestry was publishing the NSAP for wetlands management (Ministry of Environment, 1996). The NWC for South China Sea Project developing Strategy for Coastal Wetlands Management by extracting coastal wetlands related strategy from NSAP for Wetlands. The Strategy and Action Plan is attached.

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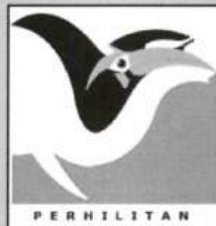
Global Environment
Facility

NATIONAL REPORT

on

Wetlands in the South China Sea

MALAYSIA



Mr. Zainuddin Ab. Shukor
Focal Point for Wetlands

The Protected Area Division
Department of Wildlife and National Parks
KM 10, Jalan Cheras, 56100
Kuala Lumpur, Malaysia

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1. INTRODUCTION

Wetlands contribute significantly to the economy of Malaysia; firstly through agricultural production, forestry and fisheries; second, and increasingly, for water supply (for domestic use as well as for irrigation). Other economic and ecological benefits of wetlands include groundwater replenishment, maintenance of water tables for agriculture, flood control, shoreline protection and stabilisation, climate change mitigation, sediment and nutrient retention, water purification and habitats for biodiversity. Tourism in wetlands is also becoming increasingly important.

Ten percent of the total land area of Malaysia is comprised of wetlands (IPT-Asian Wetland Bureau, 1994). Different communities near and around these important ecosystems have used the wetland resources for centuries. In 1994, Malaysia ratified the Ramsar Convention of Wetlands of International Importance, and soon thereafter designated Tasek Bera, a unique freshwater swamp as its first Ramsar site. The Malaysian Wetland Directory was compiled in 1987 and highlights 96 wetland sites of national importance.

Malaysia's land use policy is "*use-oriented*", i.e., designed for maximum exploitation and development (Ministry of Science and Technology and Environment (MoSTE) 1997). Thus, conversion of land for urbanisation, industrial, agricultural, mining and forestry development has higher priority than that of conservation, although it is probable, in many cases, that conservation for sustainable use of resources has a higher rate of return on investment in the long-term. This is because, when decision are made on the conversion of wetlands to other land uses, the cost/benefit analyses used in these situations often do not take into account the full range of benefits of the wetland area to be converted. The National Land Code (NLC) is applicable only in Peninsular Malaysia while in East Malaysia, the Sabah Land Ordinance and Sarawak Land Ordinance form the basis of land laws and administration. The Land Capability Classification (LCC) which is applicable throughout Malaysia divides land use into five categories: mining, agriculture covering a wide range of possible crops, agriculture for a restricted range of possible crops, forestry and conservation, based on potential productivity and economic yield of the land in question. Land designated for conservation has the lowest priority in this order. Since its implementation, the LCC has introduced major land use changes which have been financially beneficial and have done much to address problems of rural poverty and social inequality. The LCC's weakness is its limited applicability to adequately address biological diversity and conservation issues, although conservation has been widely defined as the judicious use and management of nature and natural resources for the benefit of human society and ethical reasons. Development projects in wetland areas, for example agriculture (whether planned or unplanned) compromises the ecological integrity of intact wetland areas, and result in loss or degradation of these sensitive, yet fragile ecosystems.

Most key wetland sites in Malaysia are included in the Permanent Forest Estate (PFE), managed primarily as source of timber and non-timber goods. The value of wetland forests for instance, peat swamp forests, and mangrove forests in performing various environmental or cultural services has rarely been considered in decision-making. The term PFE, however, may be misleading since it implies that the forest areas are permanent. This is not guaranteed since the Executive Council within state governments can declassify any area of PFE for infrastructure development, agriculture, housing or other purposes (PFEs are the jurisdiction of respective state governments). Very few wetland areas in Malaysia that are designated as nature parks and wildlife sanctuaries are legally protected for conservation, while some wetland areas forming part of state land forests are essentially viewed as land earmarked for development.

The Ramsar Convention stresses the importance of wetlands as rich areas of biological diversity and productivity and as life support systems for human populations. This has been a key theme in the evolving global support and political commitment for sustainable development and environmental conservation as articulated in the Ramsar Convention's Strategic Plan 1997-2002; the World Conservation Strategy; Caring for the Earth, the report of the Brundtland Commission; and Agenda 21. The role of wetlands has emerged as a key element in the conservation of natural ecosystems through the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change, among others.

The importance of wetlands goes beyond their status as habitats for many endangered plant and animal species. They are a vital component of national and global ecosystems, and economies.

Since the ratification of the Ramsar Convention in 1994, there has been a progressive loss and degradation of wetlands in Malaysia. One of the many wise use guidelines for wetland conservation under the Ramsar Convention is the adoption of a holistic approach to land use planning. Although the National Land Code (NLC) in Malaysia is federal legislation, land is legally administered under the respective state governments (MoSTE, 1997). The National Land Codes has no direct bearing on biological diversity conservation, although it provides certainty in use through the land categorisation system, and security in tenure in terms of ownership rights. The absence of a single central authority in charge of land administration, given the division of functions between state and federal governments, implies that the maintenance of wetland reserves for biodiversity conservation is dependent upon the decisions of policy-makers of individual states. This conflict, in many ways, has resulted in poor implementation of the Ramsar Convention's goals and objectives in Malaysia.

Malaysia launched its National Biodiversity Policy in 1998. In 1997, the Framework for the National Policy on Wetlands was established, but until today the policy is still in a draft form. It has taken considerable time and lengthy consultation to overcome barriers such as institutional reluctance to change practices in government agencies and elsewhere.

In view of increasing threats to wetlands and their biological diversity, the National Land Council (which is the advisory council of the NLC) needs to integrate the major issues of unsustainable land use practices into its long-term land use planning, in addition to administering land use laws. Land use patterns and priorities have undergone drastic changes since the 1960s; therefore the Land Codes Classification should be replaced with an integrated and holistic approach to land use planning (MoSTE, 1997).

Like many developing nations, Malaysia's quest for economic growth has focused government attention on the financial gains of land development, manufacturing, industry, and tourism with considerable regard paid to the environmental costs. The government's enthusiasm for what it views as the tremendous potential of agriculture and tourism has been somewhat tempered by the present status of its marine resources. The rate of development along the rivers shows that the quality of wetland habitats has declined. The damaging effects generated by the above developments are one of the factors lead in declining wetland quality. Even though the present wetland quality is not very alarming, the environmental degradation of the South China Sea still requires serious mitigation. Given Malaysia's history of strong environmental regulations, long-time support of agriculture, and overlapping and conflicting jurisdictions between governmental authorities, the problem of environmental degradation in the South China Sea should be considered as a regional problem to be solved. Malaysia should be responsible in the regional solution to the problem because most of the major rivers in Malaysia drained into the South China Sea. Recognition of the problems produced by irresponsible activities can only be solved at best, by good management practices. It can also be viewed as an encouraging preliminary step toward an effective policy of environmentally sustainable development in the wetland areas (Wetlands International-Asia Pacific- Malaysia Programme, 1998).

2. WETLAND TYPES AND DISTRIBUTION

2.1 Site Description

The only national inventory of wetlands in Malaysia was conducted in 1986 by the Malaysia Wetlands Working Group, Department of Wildlife and National Parks. In Malaysia there are 91 wetland sites, of which 55 are in Peninsular Malaysia, and 18 each in Sabah and Sarawak respectively. However, only fourteen sites were chosen in Peninsular Malaysia, four sites in Sabah and 10 in Sarawak for the National Wetland Committee consideration.

Although the data appears to be quite outdated, the recommended sites were each investigated recently. During the data collection, a guideline proposed by Ramsar was used, in accordance to criteria of the Ramsar Convention Criteria for selection of demonstration sites in this project were based on the previously mentioned guidelines, and include: criteria, indicators, data and information required for national reviews. At the second meeting of the National Wetlands Committee on October 29, 2003, 28 sites were endorsed and accepted as candidates for pilot sites. The decision was based on nine criteria (Table 1).

On January 11, 2004, the prioritised data from the sites was presented to the Third National Wetlands Committee for site(s) selection. The Committee agreed to select five sites to propose for the project: South East Pahang swamp forests, Sungai Cherating forest reserve (estuarine), Kuala Rompin estuarine, Rajang delta – mudflats and Klias Peninsula – peat swamp.

Table 1 Wetland Sites Proposed at the Second National Wetlands Committee Meeting.

| No. | Name | Location | Area(ha) |
|-----|---|------------|----------|
| 1. | Telong melaleuca swamps | Kelantan | N/A |
| 2. | Sungai Golok melaleuca | Kelantan | N/A |
| 3. | Tumpat Lagoon – estuarine | Kelantan | N/A |
| 4. | Melaleuca North of Kuala Terengganu | Terengganu | N/A |
| 5. | Merchang peat forest | Terengganu | N/A |
| 6. | Tasek Chini | Pahang | 202 |
| 7. | Sungai Cherating Forest Reserve – estuarine | Pahang | 277 |
| 8. | Tanjung Agas lagoon | Pahang | N/A |
| 9. | South east Pahang swamp forests | Pahang | N/A |
| 10. | Tasek Bera | Pahang | 16,500 |
| 11. | Kuala Rompin estuarine | Pahang | N/A |
| 12. | Kuala Endau mangrove | Johor | N/A |
| 13. | Sungai Sedili Kecil | Johor | 433 |
| 14. | Sungai Sedili Besar | Johor | N/A |
| 15. | Klias Peninsula – peat swamp | Sabah | 100,000 |
| 16. | Kinabatangan floodplain – freshwater swamp | Sabah | 280,000 |
| 17. | Merintaman Menggalong | Sabah | 1,700 |
| 18. | Unggang swamp | Sabah | 500 |
| 19. | Lawas mangrove | Sarawak | 227,500 |
| 20. | Trusan – Sundar mangrove | Sarawak | 6,000 |
| 21. | Sandakan – Tambisan – coastal wetlands – freshwater | Sabah | 95,000 |
| 22. | Sibuti Mangrove – peat swamp | Sarawak | 1,213 |
| 23. | Rajang Delta – mudflats | Sarawak | |
| 24. | Maludam Swamp Forest | Sarawak | 125,000 |
| 25. | Limbang mangrove – estuarine | Sarawak | |
| 26. | Sarawak mangrove forest – estuarine | Sarawak | 13,098 |
| 27. | Sampadi mangrove forest – delta | Sarawak | 202,500 |
| 28. | Sadong swamp forest – peat swamp | Sarawak | 427,500 |

2.2 Natural Wetlands

1. Mangroves

Mangroves are well developed in sheltered estuaries where waters are brackish and waves and tidal conditions are conducive for mud accumulation. Mangroves cover about 3% (641,891ha) of the total land area in Malaysia with about 57% in Sabah, 26% in Sarawak and the remaining 17% in Peninsular Malaysia (Chan *et al.*, 1996; Wetlands International-Asia Pacific, 1996; Management Plan for the Mangroves of Johor, 1999) (Table 2). About 70% of the total mangrove area has been recorded as forest reserves with the remainder being state land. The term “mangroves” is a collective name for a group of plants with more than 50 species identified which fall into four main genera: *Avicennia*, *Rhizophora*, *Bruguiera* and *Sonneratia*. The mangrove vegetation in Malaysia is believed to have reached its optimal development.

Table 2 Mangrove Areas in Malaysia.

| State | Total Area (ha) |
|-----------------|-----------------|
| Perlis | 100 |
| Kedah | 7,949 |
| Penang | 451 |
| Perak | 43,502 |
| Selangor | 23,882 |
| Negeri Sembilan | 1,061 |
| Melaka | 305 |
| Johor | 27,733 |
| Terengganu | 954 |
| Pahang | 2,482 |
| Kelantan | 20 |
| Sabah | 365,460 |
| Sarawak | 167,992 |

2. Peat Swamp

The tropical climate and high annual rainfall in Malaysia have resulted in the formation of peat swamp forests. Where permanent water logging and anaerobic conditions prevail, partial inhibition of vegetation decay has given rise to peat formation. The peat releases tannin and organic acids into the water. This accounts for the water acidity, with a pH value of between 3 and 4, and the coloration of water, which is almost black in appearance, but is clear when held up against the light. Today, about 2 million ha (Chew, 1997; Latiff, 1997; Mahadon, 1997; Mohd Radhi, 1997; Jalil, 1997 and Moktar, 1997) remain in Malaysia which accounts for about 7.2% of the total land area of Malaysia. Less than 25% of this wetland type is found in the peninsular with another 75% in Sarawak, while the rest is in Sabah. Table 3 shows peat swamp areas in Malaysia.

Table 3 Peat Swamp Areas in Malaysia.

| State | Total Area (ha) |
|-----------------|----------------------------------|
| Perlis | No significant peat swamp forest |
| Kedah | No significant peat swamp forest |
| Penang | No significant peat swamp forest |
| Perak | 96,000 |
| Selangor | 76,134 |
| Negeri Sembilan | No significant peat swamp forest |
| Melaka | No significant peat swamp forest |
| Johor | 13,346 |
| Terengganu | 13,819 |
| Pahang | 198,866 |
| Kelantan | No significant peat swamp forest |
| Sabah | 166,698 |
| Sarawak | 1,500,000 |

3. Freshwater Swamp Forest

Freshwater swamps occur in areas permanently or seasonally flooded, where the soils contain more than 35% mineral content, normally found along upper reaches of certain rivers. Examples include the freshwater swamp forests in Sg. Sedili in Johor, Tasek Chini and Tasek Bera in Pahang, along Sabah's east coast and along lower reaches of certain rivers in Sarawak (Chew, 1997; Malaysian Wetland Working Group, 1987). This type of forest is quite species-rich with a high diversity of understory species including rattan and palm. The swamp forest vegetation of Tasek Chini is dominated by *Eugenia* species (Wetlands International-Asia Pacific – Malaysia Programme, 1998). Table 4 illustrates freshwater swamp forest in Malaysia.

Table 4 Freshwater Swamp Forest in Malaysia.

| State | Total Area (ha) |
|-----------------|--|
| Perlis | No significant freshwater swamp forest |
| Kedah | No significant freshwater swamp forest |
| Penang | No significant freshwater swamp forest |
| Perak | 1,967 |
| Selangor | Data not available |
| Negeri Sembilan | No significant freshwater swamp forest |
| Melaka | No significant freshwater swamp forest |
| Johor | 11,900 |
| Terengganu | 10,433 |
| Pahang | 330,980 |
| Kelantan | No significant fresh swamp forest |
| Sabah | 152,702 |
| Sarawak | 28,907 |

4. Nipa Swamp

Nipa swamps occur in association with mangroves and extend further into brackish water (Table 5). They are normally found surviving in the borderline of brackish and freshwater areas of tidal influence. Comprising mono-specific stands of the palm *Nypa fruticans*, they form huge swamps in tidal reaches of rivers as in the Sarawak Mangrove Reserve (Chew, 1997; Malaysian Wetland Working Group, 1987).

Table 5 Nipa Swamps in Malaysia.

| State | Total Area (ha) |
|-----------------|--------------------|
| Perlis | Data Not Available |
| Kedah | Data Not available |
| Penang | Data Not Available |
| Perak | Data Not Available |
| Selangor | Data Not Available |
| Negeri Sembilan | Data Not Available |
| Melaka | Data Not Available |
| Johor | Data Not Available |
| Terengganu | 24,100 |
| Pahang | Data Not Available |
| Kelantan | 1,020 |
| Sabah | 758,770 |
| Sarawak | 869,700 |

5. *Melaleuca* Swamp Forest

Melaleuca swamp forests, known locally as “gelam” forests, are actually freshwater swamp forests; however, the vegetation is comprised almost exclusively of *Melaleuca cejeputi* (Table 6). The forests replace the original freshwater swamp forest after it has been burnt since *Melaleuca* are resistant to fire. These forests occupy extensive areas of alluvial flats along the east coast of peninsular Malaysia, mainly in Kelantan and Terengganu (Chew, 1997; Malaysian Wetland Working Group, 1987).

Table 6 *Melaleuca* Swamp Forest in Malaysia.

| State | Total Area (ha) |
|-----------------|--|
| Perlis | No significant <i>melaleuca</i> swamp forest |
| Kedah | No significant <i>melaleuca</i> swamp forest |
| Penang | No significant <i>melaleuca</i> swamp forest |
| Perak | No significant <i>melaleuca</i> swamp forest |
| Selangor | No significant <i>melaleuca</i> swamp forest |
| Negeri Sembilan | No significant <i>melaleuca</i> swamp forest |
| Melaka | 1,400 |
| Johor | No significant <i>melaleuca</i> swamp forest |
| Terengganu | 29,100 |
| Pahang | No significant <i>melaleuca</i> swamp forest |
| Kelantan | 11,020 |
| Sabah | No significant <i>melaleuca</i> swamp forest |
| Sarawak | No significant <i>melaleuca</i> swamp forest |

6. Marshes

Marshes have a number of specific characteristics. They are usually dominated by reeds, rushes, grasses and sedges that are commonly referred to as emergents since they grow with their stems partly in and partly out of the water. Marshes rely on water sources and include some of the most productive ecosystems in the world. In Malaysia, marshes are normally found in areas where the original freshwater swamp forest has been cleared or burnt (Table 7). They are a stage of ecological succession, and not normally a permanent vegetation type. Dominant plants include species of reeds, reedmace, club rush, sedges and spike rushes. There are relatively few open marsh areas in Malaysia (Malaysian Wetland Working Group, 1987) with the exception of Kota Belud Bird Sanctuary on the Tempasuk Plain in north-western Sabah.

Table 7 Marshes in different states of Malaysia.

| State | Total Area (ha) |
|-----------------|----------------------------|
| Perlis | No significant marsh areas |
| Kedah | No significant marsh areas |
| Penang | No significant marsh areas |
| Perak | 1,967 |
| Selangor | No significant marsh areas |
| Negeri Sembilan | No significant marsh areas |
| Melaka | 600 |
| Johor | No significant marsh areas |
| Terengganu | No significant marsh areas |
| Pahang | 20,350 |
| Kelantan | No significant marsh areas |
| Sabah | 721,216 |
| Sarawak | Data Not Available |

7. **Mudflats**

Intertidal mud and sand flats are extremely important wetland habitats in Malaysia (Table 8). They fringe the majority of Malaysia's coastlines and in certain places may be several kilometres wide at low tide. Mudflats that are associated with major mangrove forests support a very rich benthic (organisms that are either attached or living within the bottom sediments) population. These areas represent the richest feeding grounds for migratory shorebirds and resident water birds such as herons, egrets and storks. In Malaysia, there are approximately 400,000ha (MoSTE, 1997; Sasekumar, *et al.*, 1998) of tidal mudflats. This is about 1.9% of the total land area of Malaysia. Yet they are rarely included in reserve areas and are very poorly documented.

Table 8 Intertidal Mudflats in Malaysia.

| Stat | Total Area (ha) |
|-----------------|--------------------|
| Perlis | 0.22 |
| Kedah | 1,483.46 |
| Penang | 4,189.90 |
| Perak | 7,797.64 |
| Selangor | 20,806.14 |
| Negeri Sembilan | 301.62 |
| Melaka | 1,012.85 |
| Johor | 16,586.61 |
| Terengganu | Data Not Available |
| Pahang | 1,777.000 |
| Kelantan | Data Not Available |
| Sabah | Data Not Available |
| Sarawak | Data Not Available |

8. **Sandy Beaches**

In Malaysia, sandy beaches occur largely along the East Coast of Peninsular Malaysia, Sabah and Sarawak (Sasekumar *et al.*, 1998). Plants in this habitat have to anchor themselves deeply in shifting sands and find enough freshwater between the loose silica sand grains. Animals are found mostly in the tidal zones, with bivalve molluscs being the most common. Sandy beaches are also important as turtle landing and nesting sites. Beaches are attractive recreational areas for people, hence are often used for tourism. Table 9 shows sandy beaches in Malaysia.

Table 9 Sandy Beaches in Malaysia.

| State | Total Area (ha) |
|-----------------|--------------------|
| Perlis | 343.00 |
| Kedah | 181.22 |
| Penang | 390.38 |
| Perak | 734.20 |
| Selangor | 4,767.19 |
| Negeri Sembilan | 816.66 |
| Melaka | 318.23 |
| Johor | 285.54 |
| Terengganu | Data Not Available |
| Pahang | Data Not Available |
| Kelantan | Data Not Available |
| Sabah | Data Not Available |
| Sarawak | Data Not Available |

9. **Rocky Shores**

Rocky shores are rare habitats in Malaysia. Isolated rocky headlands and islands occur at places such as Tanjung Tuan, at the many offshore islands along the west and east coast of Peninsular Malaysia (Sasekumar, *et al.*, 1998), and in Sabah and Sarawak (Table 10). Rocky shore ecosystems support animals and plants found nowhere else in Malaysia. Ecological information on this unique habitat is scarce.

Table 10 Rocky Shore Areas in Malaysia.

| State | Total Area (ha) |
|-----------------|-----------------------------|
| Perlis | 11.82 |
| Kedah | 195.38 |
| Penang | 58.27 |
| Perak | 86.98 |
| Selangor | No significant Rocky Shores |
| Negeri Sembilan | 48.25 |
| Melaka | 1.12 |
| Johor | 33.37 |
| Terengganu | No significant Rocky Shores |
| Pahang | No significant rocky shores |
| Kelantan | No significant rocky Shores |
| Sabah | Data Not Available |
| Sarawak | Data Not Available |

10. Coral Reefs

A coral reef is assembled of many types of plants and animals, and of which corals form one of the dominant components. Reefs are essentially massive deposits of calcium carbonate that have been produced by corals with major additions from calcareous algae and other organisms that secrete calcium carbonate. Coral reefs are sensitive and easily destroyed because they need specific conditions to grow and survive such as water temperature above 18°C, water depth shallower than 50m, low sedimentation rates and sufficient circulation of pollution-free water. Coral reefs are distributed mainly around the offshore islands in three regions: the East and West Coast regions in Peninsular Malaysia, Sabah and Sarawak. Typically, the marine waters of the offshore islands where the corals occur are either protected as Marine Parks or are areas where fishing is prohibited (MoSTE, 1997; Jabatan Perancang Bandar & Desa, 2001). Marine Parks are protected areas which extend for a distance of two nautical miles seaward from the outer most points of the islands. However, the land areas of these islands are not protected as part of the marine park designation (Table 11).

Table 11 Coral Reefs Areas in Malaysia.

| State | Total Area (ha) |
|-----------------|----------------------------|
| Perlis | No significant coral reefs |
| Kedah | 18.700 |
| Penang | Data Not Available |
| Perak | Data Not Available |
| Selangor | No significant coral reefs |
| Negeri Sembilan | Data Not Available |
| Melaka | Data Not Available |
| Johor | 68,151 |
| Terengganu | 53,029 |
| Pahang | 67,661 |
| Kelantan | No significant coral reefs |
| Sabah | 20.622 |
| Sarawak | Data Not Available |

11. Seagrass Beds

Seagrass beds are flowering plants complete with leaves, rhizomes (an underground, usually horizontally oriented stem) and root systems. Seagrass beds are located within the shallow coastal zones, hence they are directly affected by the way we treat the land and what we put into the sea. Most seagrass species are located in soft (silty or sandy) sediments. Seagrass beds play an important role in maintaining nutrient levels in marine ecosystems, providing food for turtles and dugongs, and acting as a nursery, shelter and food source for fish and other invertebrates. In Peninsular Malaysia, seagrass beds are commonly found on the coast of Penang, Port Dickson, South West Johor's mangroves and mudflats, the East Johor Islands and Langkawi group of islands.

12. River Systems

As rivers meander through the low-lying basins, they form various wetland complexes. The wetlands alongside rivers are also referred to as riparian fringes or riverine habitats. There are 159 rivers in Malaysia: 88 in the Peninsular, 48 in Sarawak and the rest in Sabah. The Rajang river basin is the largest in Malaysia with a catchment area of 51,000km². In Peninsular Malaysia, most of the rivers originate from the central mountain range. Flowing into the South China Sea, the Pahang river and its tributaries, with a catchment area of 26,800km², form the largest river basin in the Peninsular. The state and area of the river are hard to discern in Malaysia, as different sections of a river can be under the management of different local governments as rivers are known to flow through many administrative boundaries.

13. Natural Lake Systems (including oxbow lakes)

Lakes are permanent/seasonal bodies of freshwater occupying either large basins or small depressions in the landscape. There are very few natural lakes in Malaysia; good examples are Tasek Bera and Tasek Chini in Pahang and Loagan Bunut (a floodplain lake) in Sarawak. Tasek Bera is Malaysia's sole Ramsar Site (Wetlands International-Asia Pacific, 1999). The oxbow lakes, which occur mainly in East Malaysia, are found along the meandering lower reaches of major rivers such as the Baram and Liman Rivers in Sarawak, and the Kinabatangan, Sugut and Segama rivers in Sabah. Lakes are primarily known for mitigating floods as well as their importance in providing fish resources for local inhabitants. They are also natural breeding areas for certain fish species, namely the migrating species from inflowing rivers. In addition, lakes have great cultural and spiritual significance to local people. Nature tourism in lake ecosystems is highly popular in Malaysia.

2.3 Constructed Wetlands

1. Reservoirs

Dams are usually constructed in catchment areas which function in gathering, collecting, storing and transmitting the water provided by rainfall. They are constructed both for water supply (water for domestic use and irrigation) as well as for hydroelectric power generation. Reservoirs are the result of these structures. There are about 54 dams in Malaysia with a total water capacity of 12 billion cubic meters per year. The integrity of a dam depends very much on the surrounding land activities in the catchments; illegal logging and indiscriminate land clearing as a result of human intervention are contributory factors which lead to siltation, and decrease the life span of dams.

2. Rice Fields

Wet rice fields are major, man-made wetland habitats in Malaysia. Rice fields occur chiefly on level terrain in former wetlands, floodplains and swamps. Rice fields are of major importance as they produce Malaysia largest staple food item. In addition, rice fields are known for their biodiversity value, namely in providing food resources for resident and migrating water birds, and in some cases providing breeding areas for some bird species. They support large numbers of winter visitors and passing migratory birds, such as herons, egrets and waders. There are over 650,000ha of wet rice fields in Malaysia, of which 450,000ha occur in the Peninsular, mainly in Krian-Perak, Sekinchan-Selangor, and in the coastal areas of Perlis and Kedah. In Sabah, freshwater swamps have been converted to rice fields while small scale ventures exist in Sarawak (Chew, 1997; Malaysian Wetland Working Group, 1987) (Table 12).

Table 12 Rice Field Areas in Malaysia.

| State | Total Area (km ²) |
|-----------------|-------------------------------|
| Perlis | Data Not Available |
| Kedah | Data Not Available |
| Penang | Data Not Available |
| Perak | 23,100 |
| Selangor | 5,000 |
| Negeri Sembilan | Data Not Available |
| Melaka | Data Not Available |
| Johor | 4,000 |
| Terengganu | Data Not Available |
| Pahang | Data Not Available |
| Kelantan | Data Not Available |
| Sabah | Data Not Available |
| Sarawak | 70,000 |

3. *Created and Rehabilitated Wetlands*

This category includes created wetlands such as the Putrajaya Wetlands, and rehabilitation carried out in wetlands such as abandoned tin-mining pools and degraded peat swamp forests. Paya Indah Wetland Sanctuary, Kinta Nature Park, Kelana Jaya lakes are examples of rehabilitated wetlands. Most of the wetlands in this category were developed for recreational purposes; however their benefits surpass recreation since these wetlands attract and support significant biodiversity, and can serve as flood control measures. The Putrajaya wetlands, consisting of marsh, swamps and an open water lake system, was created to serve a functional purpose; natural remediation of inflowing river water and storm water. Despite rehabilitation efforts, large abandoned tin-mining areas still occur in the states of Perak and Selangor, and are generally unrecorded. Other man-made wetlands such as constructed lakes and ponds, including aquaculture and oxidation ponds are evident in Malaysia; however, data on them is scarce.

2.4 **Function and Values of Wetlands**

Wetlands provide tremendous economic benefits, for example: water supply (quantity and quality); fisheries (over two-thirds of the world's fish harvest is linked to the health of coastal and inland wetland areas); agriculture, through the maintenance of water tables and nutrient retention in floodplains; timber production; energy resources, such as peat and plant matter; wildlife resources; transport; and recreation and tourism opportunities.

In addition, wetlands have special attributes as part of the cultural heritage of humanity: they are related to religious and cosmological beliefs, constitute a source of aesthetic inspiration and form the basis of important local traditions.

These functions, values and attributes can only be maintained if the ecological processes of wetlands are allowed to continue functioning. Unfortunately, and in spite of important progress made in recent decades, the wetlands ecosystem in Malaysia continues to be threatened, mainly due to ongoing drainage, conversion, pollution, and resource exploitation.

The survey identified that the benefits (goods and services) that wetlands provide encompass direct uses, functions and attributes. Direct uses (also termed as goods) imply resources in wetlands of Malaysia that can be harvested directly for use. Wetland functions (also termed as services) are defined as physical, chemical or biological processes occurring within a wetland system such as those related to flood control, and groundwater recharge. Wetland attributes are the characteristics of wetlands which are perceived as valuable to society, for example, cultural and religious values, and biodiversity.

There are many direct uses (also called goods) that lagoons, mudflats, peat swamp and estuaries provide. During the data collection and survey of wetland areas in the states of Kelantan, Terengganu, Pahang, Johor, Sabah and Sarawak, a tremendous amount of direct uses were encountered. As a result of direct uses, the river system was highly degraded and thus, indirectly affected the South China Sea. The direct use activities are very familiar as in other wetlands in the region: most people use the wetlands as fisheries, agriculture sites, and for energy (water, peat, timber).

In the case of functions, it is very important to consider the kinds of services to offer to the people and the states. Wetlands should also be considered as a providers of both inland uses and marine uses. However, the management authority who is responsible for the sites should be aware that wrongly approved activities in the pristine sites (inlands) is proportionally adverse to the marine lives.

The functions include:

- Flood control
- Shoreline stabilisation
- Prevention of saltwater intrusion
- Water transport
- Sediment/nutrient retention
- Toxicant removal
- Microclimate stabilisation
- Education
- Research
- Tourism
- Recreation.

The attributes include:

- Biological diversity; gene bank
- Unique cultural/heritage
- Life cycle – migration routes, nursery grounds.
- Global carbon sink
- Prevention of the development of acid sulphate soils.

2.5 Threats to Wetlands

Despite the importance of wetlands to Malaysia's ecological and economic health and vitality, the last century has witnessed their continued loss and degradation. Since 1900, Malaysia's total wetland areas have been reduced through reclamation, drainage and conversion or loss to other land uses. Significant portions have been seriously degraded or are at imminent risk. The loss and degradation of wetlands continues unabated.

The rapidly increasing population in Malaysia and resulting rate of urbanisation puts strong pressure on acquisition of land for development. Wetlands are often converted, or reclaimed as sites for agriculture, including aquaculture; industry, human settlements, and other uses. Holistic land use approaches or guidelines which successfully integrate wetlands into multiple land use planning are inadequate at the moment. This has led to the loss of important wetland benefits. Without the adoption of appropriate land use approaches, wetlands as functional ecosystems providing a variety of benefits will be lost, as will be important contributions to development.

The following are perceived as major threats to wetlands in Malaysia:

1. *Conversion to Agriculture use*

Large wetland areas in Malaysia have been converted to agricultural land. Prior to 1966, approximately 400,000ha of wetlands were converted to rice production in Peninsular Malaysia. This represents about 20% of the original wetland area and possibly 70% – 80% of the original area of freshwater swamp forest in the Peninsular. Between 1966 and 1974, an additional 110,000ha of wetlands were converted to agricultural use, including 28,000ha of rice fields. Rice production places a heavy demand on water resources (irrigation accounts for 82% of water demand in Peninsular Malaysia) and in some states, the acreage under production is decreasing due to a shortage of water. This may be partly due to the clearance of swamps which originally acted as "reservoir" areas.

2. *Industry and Urbanisation*

A number of wetland areas in Malaysia have been filled-in for industrial and urban development. In Kota Kinabalu, Sabah, coastal mudflats have been reclaimed for housing and commercial development. The solar salt factory at Kuala Selangor destroyed a substantial part of the South Banjar Forest Reserve, and undoubtedly affected important adjacent inshore fisheries. The project was a failure due to poor planning. Mangroves and other swamps are also frequently used as sites for dumping rubbish and land fill without due regard for their natural value in water control and fisheries. Many of these actions have been carried out, not because of a shortage of land areas for development, but because of the mistaken view that wetlands are wasteland with no intrinsic values.

3. *Pollution*

Pollution is a serious threat as pollutants tend to accumulate in wetlands. Pollution arising from solid waste dumping, pesticide and herbicide residues from land and coastal based agricultural activities, untreated effluent or discharges from industries and domestic areas, silt, soil erosion, and oil spills are major threats to wetlands.

Agro-based wastes from palm oil and rubber processing industries at one time were a major source of pollution, but have been brought under control and reduced by up to 95% over the last five years. Pollution from manufacturing industries has been reduced by 60%, but is still causing some problems.

4. *Changes to wetland hydrology*

Surface water flows are modified for several reasons including flood control and water supply. Seasonal surface water flows may also be disrupted through the clearance of vegetation from catchment areas. This leads to increased surface flows in the wet season and decreased flows in the dry season. Regulation of flows by weirs and dams results in disrupting natural fluctuations in water supply to wetlands. This affects ecosystem processes and may effect the life cycles of flora and

fauna. In addition, many watercourses in urban areas have been converted to concrete drains and embankments, with loss of in-stream, fringe wetlands and riparian vegetation.

Thus, the biodiversity of wetlands has been affected. Drainage of wetland areas, especially peat swamps, for agriculture purposes has been shown to have adverse effects. The loss of peat swamps results in a loss of water storage capacity and lowering of water tables. Reduced water tables in peat swamps will increase the incidence of peat and forest fires. Severe degradation of peat lands in Malaysia is resulting in a decline in the capacity of these wetlands to serve as carbon sinks, and the resulting carbon emissions are contributing to global climate change.

3. CONCLUSION AND RECOMMENDATIONS

Effective land use planning requires a sound policy basis if it is to successfully incorporate the interests of a wide variety of user groups, maximize the efficiency and profitability of the use of natural resources, while maintaining the long-term viability of the resources.

In their undisturbed state, Malaysia's wetlands are highly productive, valuable natural resources, which are however, very sensitive to disturbance. In order to achieve the maximum long-term productivity on a sustainable yield basis from Malaysia's wetlands, it is essential that a National Wetland Policy is formulated. This concurs with the philosophy behind the Convention on Wetlands of International. Especially as Waterfowl Habitat which requires contracting parties to the Convention to "formulate and implement their planning so to promote...as far as possible the wise use of wetlands in their territory" (Article 3.1). The First Conference of Contracting Parties recommended that, in order to achieve "wise use", comprehensive national policies, a nationwide inventory of wetlands and their resources would be necessary.

Remaining areas of mangrove, freshwater and peat swamp forests which are already disturbed should be managed on a sustainable yield basis. This will involve zoning the sites for production, forest protection and preparation of management plans.

Fresh water swamp forests have been virtually destroyed in Malaysia through conversion to agricultural uses. The wetland forest types – mangroves and peat swamp are generally unsuitable for agriculture and are best managed for their natural forestry products; together with fisheries, flood prevention, water supply and purification values.

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Global Environment
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NATIONAL REPORT

on

Wetlands in the South China Sea

PHILIPPINES



Ms. Marlynn M. Mendoza
Focal Point for Wetlands
Protected Areas and Wildlife Bureau
NAPWNC Compound, North Avenue, Diliman
Quezon City 1101, Philippines

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Figure 1 Map of Wetlands Connected to the South China Sea

1. INTRODUCTION

The Philippines, the second largest archipelago in the world after Indonesia, is comprised of more than 7,100 islands that cover an estimated land area of 300,000km² and an estimated 2.2 million km² of archipelagic waters. The Philippines Archipelago extends from latitudes 04°23' and 21°25'N and between longitudes 116°00 and 127°E. It is divided into three major island groupings, namely Luzon, Visayas, and Mindanao. It is bounded in the north by the Bashi Channel, in the east by the Pacific Ocean, in the south by the Celebes Sea and in the west by the South China Sea.

The Philippines is part of the "Pacific Ring of Fire", a region of frequent volcanic activity; it also lies in the Western Pacific earthquake belt, a region of frequent land movements (Scott, 1989). Recent geological studies had shown that the Philippines is of volcanic origin and had been separated from its neighbours by deep-sea channels for millions of years (Hall, 1998). Its biodiversity has evolved distinctly and separately from its neighbours, resulting from very limited colonisation from Mainland Asia in the northwest, from Taiwan in the north, and from Borneo and Sulawesi to the south. Thus, it is considered a separate biological region in its own right (Mallari *et al.*, 2001). These partly explain the rich biodiversity in the country, including its unique patterns and assemblages.

2. WETLANDS IN THE PHILIPPINES

With its rich biodiversity, the Philippines is included as one of the 17-megadiversity countries, that between themselves contain 75% of global biodiversity. However, it is also considered as one of 25 global biodiversity hotspots, wherein to qualify, an area should have lost more than 75% of its original habitats, (Myers, *et al.*, 2000; Heaney *et al.*, 1999). The Philippines has less than seven percent of its primary forest left (ESSC, 1999). This is translated into the loss of more than 14 million hectares of primary forests in the last fifty years of the 20th century, which is much more than the 12 million hectares of forests lost during the combined 400 years of Colonial rule (Ong, 2004). During the same period, the marine environment suffered a similar fate, wherein less than 24% of the country's mangroves remain and between 30% and 50% of seagrass beds were lost (Calumpong, 1994; Fortes, 1994). The Philippines was also identified as the top marine biodiversity hotspot based on the diversity of coral reefs and its threatened condition (Gomez *et al.*, 1994; Roberts *et al.*, 2002).

In light of these findings about the dire situation of the Philippine's biodiversity, the Philippines, through the PAWB-DENR, Biodiversity Conservation Program of the University of the Philippines' Center for Integrative and Development Studies and Conservation International-Philippines, implemented and completed the Philippine Biodiversity Conservation Priority-setting Program (PBCPP) (Ong *et al.*, 2002). This was the second iteration of the country's National Biodiversity Strategy and Action Plan (NBSAP) in 2002. The PBCPP updated the first iteration of the NBSAP, which was completed and published in 1997 by the DENR.

The PBCPP identified a total of 206 priority areas: 170 terrestrial and inland waters priority areas and 36 marine priority areas. Five strategic actions needed for implementation in the chosen priority areas were also identified, if these priority areas are to be conserved for future generations. For wetlands, the Inland Waters Working Group of the PBCPP reviewed a total of 211 lakes, 18 major rivers, and 22 marshes, swamps and reservoirs, of which 34 priority areas for research and conservation were identified (Santos-Borja, 2002).

2.1 Wetland Ecosystems

The Philippines is endowed with extensive wetland areas that range from lakes, rivers, ponds, inland and coastal marshes and swamps, estuaries and mangrove swamps. The total area of Philippine wetlands is broken down as follows: (a) freshwater lakes are estimated to be about 1,140km²; (b) swamps and estuaries at about 5,270km²; (c) brackish ponds at about 1,760km²; and (d) man-made reservoirs at 1,300km² (Scott, 1989; Davies *et al.*, 1990). Despite these impressive numbers, there have been very few studies about the biodiversity of Philippine wetlands and their functions compared to those available for forest and marine ecosystems, consequently very limited information about Philippine wetlands is available.

The total biodiversity of Philippine wetlands is comprised of 1,616 species of aquatic plants and 3,675 species of aquatic fauna (DENR, 1997). But these numbers include those species that originate in marine and brackish waters. The amount and extent of biological data available for inland waters are not commensurate to the physical extent of inland waters, and where available, there is uneven representation of data (e.g., some areas are more studied than others are). Most information about Philippine wetlands consists of inventories with very limited ecological assessments and analysis (Santos-Borja, 2002). Figure 1 shows Map of Wetlands Connected to the South China Sea.

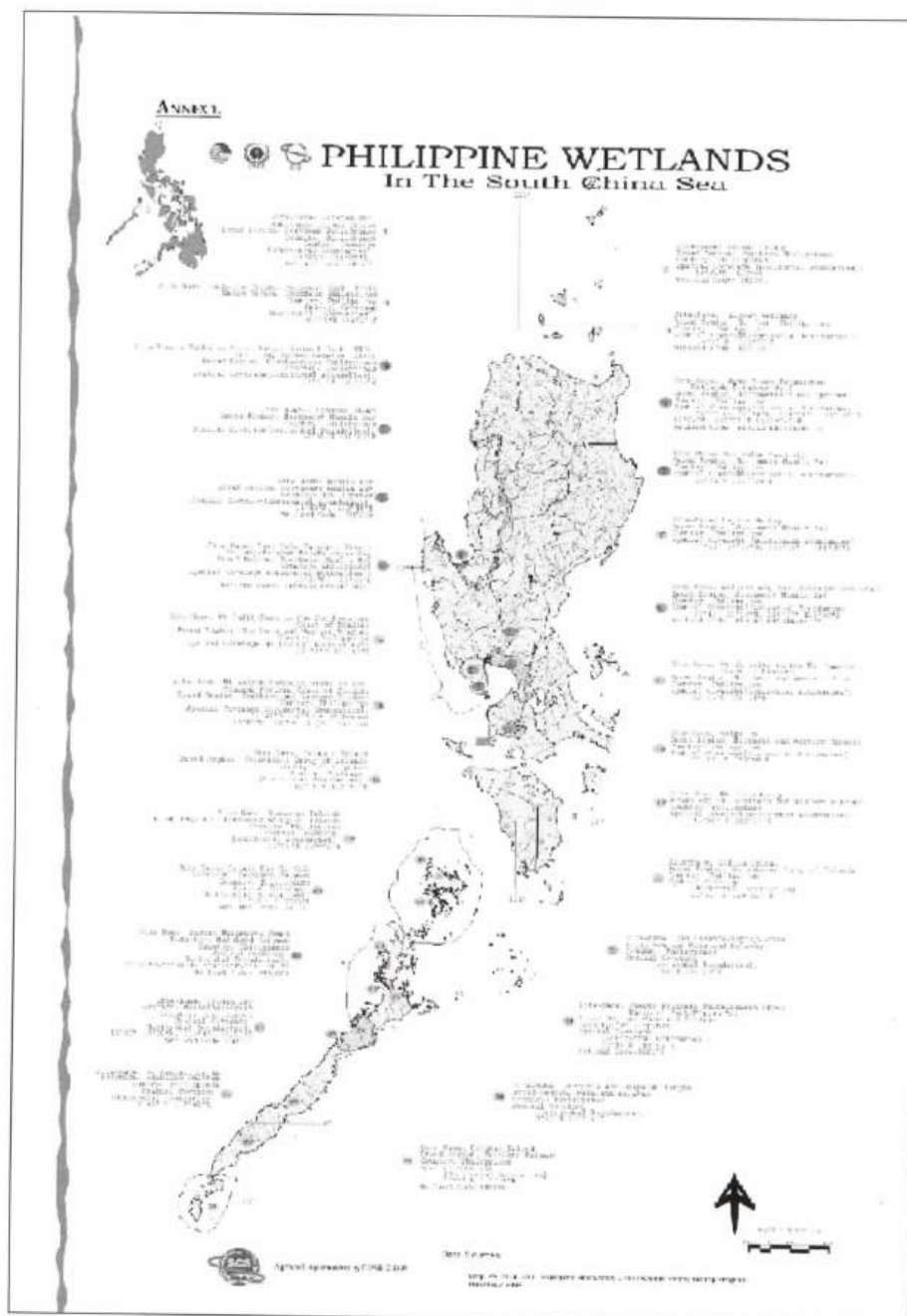


Figure 1 Map of Wetlands Connected to the South China Sea.

2.2 Philippine Wetlands of International Importance

Four Philippine wetlands of international importance are recognised under the Ramsar Convention. These are the Tubataha Reef Marine National Park in Palawan, Olango Island Wildlife Sanctuary in Cebu, Naujan Lake National Park in Oriental Mindoro, and, Agusan Marsh Wildlife Sanctuary in Northeastern Mindanao. Additionally, there are several peat swamps, or more accurately freshwater swamps with peat, found in the Sab-a basin in southern Leyte, in Liguasan Marsh and Agusan Marsh in Mindanao. Unfortunately, none of these are linked to the South China Sea.

3. SITES PRIORITISATION

Based on a review of past, current and continuing projects, studies on economic valuation, legislation, institutional and administrative arrangements and the GIS database and other information, it appears that a lot of information resources are available. However, the quality and reliability of this information remains to be validated. Some of the information is old (e.g., directory of Philippine wetlands from 1990) while some is simply absent (e.g., data on half of the wetlands in the directory are not available). In the initial listing of Philippine wetlands, 63 sites were identified, of which 11 sites were directly or indirectly connected to the South China Sea. The most recent validated data would be from the PBCPP (Ong *et al.*, 2002) where the 28 sites were identified. This was supplemented by information from Key Conservation Areas identified by Mallari *et al.* (2001), where threatened birds occupy wetlands connected to the South China Sea, and by Scott (1989), Davies *et al.*, (1990) and Talaue-McManus (2000).

Furthermore, as discussed earlier regarding the level and quality of information on Philippine wetlands; as exemplified by most recent data on Manila Bay where it is at least six-years-old and referred to wetland types other than those that are of immediate concern to the South China Sea project. This is a recurring theme throughout the search for data on the three wetland habitats and ecosystems. Thus the subsequent discussions are still based mainly on the biodiversity of coral reefs, mangroves, seagrass and seaweeds.

3.1 Identification Process of Initial Long List

The Philippines implemented the Philippine Biodiversity Conservation Priority-setting Program (PBCPP), a priority-setting process that identified 170 integrated terrestrial and inland waters and 36 integrated marine priority areas for biodiversity conservation (Ong *et al.*, 2002). On top of this, another 206 sites were identified by the thematic working groups, which later formed the basis of the integrated priority areas. This was a second iteration of the country's National Biodiversity Strategy and Action Plan (NBSAP). The Protected Areas and Wildlife Bureau of the Department of Environment and Natural Resources (PAWB-DENR) spearheaded the PBCPP, with technical assistance from the Biodiversity Conservation Program of the UP Center for Integrative and Development Studies (BCP-UPCIDS) and the Philippine Program of Conservation International (CI Phil).

The consensus building process of the PBCPP began in January 2000 and culminated in December 2000 during an international workshop attended by more than 200 local and international natural and social scientists from more than 100 institutions. The results of this workshop were further refined and the output released to the public in September 2002. The PBCPP used published information and experts' opinion to determine priority areas according to taxa (plants, arthropods, fishes, amphibians, reptiles, birds and mammals) and themes (inland waters, marine and socio-economic). A total of 206 thematic and taxa-based priority areas were identified. These thematic and taxa-based priority areas were then overlaid to produce polygons of areas that encompassed themes and taxa, thereby producing the 206 national level priority areas (170 terrestrial and inland waters and 36 marine priority areas). Detailed information about the methodology used in setting the priorities is available at Ong *et al.*, 2002.

Twenty-eight of these priority areas were initially identified as meeting the requirements of being a Philippine wetland and at the same time directly linked to the South China Sea (SCS). This initial list was further supplemented by information about additional areas identified in the Key Conservation Sites by Haribon Philippines and Birdlife International (Mallari *et al.*, 2001), the Transboundary Diagnostic Analysis (Talaue-McManus 2000) and the Directory of Philippine Wetlands prepared by the Davies *et al.* (1990) and Scott (1989), bringing the list to a total number to 33 areas as part of the initial list. From the 33 areas short-listed for consideration as an investment priority by the South China Sea project; these were grouped based on their regional locations. Nine regional groupings, with the number of specific sites indicated in parenthesis, were identified:

1. Northern Philippines (4) – Batanes and Babuyan Group of Islands, Buguey Wetlands, Palui Island and Kalbario Patapat National Park
2. Northwestern Philippines (2) – Agno River-Pangasinan Wetlands-Lingayen Gulf, Bataan Natural Park -Subic Bay Forest Reserve
3. Northwest Manila Bay (3) – Candaba Swamp, Mariveles Mountains, Manila Bay

4. Southwest Manila Bay (1) – Laguna Lake
5. Taal Lake-Pansipit River-Balayan Bay-Batangas Bay (2) – Taal Lake-Pansipit River and Balayan Bay-Calatagan Peninsular
6. Northern and Western Mindoro (5) – Mt. Calavite, Mt. Iglit-Baco, Mt. Halcon-Sablayan, Malpalon, Mt. Hinunduang
7. Calamianes Group of Islands (3) – Caluit Island, Busuanga Island and Culion
8. Mainland Palawan (7) – Bacuit Bay-El Nido, Malampaya Sound, San Vicente-Taytay-Roxas forests, Puerto Princesa Subterranean River National Park, Ulugan Bay, Anapalan-Victoria Ranges, Mt. Mantalingahan
9. Balabac Group of Islands (1) – Balabac

In the process of selecting the areas for consideration as an investment area for the next phase of the South China Sea project, the following steps were undertaken to narrow down the priority areas. The first step was to go back to the title of the project, "Reversing Environmental Degradation of the South China Seas and the Gulf of Thailand," to guide the selection process. The National Wetlands Committee agreed that reversing environmental degradation trends include:

1. Maintenance and protection of remaining pristine environment, which encompass on-site interventions to protect existing biodiversity.
2. Restoration of degraded environment, which encompasses on-site interventions to restore lost biodiversity. Restoration activities refer to activities that will lead to the recovery and rehabilitation of degraded areas and the delisting of threatened species from the threatened category because their population level has increased to a level that ensures their survival.
3. Prevention of degradation by removing and reducing the cause of degradation that encompass off-site interventions to remove/reduce cause of loss of biodiversity to maintain the good condition of the site. Prevention activities remove factors that threaten the population of priority species. Prevention activities involve off-site activities, dealing with factors outside of the areas and species being protected.

It was also agreed that based on the above definitions, prevention activities should form part and parcel of any restoration or protection and maintenance activities, since investments made in restoration or protection and maintenance will be negated if no prevention activities are undertaken simultaneously, i.e., factors that contribute to the degradation of good sites, and those that further degrade degraded areas are not removed.

Furthermore, the National Wetland Committee also agreed that environmental degradation is measured in terms of:

1. Loss of biodiversity
2. Pollution
3. Decrease in fish productivity

For this element of the selection, loss of biodiversity is the primary determinant in the selection of an area while the pollution and decrease in fish productivity were secondary considerations. Loss of biodiversity includes the loss of habitat in terms of the area of such habitats (quantity), the status of the habitat (quality), the number of threatened species found in the said areas (quantity), and the level of diversity of species found in the said areas, particularly of endemic species (quality). Philippine wetlands that qualify under the South China Sea project are those wetlands that directly contribute to the environmental degradation of the South China Sea. Areas that are recipient of South China Sea effects were excluded in the selection process.

Once the National Wetland Committee agreed upon these parameters, the 33 short-listed areas were reviewed again. Immediately, the Buguey wetlands, Palau Island and the Batanes and Babuyan Islands in Northern Luzon were dropped off the list as they were determined to be affected by the South China Sea rather than contributing to the environmental degradation of the South China Sea. The fourth area, the Kalbario-Patapat National Park was more an off-site source of degradation and its relationship to the South China Sea was several steps removed. This had the effect of removing the Northern Philippines as a region for consideration.

The six sites from Northern and Western Mindoro were also removed from the list, as five were forests on mountains and several steps removed from the South China Sea. This also had the effect of removing Mindoro from the next level of analysis.

The forests in the mountains of mainland Palawan (San Vicente-Taytay-Roxas, the Anapalan-Victoria Ranges and Mount Mantalingahan) were also excluded from the next level of selection as these were more offsite sources of degradation and their relationship to the South China Sea was several steps removed.

Balabac was also excluded from the next level of selection as very little information is available about the site compared to the other candidate sites, thus more energy would be required before a decision can be made regarding Balabac.

The remaining areas in the six regions were then classified if they require restoration activities, protection, and/or maintenance activities.

Restoration:

1. Northwest Manila Bay
Candaba Swamp-Pampanga River-Mariveles Mountains-Manila Bay
2. Southwest Manila Bay:
Laguna Lake-Pasig River-Manila Bay-Northwest Cavite
3. Northwestern Philippines
Pangasinan Wetlands-Lingayen Gulf-Agno River
4. Mainland Palawan
Malampaya Sound

Maintenance:

1. Northwestern Philippines
Zambales Coast-Subic Bay-Bataan National Park
2. Taal Lake-Pansipit River-Balayan Bay-Batangas Bay
3. Calamianes
4. Mainland Palawan
El Nido
PPSRNP/Ulugan Bay

Prevention:

1. Northwestern Philippines
Amburayan-Abra Rivers draining into the Ilocos Coast
Pangasinan Wetlands-Lingayen Gulf-Agno River
Zambales Coast-Subic Bay-Bataan National Park
2. Northwest Manila Bay
Candaba Swamp-Pampanga River-Mariveles Mountains-Manila Bay
3. Southwest Manila Bay:
Laguna Lake-Pasig River-Manila Bay-Northwest Cavite
4. Taal Lake-Pansipit River-Balayan Bay-Batangas Bay
5. Calamianes
6. Mainland Palawan Areas
El Nido
Puerto Princesa Subterranean River National Park/Ulugan Bay
Malampaya Sound

3.2 Selection of Priority Areas Based on the Type of Reversing Activities

The rationale for the grouping was to make the selection fairer by comparing apples with apples, i.e., by comparing areas that require similar primary activities whether restoration, or for protection and maintenance.

3.2.1 Restoration Activities

From the medium list of six regions, four were identified as priority for restoration, of which two areas were selected as priority areas for investment for different reasons. One is the Southwest Manila Bay while the other is the Malampaya Sound. Southwest Manila Bay was selected as a model problem area. From a biodiversity point of view, Manila Bay would seem dead if its current biodiversity status were assessed. However, it is an important biodiversity area historically and data from the PEMSEA and MBEMP-TWG-RRA (2004) report indicates that Manila Bay still contains remarkable biodiversity and performs critical environmental services. It is also the type locality for the Olive Ridley Turtle. It is a model problem area because of the onslaught of unplanned development, the multitude of stakeholders with competing vested interests in the sub-region and the scale of the area that needs to be covered, among others.

Furthermore, the National Wetland Committee firmly believes that if Manila Bay can be successfully restored, then there is no place else in the South China Sea and the Gulf of Thailand where restoration work cannot be done. Lessons learned from the restoration efforts in Manila Bay could be invaluable to the rest of the South China Sea and the Gulf of Thailand where similar conditions exist.

On the other hand, comparatively speaking, Malampaya Sound is in the early stages of degradation and thus it would take less effort and resources to restore it back to good condition, than Manila Bay. Hence it is considered to be a model demonstration site since the size of the area under consideration is manageable, the level of awareness and participation of stakeholders involved are comparatively high than in other areas.

3.2.2 Protection and/or Maintenance Activities

From the medium list of six sub-regions, four were identified as priority for protection and/or maintenance activities, of which three areas were selected as priority areas for investment, again for different reasons. These areas are: (1) Taal Lake-Pansipit River-Balayan Bay-Batangas Bay, (2) Calamianes, and, (3) PPSRNP-Ulugan Bay.

Taal Lake-Pansipit River-Balayan Bay-Batangas Bay was selected as a priority for protection and maintenance activities because if present degradation trends continue, then it is likely to go the way of Manila Bay. Hence intervention is urgently needed to ensure that the degradation trends are reversed as soon as possible.

On the other hand, the biodiversity of the Puerto Princesa Subterranean River National Park (PPSRNP)/Ulugan Bay, and the Calamianes in Palawan are in better shape than the other regions, and thus would require less effort and resources to maintain in their current condition. Between the PPSRNP/Ulugan Bay and the Calamianes, PPSRNP has the advantage of being declared a World Heritage Site, and Ulugan Bay is proposed to be included as part of expanded PPSRNP, and consequently as part of the World Heritage Site.

3.2.3 Final Site Selection for Investment

In the final selection of sites for the development of investment proposals, the choices were narrowed down to two areas, the Malampaya Sound for restoration, and the Taal Lake-Pansipit River-Balayan Bay-Batangas Bay was selected as a priority for protection and maintenance. Other factors such as local government unit interest and local community participation were taken into consideration in the final selection.

4. THREATS TO WETLANDS IN THE PHILIPPINES

4.1 Direct Causes of Loss of Wetlands

With this framework as a guide, the different factors identified in previous assessments undertaken about the threats to wetlands and causes of wetlands loss, were reformulated as the major direct causes of wetland loss in the Philippines (DENR, 1997; Santos-Borja, 2002; Ong *et al.*, 2002). However, these are again a broad identification and not specific to the three type of habitats and ecosystems in the South China Sea context:

1. Habitat Loss and Deterioration
 - (a) Conversion of wetlands into other landuses with perceived higher economic value such as aquaculture farms, resorts and reclamation areas, among others. The operations of these economic activities further exacerbate the destruction of wetlands by ensuring that the process becomes irreversible when this leads to further pollution due to the indiscriminate use of artificial feeds and overstocking.
 - (b) Diversion of rivers for irrigation and the construction of dams that leads to:
 - i. Detrimental impacts on the movement of migratory fish species
 - ii. Drying up of riverbeds
 - iii. Modification of the habitat of the riverine flora and fauna
2. Resource Use and Exploitation
 - (a) Over fishing
 - (b) Over harvesting of forest products
 - (c) Over harvesting of freshwater products
3. Pollution and Climate Change
 - (a) Pollution from domestic, industrial and agricultural sources that in turn lead to water quality problems like massive algal blooms and oxygen depletion.
4. Introduction of exotic species and disease
 - (a) Leads to the displacement if not extinction of endemic and native species through
 - i. Predation
 - ii. Competition for food and other resources
 - iii. Proliferation due to lack of natural predators.

4.2 Indirect Causes of Loss of Wetlands

In turn, these direct causes have underlying causes as well. Some of these underlying causes are:

1. Socio-economic pressures
 - (a) Poverty
 - (b) Illiteracy
 - (c) Population
 - (d) National and local politics
2. Environmental Policy and Regulations
 - (a) Limited if not lack of enforcement
 - (b) Where present, it is biased towards development at all cost
 - (c) Subsidies provided to some economic activities such as the promotion of aquaculture in the 1970s and 1980s which led to the wholesale conversion of mangroves into fishponds.

5. LEGISLATION, INSTITUTIONAL AND ADMINISTRATIVE ARRANGEMENTS

Laws that directly apply to wetlands are few and are more frequently encountered in other general laws that regulate access to natural resources, jurisdictions over territory and management, and prohibition of certain acts. Examples are:

1. Resource access provisions of the Philippine Constitution,
2. Congressional acts dealing with water bodies that comprise wetlands,
3. Regulations granting tenure
4. Water code
5. Foreshore regulations
6. A myriad of environmental regulations that affect wetlands by licensing or restricting actions that eventually impact many ecosystems as well but without referring to wetlands specifically.

Any one or more of these regulations address broader issues with wide-ranging implications on the use of resources including in these areas, such as the water code. Examples are laws requiring environmental impact assessments, building permits, sanitation code, wildlife act, cave act and many other environmental laws.

5.1 Legal provisions with direct impact on wetlands

Legal provisions by themselves may not have an impact on wetlands unless implemented. These are a potential backbone for any advocacy to protect and conserve wetlands. Due to their breadth of scope and lack of enforcement, however, enforcement agencies have had a great deal of discretion in choosing which areas and which acts to enforce. This exercise of discretion can be seen in two ways – agencies can strategize to make maximum use of their enforcement resources, or they can act only on the basis of complaints or personal preferences. As such, the identification of gaps may be difficult since there are many laws that remain unenforced but do not quite constitute a gap in the legislation. What needs to be studied is whether these laws do, indeed, constitute gaps simply because they are impossible to fully implement. It is not, therefore, sufficient to say that there are laws and implementation is lacking, when the very deliberation of the law itself did not consider the realistic capacity to enforce.

5.2 Access to the resources

Ownership of wetlands is necessarily the primary factor in assessing whether degradation can be arrested. The Philippine Constitution and the Water Code of the Philippines are both clear in declaring wetlands as part of the public domain and incapable of alienation, except for wetlands that are part of ancestral waters, which became susceptible to open access and the tragedy of the commons. Lakes and rivers were especially vulnerable as accelerated population growth put pressure on the drainage and sewerage systems built for much lower numbers, and rivers began to double as sewer systems in highly urbanised areas.

The problem of open access was dealt with by a provision that large-scale exploitation of all natural resources in the public domain will only be undertaken by the State directly or in joint venture, production sharing and co-production while small-scale utilisation by Filipino citizens could still be allowed by Congress through law. This small-scale utilisation specifically included “*co-operative fish farming, with priority to subsistence fishermen and fish workers in rivers, lakes, bays and lagoons*”. Such provision requiring democratisation of access and equity in resource distribution was directly relevant to the utilisation of wetlands.

Among such laws that can be used to give flesh to this mandate of the Constitution are the Local Government Code and the Philippine Fisheries Code of 1998. The Local Government Code allows the local council, or Sangguniang Bayan, to grant fishery privileges to erect fish corrals, oyster, mussels or other aquatic beds or bangus fry areas, within a definite zone of the municipal waters, as determined by it. The Philippine Fisheries Code of 1998 also prioritizes qualified fishing cooperatives and/or associations as well as small and medium enterprises as defined under Republic Act No. 8289, in the section governing the disposition of lands for fishery purposes.

Other legislation that has great impact on wetlands, specifically tidal flats, is the Public Land Act that provides for foreshore leases. The foreshore includes tidal flats and estuaries, which shall be disposed of to private parties only by lease and not otherwise and only upon a declaration by the President, upon recommendation by the Secretary of the Department of Environment and Natural Resources, that such foreshore land is not necessary for public service. The lease contract must contain a provision that easements reserved by existing law or by laws enacted shall be respected.

The Civil Code of the Philippines provides for easements of five meters from the high water line on coasts of agricultural lands and twenty meters on coasts of forestlands that must be respected. Foreshore areas are also dealt with in the Water Code and the Forestry Decree of 1975. Apart from regulating the use and disposition of foreshore areas, the Water Code also has wide-ranging implications if religiously enforced. It identifies state ownership of rivers and their natural beds, continuous or intermittent waters of springs and brooks running in their natural beds, and the beds themselves; natural lakes, lagoons and seawater.

From this enumeration, virtually all wetlands are already covered. All uses of these state properties would require a water permit to be legal with very few exceptions that refer to domestic, small-scale usage. However, the law was not accompanied by the resources needed to undertake such massive regulatory infrastructure, especially considering a very long and broken up coastline as that of the Philippines.

The recently passed Clean Water Act may also be of use in wetland protection. Specifically the provisions that prohibit dumping of waste in, and the provisions directing the establishment of water quality management areas, a national sewerage and septic waste management programme, and the imposition of wastewater discharge charges.

5.3 Management and conservation jurisdiction

The Philippine Fisheries Code defines municipal waters to include wetlands but exempts areas falling under the National Integrated Protected Areas System (NIPAS) from the definition. As such, wetlands of the public domain may either be municipal waters or protected areas. Inland waters and tidal flats that are not NIPAS areas are municipal waters under the first part of the definition while lagoons fall under the second part, whether the lagoon be part of a NIPAS area or not. For NIPAS areas that are inland waters or tidal flats, jurisdiction over management is vested in the Protected Area Management Board with specific mandates to the DENR. Both local government authorities who retain jurisdiction over them in the exercise of their general welfare functions, and the Protected Area Management Boards (PAMBs) who are responsible for biodiversity conservation and sustainable development, can be seen to have different jurisdictional coverage over the same territory.

Due to lack of appropriation for the implementation of the NIPAS Act, however, many PAMBs of wetland areas are hardly equipped with the technical and financial capacity for hard-nosed management. Under the Clean Water Act, a four-person body called a governing board is mandated to be established for designated Water Quality Management Areas. Apart from these, self-reporting, permitting and other monitoring requirements can be used to pinpoint urgent problems with respect to important wetlands. Certain government agencies are vested with jurisdiction over wetlands, but by the nature of their function, view them not in terms of habitat and biodiversity, but in terms of their value as real estate and economic commodity. These are the Public Estates Authority that have jurisdiction over all reclamation projects, and as such has disposition of these prime properties, and the Philippine Port Authority, which by its nature operates facilities in tidal flats. These are both attached agencies of the Department of Public Works and Highways, which is accountable for these jurisdictions in terms of environmental impact only in the Environmental Impact Assessment process. Management and conservation by municipal authorities range from very good management to neglectful, unregulated and permissive exploitation. Because of the demonstration of hugely successful local government management in many areas, the likelihood of successful management of wetlands may lie in local government units hands, particularly since these areas are not contiguous and should be seen as integral to the entire territory of the local government units rather than isolated patches of water bodies.

Other agencies have specialised jurisdictions over wetlands. Those involved in scientific research include the Philippine Council for Aquatic and Marine Resources Development – Department of Science and Technology and the state universities. On the other hand, agencies involved in enforcement include the Philippine National Police (PNP) Maritime Command – Department of Interior and Local Government that took over the police functions of the Philippine Coast Guard over municipal waters; and, the Philippine Coast Guard, which enforces fisheries laws in the high seas, ensures maritime safety, and marine pollution laws. Agencies involved in institutional co-ordination on aspects relating to fisheries and coastal resources management include the Presidential Commission on Anti-Illegal Fishing and Marine Conservation, the Inter-Agency Task Force on Coastal Environment Protection, and the Marine and Ocean Affairs – Department of Foreign Affairs.

5.4 Enforcement Problems

Public interest lawyers, local governments and other concerned citizens and groups may use existing and applicable laws to protect specific wetlands that are deemed important, but their total enforcement to protect most wetlands as habitats is limited. This is not only due to lack of resources but a failure in the lawmaking process to identify prohibitions that are realistic and which will remain in the books. Nevertheless, the Civil Code does state that laws are only repealed by subsequent ones, and their violation or non-observance shall not be excused by disuse, or custom or practice to the contrary. As such, while it is frustrating to hear about unimplemented laws, the opportunity they present is much better than not having them at all.

The Civil Code enumerates all the officers and agencies that the law deputises to enforce it along with other fishery regulations. Other competent government officials and employees, barangay leaders and officers and members of fishing associations who have undergone training on law enforcement may be designated in writing by the Department of Agriculture as deputy fish wardens in the enforcement of this Code and other fishery laws, rules and regulations. Furthermore, the law mandates that the Department of Justice embark on a programme to strengthen the prosecution and conviction aspects of fishery law enforcement through augmentation of the current complement of state prosecutors and through their continuous training and reorientation on fishery laws, rules and regulations.

Enforcement depends on a strong awareness among enforcers as to what the law provides along with a strong belief that it is a law that will be beneficial to people. Due to the many different overlaps in jurisdiction, inconsistencies and the necessity to harmonise many different laws governing the same resources, enforcement agencies have not been updated on the latest legal interpretation.

5.5 Other General Laws that may apply to wetlands

Seen from the perspective of reducing the degradation factors of wetlands, a great deal of attention needs to be paid to land based causes of degradation. As such, the forestry code, the Philippine Mining Act of 1995, easement provisions under various laws including the Civil Code, the Ecological Solid Waste Management Act and the Environmental Impact Assessment System are only a few that effect in wetlands. These effects are felt especially where solid waste, effluents and tailings are allowed to collect and damage tidal flats, estuaries, and lagoons. These are laws useful to local implementers and managers, but the processes involved in the licensing, permitting and planning in each area and project are tedious to use on a countrywide scale to protect wetlands. Also, a general enforcement of good laws such as the Ecological Solid Waste Management Act will no doubt have an incidental, but nevertheless gargantuan, impact on wetlands. Those wetlands to which urbanised and populated areas drain into including tidal flats, which, by the nature of wind and wave patterns tend to gather more solid waste, will necessarily benefit from a strict implementation of the law.

5.6 Local Policies

The Manila Bay, Laguna Lake and the Pasig River are three bodies of water that have been under several local policies and policy disputes, and the variety of their experiences is instructive of what can work. The major problems confronting these connected wetlands are drainage, run-off and sewerage from the surrounding areas, notably the Metropolitan Manila area. The Laguna Lake Development Authority has a basin-wide mandate for it to exercise the functions required to affect the lake. It has full authority to issue permits for the use of the lake and for developments in the whole catchment area of the lake. Its multiple uses had already been subjected to economic valuation studies and innovative policies such as user fee systems and permits for the release of effluents have been initiated with favorable results. The Pasig River and Manila Bay continue to act as the sewerage system of metro Manila, and the projects for clean up, have failed to take this major contributing factor into consideration. A closed season for commercial fisheries was declared in the entire Manila Bay in the 1990s and fully lapsed after five years without having been enforced. Despite the state of its waters, though, other uses such as recreational, navigational and fishing still remain.

The Lingayen Gulf Coastal Area Management Program is a programme that operated over a period of six(6) years and covered twenty (20) municipalities. It generated a database for planning, with data on fisheries, and attempted to establish regulations based on catch per unit effort and maximum sustainable yields. The programme later directed efforts towards education and the generation of local political will when the first plans proved too difficult. The National Economic Development Authority uses the Lingayen Gulf Coastal Area Management Programme experience as a model since it created an institutional arrangement to co-ordinate planning and implementation resulting in policy directives to reduce and eliminate commercial fishing within the Gulf, improved law enforcement and reduced levels of illegal fishing, a detailed integrated management plan for the municipal waters and coastal resources of Bolinao, guidelines for improved aquaculture development and mangrove reforestation projects.

As a result of being a prime diving destination, Balayan Bay has had several marine sanctuaries declared in the municipalities of Bauan, Mabini and Tingloy. While the sanctuaries themselves cover areas further at sea than the tidal flats, regulations usually also affect the tidal flat. Some of these sanctuaries are covered by private and non-governmental agreements among resource users. These agreements serve as the management regime and regulatory scheme for the sites. Some such examples are the resource management agreement under the sanctuary ordinance granted to peoples' organisations, clam stewardship agreements between non-government organisations seeding giant clams and the resort owners, and other such private initiatives. To date, no user fee system has been established for the lucrative diving industry as the dive sites are scattered over several municipalities and the resorts are concentrated on the mainland, thereby risking an unequal benefit for sanctuary managers in outlying islands. A more integrated approach, however, is crucial at this stage when rapid industrialisation is taking place on the other side of the bay from the sanctuaries. It would seem that massive development of heavy industries such as cement plants, power plants and other manufacturing factories are slated to be constructed facing the bay. The lack of co-ordination between the small fishermen on the western side and those employed by the diving industry and the resorts on the eastern side might result in long-term degradation of the resource base. Batangas province has an integrated Fisheries and Aquatic Resources Management Council created in pursuit of the Fisheries Code, but no other bay-wide entity has the mandate or authority to specifically address these problems.

The degradation of resources in Taal Lake galvanised local community action in pressing for more regulation. The early 90s saw the enactment of Provincial Ordinance No. 4 that regulates fishing on the lake as well as other uses such as fishcage development and the dismantling of fishpens on the Pansipit River in 1997 and 2001. These dismantlings were also in consonance with the Master Plan for Development prepared for the lake by the defunct Presidential Commission on Tagaytay-Taal. The management plan, therefore, has no official imprimatur. The lake area was proclaimed a protected landscape in 1997. Currently, management jurisdiction rests with the PAMB with the province retaining ordinance and local taxation power to promote its general welfare. The nine towns and two cities also create similar ordinances, such as the garbage ordinance and the ordinance prohibiting jet skis.

Palawan is the ideal example of delegation of management powers over wetlands to the local government. In 1993, the DENR entered into a Memorandum of Agreement with the City of Puerto Princesa over what was then 3,900 hectares of the Puerto Princesa Subterranean River National Park (PPSRNP). The agreement worked, with the City underwriting a third of the cost of park operations while park revenues covered the rest. This is a good example of national government support for local management that has resulted in conservation. The PPSRNP has also increased considerably in size from 3,900 hectares to approximately 22,000 hectares. Most of the area of expansion is already covered by Certificates of Ancestral Domain Claims (CADC) where Ancestral Domain Management Plans have been approved by the DENR, recognised by the City and are in full force and effect. Here, then, is a situation where management is apportioned among the City for the most part, the indigenous peoples, and the DENR for enforcement in the expansion areas not covered by CADC. The clarity and consensus among the groups as to the jurisdiction and authority of each and the representativeness of community, local government and national government stakeholders in the management seems to be working.

5.7 Strategies in reduction of degradation factors

Considering a long history of distrust of the law and the legal system among those primarily dependent on wetland resources, there is a need for creative, appropriate and practicable policies as well as strategic application of existing law. As can be seen from the above analyses, the applicable laws are either too broad to be practicably enforced or too strict to be implemented. Community initiatives and meta-legal strategies are important so that other laws with indirect impact can be used whenever a wetland area is threatened by particular activities, such as the industrial development proposals. Apart from communities, composite teams have been proven to work in proper implementation of fishery laws in marine areas. Based on the experience and general capacity to enforce, there are many available options for the protection of wetlands and the reduction of degrading factors thereon. Projects that threaten wetlands directly can be questioned under any number of regulatory laws from the Environmental Impact Assessment System to the water code, local government requirements and many other laws.

The Philippines is a Contracting Party to the Ramsar Convention, Convention on Biological Diversity, the Basel Convention, and the Convention on Migratory Species, among the many international agreements the country has entered into. In line with the country's obligations under the RAMSAR Convention, four sites have been designated as wetlands of international importance, with two of these having a peripheral impact at best on the South China Sea, particularly Lake Naujan in Mindoro and Tubattaha Reefs in Palawan.

Pursuant to Department Administrative Order 97-17 prescribing the criteria for selection of wetlands critical to biodiversity, 133 sites have been selected. As with any government agency, the PAWB-DENR has limited resources to spread out to as many as 133 sites, despite their importance. As such, it may be well to prioritize those sites to determine interventions that would be strategic and highly selective. An example, for waterbirds, would be to assess topographical maps for potential nesting and roosting sites and mark off only a small part of some wetlands for on-the-ground protection activities. Without substantial infusions of funding, the designation of these sites critical to biodiversity is in danger of remaining paper declarations. These identified habitats can then be endorsed to local governments or even local volunteer groups with merely the guidance of the national level agencies as to their importance and means of protection.

In general, management of many wetlands still seems to be tied up with management of the associated ecosystems for tidal flats, and for lakes and rivers, in integrated ways such as Fisheries and Aquatic Resource Management Councils, or integrated local ordinances of the towns with territory on the coasts of the lakes or lagoons. With rivers, catchment area management seems to be the most effective management solution so that the policies that have general application can be applied not only with respect to the wetland itself but to activities in the catchment area affecting the wetland. One prime example is the catchment area management of the Puerto Princesa Subterranean National Park.

In all these instances, it bears noting that the best policies can only see proper implementation with a management structure: (a) that is locally based but nationally endorsed; (b) that understands the flexibility required in policy application thereby having the ability to focus on certain regulations with the greatest impact, and, (c) that has a consensus building mechanism and participation processes among the multiple users of the resource.

Another important part of a workable implementation strategy would be to send a message that breaking the law would no longer be tolerated and would be met with punishment. Choosing a solid law, fully enforcing it and sustaining enforcement would focus efforts of the multi-sectoral teams instead of dissipate energies on the breadth of regulations. In choosing the law to fully implement, one must be reminded that the implementation should be fair and consistent, that observance of the law should bear visible results, and that it is realistic. Implementation of this one law could serve as the lynch pin for other violations and destructive activities. In the country, one such law that sees consistent implementation and observance is the vehicle registration requirements. In the way that smoke-belching regulation was tied up with this requirement, the government hopes to use the registration process to arrest smoke belching. If boat licensing would be implemented the same way, and boats can be checked while near shore or docked, a good number of fishery violations could be prevented. It may well be that such a lynch pin law would be the provisions of the water code which make the obstruction of waterways a criminal act. The same obstruction is also penalised in the Fisheries Code.

A National Wetlands Policy will surely help rationalise laws and policies on access to wetland resources, management jurisdictions and enforcement, but it should also consider a menu of options for institutions as close to the ground as possible, which can be used appropriately and in a timely manner; in order to protect specific wetland areas and their associated ecosystems.

A National Wetlands Action Plan had been developed by PAWB-DENR, however this has not been subjected to a wider stakeholder consultation, thus had remained unimplemented in general. This will be part of the work of the newly created National Wetlands Committee that the South China Sea project has established.

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NATIONAL REPORT

on

Wetlands in the South China Sea

THAILAND



Mr. Narong Veeravaitaya
Focal Point for Wetlands
Department of Fisheries Biology
Faculty of Fisheries, Kasetsart University
50 Phaholyothin Road, Bangkok
Bangkok 10900, Thailand

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1. INTRODUCTION

Thailand is a South eastern Asian country located between latitude 5°45' and 20°30' N and longitude 97°30' and 105°45' E, covering a total area of approximately 513,115 square kilometres. A joint study by the Royal Forest Department and IUCN (World Conservation Union) in 1989 found that Thailand possessed 42 wetlands of international importance, particularly as habitats for migratory species, accounting for 25,100 square kilometres, or roughly 4.9 percent of the total area of the country. These sites include well known mangrove forests, swamp forests, rivers, seas and freshwater ponds like Kwan Phayao of Phayao Province, Nong Han of Sakon Nakhon Province, Bung Borapet of Nakhon Sawan Province, Songkhla Lake of Songkhla Province, Sam Roi Yot National Park in Prachuap Khirikhan Province and Thale Noi Wildlife Non-hunting Area in Phatthalung Province. The study also documented several other wetlands which, although not of international importance, were found to exhibit long and close relationships with generations of local inhabitants.

2. STATUS OF WETLANDS IN THE GULF OF THAILAND

2.1 Characteristics and Types of Wetlands in the Gulf of Thailand

The inventory was conducted to compile, list and classify wetlands nationwide. The project which was implemented during the period 1996-1999, found at least 42,653 wetlands, covering a total area of no less than 36,616.16 square kilometres or 7.5 percent of the country. Freshwater wetlands accounted for 44.8 percent of all wetlands in the country whereas coastal wetlands covered 55.12 percent. Riparian systems, such as rivers, canals and creeks were identified as the most common types of wetlands and accounted for at least 25,008 sites, followed by static reservoirs such as lakes and ponds, with no less than 14,128 sites. North eastern Thailand was found to accommodate the highest number of wetlands with 14,750, while the southern region was found to have the largest total area of wetlands with 28,465.88 square kilometres (as detailed in Table 1). The inventory also listed at least 61 wetlands of international importance, 108 sites of national importance and 42,396 locally important wetlands (OEPP³, 1999).

Table 1 Types, Numbers and Areas of Wetlands in Each Region of Thailand.

| System/Region | North | | Northeast | | Central and East | | South | |
|---------------------------------------|----------------|-------------------------|----------------|-------------------------|------------------|-------------------------|----------------|-------------------------|
| | Number (sites) | Area (km ²) | Number (sites) | Area (km ²) | Number (sites) | Area (km ²) | Number (sites) | Area (km ²) |
| Sea, coastal areas & estuaries | - | - | - | - | 387 | 670.89 | 869 | 19,513.545 |
| Rivers, canals, creeks & flood plains | 5,461 | 1,116.74 | 8,053 | 1,091.54 | 8,380 | 163.56 | 3,114 | 393.067 |
| Lakes, ponds & reservoirs | 4,573 | 1,678.46 | 6,168 | 836 | 2,228 | 2,352.86 | 1,159 | 3,643.173 |
| Swamps or marshes | 539 | 26.05 | 368 | 49.79 | 750 | 142.19 | 336 | 4,916.097 |
| Unidentified | - | - | 161 | 21.8 | 7 | - | 100 | > 1,000 |
| Total | 10,573 | 2,821.25 | 14,750 | 1,99.13 | 11,752 | 3,329.50 | 5,578 | 28,465.88 |

Sources: OEPP, 1999. Note: excluding paddy fields.

Central region: This region is characterised by lower plains with some undulated areas. The lower half of the region stretches towards the Gulf of Thailand and is dominated by river deltas, particularly that formed in the estuary of Chaopraya River (Bangkok Plain Accumulation of river sediment in the deltas has long enriched the areas with nutrients, making them the most important areas for rice cultivation. The four major rivers of the region that discharge into the Gulf of Thailand are the Bang Prakong, Chaopraya, Tachin and Mae Klong Rivers.

Eastern region: Topography of the Eastern region is dominated by coastal mountain ranges and hills. Notable ranges include Chantaburi Range in the centre of the region where a number of short

³ Office of Environment Policy and Planning.

rivers that discharge into the Gulf of Thailand originate; Bunthad Range which is a natural border between Thailand and Cambodia; and San Kumpang Range which separates the region from the central region. Coastal plains in the regions were mostly formed by river sedimentation along estuaries. Mangrove forests are commonly found in these plains, especially along coastlines of Chanthaburi and Trat Provinces. Coastal areas in other provinces, however, largely consist of beaches. Many islands can be found offshore, with Chang, Kud and Lan islands among the most notable.

Southern region: The region is a peninsular with the Gulf of Thailand on the East Coast and Andaman Sea on the West Coast. The East Coast can be characterised by the elevation of the land, creating relatively even coastlines with many beautiful beaches. Songkhla Lake is the largest and most notable lagoon of the region, accommodating a mixture of freshwater and marine ecosystems that support significant biodiversity. On the other hand, the West Coast was formed by the sinking of landmass, resulting in uneven coastlines and many islands along the shorelines. Series of mountain ranges act as a topographic backbone of the region. These include the Phuket Range that stretches from the Chumphon to Phangnga province, followed by the Nakhon Si Thammarat Range in the central section and the San Kala Kiri Range which acts as a natural border between Thailand and Malaysia.

The project sites are located in 18 provinces. These areas are mostly elevated land connected to coastlines by slopes and located in 11 major basins, including the Bang Prakong, Chaopraya, Tachin, Mae Klong, Phetchaburi, Tapi and Pattani river basins as well as the Songkhla Lake Basin. Fifteen major rivers discharge into the Gulf of Thailand. These include the Trat, Welu, Chanthaburi, Pang Lard, Prasair, Rayong, Bang Prakong, Chaopraya, Tachin, Mae Klong, Pranburi, Chumphon, Tapi, Tark Bai and Sai Buri rivers. , Twenty-seven natural sites were identified worthy of conservation by the Cabinet Decision of 1990. These sites are Oak Taru Mountain, Ratchada Pisak beach (Sai Mor Beach), Sai Ree beach, Chao Samrarn beach, Jomtien beach, Pattaya beach, Bang San beach, Sri Chang island, Sai Kaew beach (Samet island). Mae Rumpeng beach. Nara Thut beach, Kung Vimarn beach, Mae Pim peninsula, Kung Kra Ban peninsula, Tarn Ku bay, Ngu (Snake) mountain, Chao Lai mountain, Wang mountain, Hua Hin beach, Tao (Turtle) beach, Don Hoi Lot, Singa peninsula, Thale Nai (lagoon) in the Ang Thong islands, Chei Wong beach, Thale Noi, Songkhla lake and Kukut Waterfowl park.

The national inventory of wetlands conducted between 1996-1999 found that the total area of wetlands was highest in Southern Thailand with 28,465.88 square kilometres. Further compilation of information on wetlands adjacent to the Gulf of Thailand under the project focused on four groups of wetlands: coastal areas (including rocky shores, sand beaches and mudflats), swamp forests, estuaries; and freshwater reservoirs, such as lakes and ponds. The compilation, which excluded mangrove forests, coral reefs and seagrass beds, found that wetlands in the Gulf of Thailand cover a total area of no less than 2,909.70 square kilometres and could extend to another 12,477.37 square kilometres if areas up to a depth of 10 metres along the shoreline are taken into account. Wetlands included in the compilation are also those found inland outside the boundaries of saline barrier lines, originally established by Land Development Department to identify suitable sites for shrimp farming. The project areas cover 4 square kilometres of estuaries, 443.5552 square kilometres of mudflats and 388.0464 square kilometres of sandy beaches. Furthermore, approximately 9,188.2432 square kilometres of lands outside the saline barriers (Figure 1).

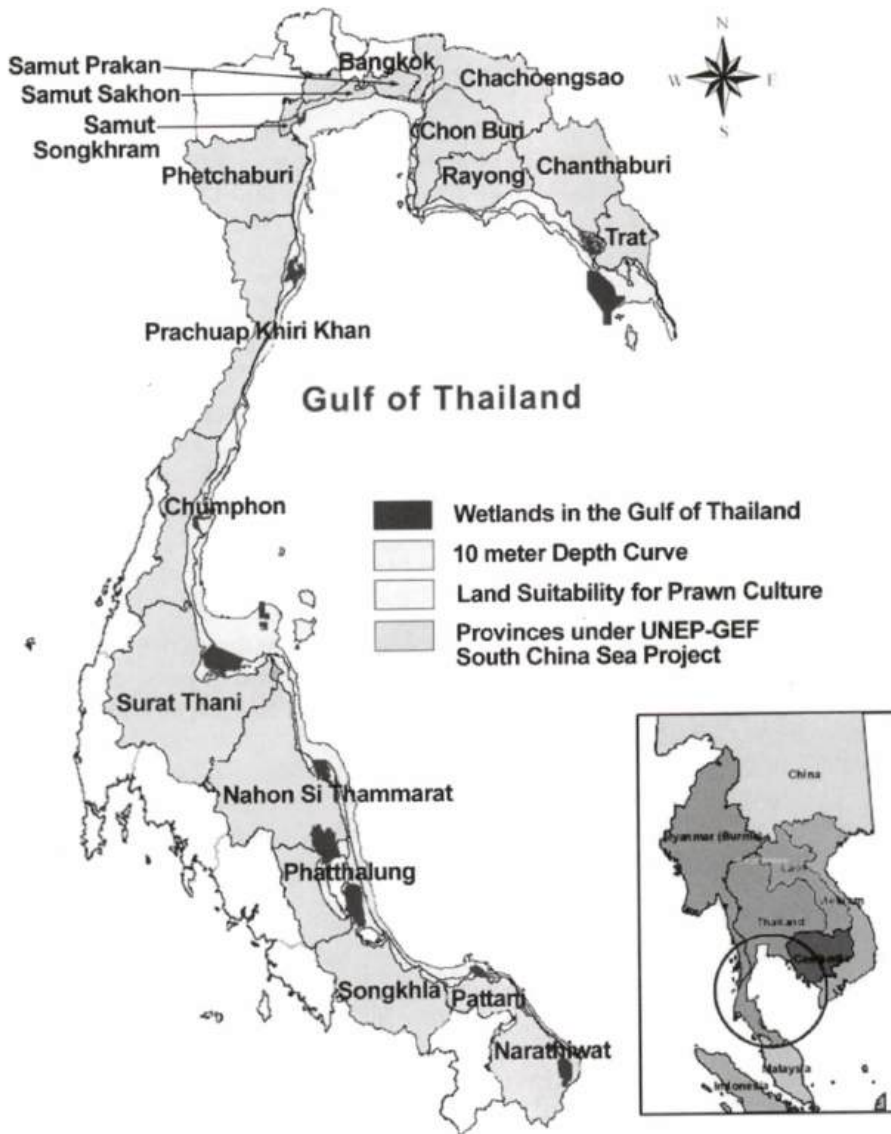


Figure 1 Extent of Thai Wetland Sub-component under South China Sea Project.

2.2 Major Threats to Wetlands

Most of the wetlands in Thailand are safeguarded and maintained by a protected area system, which includes national parks, wildlife sanctuaries and wildlife non-hunting areas. Despite being officially identified as public lands, several important wetlands remain a vital part of daily life of Thais, particularly those in rural areas who have relied on wetland services and resources for generations. By not being included in the protected area system, these wetlands have been vulnerable to encroachment and other development activities. For example, freshwater ecosystems in the floodplains of northern and central Thailand have been adversely affected by greater demand for agricultural land use; mangrove forests along the coastlines and estuaries of the Gulf of Thailand, and on both shorelines of southern Thailand have been severely damaged by aquacultural operations; while swamp forests and marshlands in north eastern and southern Thailand are now facing degradation due to some development projects.

Despite the value and benefits derived from wetlands, the ecosystem continues to be directly and indirectly destroyed at an alarming rate. Wetlands of international importance are constantly under serious threats, despite all the protective measures that have been put in place. The Asian Wetland Directory indicates that 47 percent of the 42 listed wetlands in Thailand are under moderate to seriously high threat, 8 percent are under some form of protection, while only 2 percent are

adequately protected. There has not yet been any quantitative assessment of wetlands nationwide, however numerous evidence suggests a significant reduction in the number and size of natural wetlands. This include the decline in the total area of mangrove forests from 3,680 square kilometres in 1961 to only 1,680 square kilometres in 1996 (OEPP, 2002b), while the number of man-made reservoirs has been increasing.

Surveys and monitoring of qualitative changes occurring in the wetlands also remain inadequate. There is, however, a trend indicating deterioration in water quality and biodiversity among wetlands throughout the country. The main causes for loss of wetlands in Thailand can be summarized as follows:

1. Increase in the population: Modern socio-economic development has significantly increased the exploitation of wetland resources and generated larger demand for conversion of the ecosystem for development activities.
2. Inefficient use of wetlands: Inappropriate use of wetlands, particularly conversion of natural wetlands for farming, marine aquaculture, industry, urban expansion and infrastructure development, have all adversely affected the wetland hydrology, by disrupting the water flow in and out of the ecosystem. Both civil engineering projects such as road construction, and commercial development, such as tourism, can seriously impact ecological functions of wetlands and locals whose daily life depends on such functions, if due attention is not paid to preservation of such ecosystems.
3. Wetland management problems: Despite the value and benefits derived from wetlands, the society at large, including public and private organisations and general public in both urban and rural areas, do not have adequate and accurate knowledge and understanding of wetland ecosystems. This results in the lack of due appreciation and recognition of the true function, value and benefits of wetlands and eventually, in inappropriate use of the ecosystem. Coordination between public agencies in managing wetlands is often inadequate, while relevant laws and regulations are usually ineffective in enforcement and, in many cases; do not facilitate sustainable management of wetlands.

Under this project, significant continuation in the loss of wetlands in the Gulf of Thailand was observed. A most notable example is swamp forests which have been documented as covering a total area of 640 square kilometres, with scattered communities in the eastern region (Trat province) and large communities in southern Thailand, particularly in Narathiwat province where the swamp forests accounted for nearly 453.36 square kilometres. A survey of swamp forests in Narathiwat province in 1985 reported that Phru To Daeng forest in Tak Bia, Su Ngai Patee and Su Ngai Golok districts was the only remaining large patch of swamp forest in the province and covered an area of no more than 80 square kilometres. A later survey by Santisuk (1991) found that Phru To Daeng further shrank to mere 16 square kilometres or less. Another example was provided in the 2001 Annual Report on Status of Environmental Quality, where mangrove forests were reduced from 3,680 square kilometres in 1961, to only 1,680 square kilometres in 1996 (OEPP, 2002b). Major problems that have threatened the long-term existence of wetlands in the Gulf of Thailand can be summarised as follows:

Continuous loss of wetlands: Loss of wetlands generally results from their conversion for development activities such as cultivation, housing and tourism. Activities outside the wetlands such as infrastructure and industrial development, particularly dam and reservoir construction, often disrupted the replenishment of wetlands, made the ecosystem more accessible for cultivation and hence, indirectly encouraged more encroachment by landless locals. This pattern was frequently found in several mangrove forests including those at Welu River Estuary (Chanthaburi province), Pak Phanang bay (Nakhon Si Thammarat province), Pattani bay (Pattani province) and Ban Don bay (Surat Thani province) as well as in swamp forests in Thale Noi Wildlife Non-hunting Area (Phatthalung province), Phru Kan Tulee (Surat ThanipProvince) and Phru To Daeng (Narathiwat province).

Biodiversity loss: Thailand is rich in genetic, species and ecosystem diversity. Such diversity is especially evident in wetlands where pools of genetic diversity have long played an integral role in supporting local livelihoods for generations. The numbers of wetland species and their populations have recently been on the decline, particularly among aquatic animals, due to inappropriate harvesting. Use of illegal and destructive fishing tools, driven by economic demand for greater

production, has effectively depleted fishery stocks in wetlands, while introduction of invasive alien species, like giant mimosa, golden apple snails and exotic fish, further contributed to the reduction of native plants and indigenous fish species. Illegal hunting also has adverse effects on wildlife of wetlands and has caused local extinction of some species.

Ecological degradation of wetlands: Several wetlands are now under threat from eutrophication with rapid growth in vegetation and increased sedimentation from runoff. The ecological viability of wetlands has also been seriously affected by logging, particularly in mangrove and swamp forests, and more frequent forest fires, which result in reduction of native plants and deterioration of their ecology. Pollution has become more severe with the expansion of urban areas and tourism. These activities generate a vast amount of solid waste and wastewater, which are often discharged into wetlands without any effective treatment. Agricultural land use in adjacent areas has further compounded this problem with the use of pesticides and fertilizers. In addition to contamination of both surface and underground water with toxic chemicals, these agricultural agents increase nutrient concentration in water which induces rapid growth of micro-flora (algae bloom), significantly reducing the dissolved oxygen and disrupts animal and plant food chains in the wetlands. Irrigation projects, such as dam and reservoir construction, have affected wetlands by restricting the natural flow of water into the reservoirs; while factories, power-plants and oil tanks along the riverbanks and shorelines continue to contaminate estuaries and coastal areas with wastewater, toxicants, hazardous waste, petroleum substances and high temperature discharges.

Lack of co-ordination between partners and stakeholders: With ever increasing demand for the exploitation of wetland resources by local communities, utilisation of the resources without due regard to biodiversity value, and the need for conservation and sustainable use, frequently results in conflicts between users. Any activity in wetlands, therefore, requires comprehensive participation of central and local authorities, including both conservation and development agencies, private sector, local administration and communities to decide ways and means for resource utilisation that best meet the carrying capacity of the ecosystems. Area based management is a critical component in realising such processes, while revising work plans in accordance to changing circumstances could prevent more conflicts and enable greater equity in sharing the benefits of the resources.

Lack of adequate knowledge on wetland management: Ecosystem diversity of wetlands with inclusion of freshwater and brackish water, reservoirs, riparian systems, coastal areas, swamp forests and mangrove forests, has made the comprehension of the concepts of wetlands, its value, including biodiversity, rather difficult among the general public. Therefore managing wetlands must be carried out in an integrated manner where equal attention is paid to ecological protection and socio-economic demands. This can only be achieved effectively with databases and networking which are the backbone of informed decision-making, and a basis in disseminating knowledge to every stakeholder.

Lack of human resources and competent authorities: To ensure more efficient and productive management of wetlands, the ever increasing diversity of problems and obstructions, multi-level coordination from the international community (i.e., the Ramsar Convention) to local communities has to be adequately addressed and effectively dealt with. Despite appointment of the National Committee on Wetland Management by the National Environment Board (with ONEP as the secretariat) in 1993, the amount and complexity of wetland problems has been gradually overwhelming the capacity of the Committee. Institutional restructuring, including improvement of personnel responsible for wetlands at central and local levels, should be carried out not only to enhance effectiveness in problem resolution, but also to promote local communities to become more responsible for the management of their wetland resources.

3. LEGAL ASPECTS AND INSTITUTIONAL FRAMEWORK REGARDING COASTAL WETLANDS IN THAILAND

Currently, there is no specific and comprehensive legislation governing wetlands in Thailand. However, laws relevant to wetland conservation and sustainable utilisation are scattered throughout the body of legislation. This has resulted in little or no co-ordination between various governmental agencies responsible for wetland management.

The control of natural resources in wetlands is presently the responsibility of numerous governmental agencies. Apart from that, the structure of governmental organisation in Thailand is divided as the central government, provincial governments, and local governments. The present Thai Constitution

1997 provides comprehensive decentralisation to local governments and local communities for natural resources and environment conservation. Furthermore, the charter also provides the right and liberty for the public to participate in decision-making process of natural resources management.

The government decided to reform the bureaucratic system in October 2002. This is considered the first stage of the reform process because there are still many problems in the structure of government organisations. Current reforms have created more overlap of responsibilities and authorities for several agencies. It is anticipated that the reform process could be completed in two to five years.

It is believed that sustainable resource management could be achieved given an effective legal and institutional framework. This chapter reviews and analyzes the legal framework relevant to coastal wetland management in Thailand. It also reviews the policy of the government towards coastal wetland conservation and utilisation. In addition, the institutional framework for coastal wetland management in Thailand is also examined.

3.1 Review and Analysis of Legal Aspects Relevant to Wetland Management

There are many pieces of law concerning wetland management and conservation in Thailand. These laws directly or indirectly govern wetland management. They include:

- (1) Constitution, B.E. 2540 (1997)
- (2) Fisheries Act, B.E. 2490 (1947)
- (3) Wildlife Reservation and Protection Act, B.E. 2535 (1992)
- (4) National Environmental Quality Promotion and Preservation Act, B.E. 2535(1992)
- (5) Navigation in the Thai Waters Act, B.E. 2456 (1913)
- (6) National Reserved Forest Act, B.E. 2507 (1964)
- (7) National Park Act, B.E. 2504 (1961)
- (8) Town Planning Act, B.E. 2518 (1975)
- (9) Building Control Act, B.E. 2522 (1979)
- (10) Tambol Administrative Organization Act, B.E. 2537 (1994)
- (11) Provincial Administrative Organization Act, B.E. 2540 (1997)

1. *Constitution, B.E. 2540 (1997)*

Thailand's Parliament endorsed a new constitution on Saturday, September 27, 1997, in a combined House and Senate vote of 578 to 16 (with 55 abstentions). Among the main features, the new constitution gives people additional rights and freedoms, and defines and limits the role of the government more clearly. The new constitution will radically change the political landscape of Thailand. It aims to eliminate or at least minimize unnecessary political influence on administration, and enhance transparency, accountability, responsibility, and fairness. It provides for an independent election commission, citizen's access to an anti-corruption body to oversee politicians elected to office, proportional representation for a portion of seats, a stipulation that senators and provincial village chiefs be elected instead of appointed, and a requirement that cabinet ministers resign from their parliamentary seats. There is a clear stipulation to accelerate the process of administrative decentralization to empower people; this would necessitate the establishment of many new acts. The new constitution pays greater attention to social sectors including emphasis on education, with a goal to make 12 years of education compulsory. It also obliges the government to pay sufficient attention to social welfare and environmental conservation.

2. *Fisheries Act, B.E. 2490 (1947)*

This law was enacted in 1947 and has been revised twice in 1953 and 1985. This act is executed by the Minister of Agriculture and Cooperatives through the director-general of the Department of Fisheries. This act directly governs fishing activities in the coastal areas. The act classifies fisheries by using an area approach into four categories: (1) Preservation fisheries, (2) Concession fisheries, (3) Reserved fisheries, and (4) Public fisheries.

In relation to wetland management, the Fisheries Act generally protects both coastal and inland wetlands from fishing activities and environmental degradation activities. Apart from that, this act also prevents the illegal occupation of wetlands, illegal destruction of wetlands, and so on by establishing protected areas, both coastal and inland, as preservation fisheries, and does not allow any fishing activities. The act also protects endangered species, which have habitats in wetlands. However, law enforcement is the main difficulty in implementation, which leads to constant wetlands loss.