

WETLANDS SYSTEMS IN SOUTHERN THAILAND: THE ESSENTIAL RESOURCES FOR SUSTAINABLE REGIONAL DEVELOPMENT

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Abstract—Parts of Southern Thailand are inundated by water for months annually resulting in various wetlands including, among others, Tapi River Basin, Pak Panang River Basin, Songkhla Lake Basin, Pangnga Bay, Pattani River Basin, and Narathiwat Peat Swamp. Most wetlands perform functions such as flood retention, water filtration, bird and wildlife habitat, and tree growth. These wetlands are invaluable also for the value derived from: (a) commodity products such as timber, food, and chemicals; (b) nonconsumptive uses such as recreation and tourism; and (c) environmental attributes such as biodiversity, wildlife, and water quality. These values are derived from their hydrogeologic and biochemical functions, not dependent on the size of the wetland but on the intrinsic properties of the ecosystem, particularly their location within a watershed and positioning with respect to rivers, uplands, and seas. As many wetlands have been transformed and deteriorated, research into these wetland systems and their relationships with human activities are required. Integrated and participatory approaches to management of these wetlands are also recommended.

WETLANDS IN SOUTHERN THAILAND

Wetlands in Southern Thailand may be classified into nine categories according to their formation, location, and morphology.

Open Sea Coasts, Sandy Beaches, and Offshore Islands

These wetlands are found along the coastlines and offshore islands of the peninsula. In most cases, they occur in association with other coastal wetlands, such as mudflats and mangroves. There are many islands and small rocky outcrops off the west coast of the peninsula, most of which have never been surveyed. Some islets are known nesting sites for the Pacific Reef Egret (*Egretta sacra*) and terns such as *Sterna cougalli*, *S. sumatrana*, *S. bergii*, and *S. anaethetus*. The Beach Thick-Knee (*Esacus magnirostris*) is also located, but is restricted to sand beaches on offshore islands, whereas both the Malaysian Plover *Charadrius peronii* and the Little Tern *S. albigrons* breed on the sand beaches of mainland and island coasts.

Intertidal Mudflats and Mangroves

This type of wetlands is most known and is of great conservation value in Southern Thailand, having enormous importance in sustaining both inshore capture fisheries and aquaculture. The most extensive and species-rich mangrove ecosystems are found along the west coast of the peninsula, which supported 63 percent of the total mangrove area of 2871 km² at the end of 1982. There are also several important mangrove and mudflat sites on the east coast of the peninsula. Extensive areas have been converted to shrimp farms.

Intertidal mudflats are important in terms of wildlife conservation. These wetlands support a huge number of

passage and wintering herons and shorebirds. The mangroves themselves still support nesting colonies of cormorants, herons, and a few Lesser Adjutants (*Leptoptilos javanicus*), together with considerable numbers of some birds of prey such as Brahminy Kites (*Haliastur indus*). Two other important species are the Brown-winged Kingfisher (*Pelargopsis amauroptera*) and the Mangrove Pitta (*Pitta megarhyncha*), both of which are restricted to the west coast.

Lower Perennial Rivers

Wetlands of this category in Southern Thailand consist of meandered rivers and riverine marshes. In most cases, these areas are deforested, except where narrow fringes of fresh and brackish water swamp woodlands remain along the riverbanks. As most riverbanks usually support a high human population density, relatively few waterfowl are found. Only certain grounds with strong conservation movement may support breeding colonies or large roosts of herons or storks, together with a few Black Kites (*Milvus migrans*). Vertical earth banks also support a few nesting Pied Kingfisher (*Ceryle rudis*), whereas mud and sand banks support passage shorebirds as well as the resident River Lapwing (*Vanellus duvaucelii*). There are a few colonies of Plain Sand martins (*Riparia paludicola*). The rare and local Jerdon's Bushchat (*Saxicola jerdoni*) appears to be associated with stands of the tall grass (*Saccharum arundinaceum*) in riverine floodplains. The species may have decreased greatly as a result of the burning of such vegetation in order to open up seasonally inundated alluvial soils for dry season cultivation.

Large areas of seasonally inundated land also lie along many rivers in Southern Thailand, particularly along large rivers such as the Tapi River in Suratthani and the Pak Phanang River in Nakhonsrithammarat. Many such areas are utilized for the cultivation of vegetables or rice as the

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seasonal flooding recedes, yet they may perhaps be of considerable value to waterfowl.

Upper Perennial Rivers

Wetlands of this category are usually characterized by large streams in mountainous or hilly terrain, often in association with waterfalls and rapids. Because the upper reaches of many rivers are still largely forested, they may continue to support a considerable diversity of wildlife, including a great many nonaquatic species. Some of the important sites are already enclosed within the boundaries of national parks, forest reserves, and wildlife sanctuaries.

Several kinds of birds such as Fish-Eagle, Crested Kingfisher (*Ichthyophaga humilis*), *Sarcogyps calvus*, *Pavo muticus*, and *Megaceryle lugubris* are sometimes found in these wetlands. Many such sites, including many small streams and torrents, may be of critical conservation importance for various frogs and toads. There has never been any comprehensive assessment of the conservation status of Thai amphibians, however, so that many important sites remain undocumented.

Freshwater Lakes, Ponds, and Associated Marshes

These wetlands are usually related to the Lower Perennial Rivers. They comprise abandoned oxbow lakes, inundated sinkholes, and submerged flood plains. Most sites are small (less than 500 ha) and are usually surrounded by rice paddies. A great many lie within 1 to 2 km of major rivers. Like the Lower Perennial Rivers, almost all have been utilized mostly for agriculture causing habitat disturbance, which greatly limits the residence of wildlife. The vegetation is usually restricted to floating or submerged aquatic plants alternating with open water and supports such breeding waterfowl as Pheasant-tailed Jacana (*Hydrophasianus chirurgus*). The highest diversity of breeding and wintering birds is usually found at those sites, which contain extensive areas of emergent vegetation, especially Phragmites or Typha. Many such sites are of international or national importance for their wintering duck populations.

Water Storage Reservoirs

Wetlands of this category are manmade or constructed wetlands. Most larger reservoirs are constructed for hydroelectric power generation, and are situated in steep forested river valleys. They tend to support fewer native wildlife, but may lead to a new ecosystem that can support the other wildlife. Many irrigation reservoirs, on the other hand, are situated in the plains, are relatively shallow, and show considerable annual fluctuation in area. Such sites may be of value for wintering and passage wading birds. A few such sites are known to support wintering concentrations of ducks as well as such breeding species as *Porphyrio porphyrio*.

Rice Paddies

In most circumstances, rice paddies are river flood plains, which were transformed into rice fields. They constitute an important and very extensive, seasonally inundated habitat for birds. The extent to which these areas can be utilized, however, depends upon the availability of undisturbed roosting and nesting sites such as clumps of trees and

permanent water bodies. Egrets and herons feed to a considerable extent in flooded paddies; cormorants utilize ditches around their margins, and the Asian Open-billed Stork (*Anastomus oscitans*) feeds both in flooded and dry paddies. Areas of hard, dry paddy stubble in the late dry season are utilized by huge numbers of nesting Oriental Pratincoles (*Glareola maldivarum*).

Freshwater Swamp Woodlands

Detailed information on the history of such sites is usually lacking. In most cases, such swamp woodlands may be merely the degraded remnants of primary peat swamp forests. The most disturbed sites, particularly those having been subject to repeated burning, are species poor and are usually dominated by *Melaleuca leucadendron*. Some *Alstonia spathulata* may occur in the less disturbed sites, as at Thale Noi Non-Hunting Area in Peninsular Thailand. Small areas of other freshwater swamp woodland formations may occur along the banks of larger rivers and other sites, which are subject to occasional inundation. Such sites are of considerable importance for nesting and roosting colonies of larger waterbirds, such as cormorants, herons, and storks.

Peat Swamp Forests

These are wetlands dominated by a species-rich forest community growing on waterlogged peat. They are botanically very rich and may be of great conservation importance for amphibians and for some fish, such as the walking catfish *Prophagorus nieuhofii* and possibly the highly endangered Asian Bonytongue *Scleropage fonnosus*. In terms of their avifauna, they are important in supporting many arboreal members of the lowland forest community, which are scarce or absent elsewhere due to the almost complete destruction of terrestrial lowland forest. Phru Toh Daeng or Phru Sirindhom, in Narathiwat Province, is the only example of this habitat remaining in Thailand, although many other areas, now dominated by the species-poor *Melaleuca* woodland, may be degraded remnants of this type.

MANAGEMENT OF WETLANDS IN SOUTHERN THAILAND

Wetlands are now known for many people in Southern Thailand. So are their functions and values. Some management practices have long been imposed on these areas although not all wetlands are properly managed. These practices may be categorized roughly, according to responsible organizations, into the following five categories.

Conservation Imposed by the Government

Several wetlands, including many intertidal mangroves, forested upstream wetlands, and some primary peat forests have been designated by the government as conservation areas. Among others, national parks, nonhunting areas, and wildlife sanctuaries are most common. These practices usually target objectives such as conserving wildlife, plant species, and wetland ecology. Human activities have, to some level, been controlled by the central government through responsible departments such as the Royal Forestry Department (RFD) and the Department of Fisheries (DOF). However, ecotourism, which has been allowed and promoted in many areas, may lead to more of the general public entering these wetlands and thus posing a threat to

them. One good example of wetlands with this type of management can be seen at Phru Toh Daeng in Narathiwat province.

Management Imposed by Responsible Government Agencies

Similar to the first category, this type of management, usually invented by responsible authorities in line with the government policy, aims at controlling the uses of the wetlands where such agencies have been granted special right to access and manage. Whereas the former strategy usually aims to conserve the wetlands, these agencies, Electricity Generating Authority of Thailand (EGAT) and Royal Irrigation Department (RID), for example, could seek to optimize their principal objectives while taking into account conservation practices as secondary objectives wherever possible. A constructed wetland complex at Chewlam Dam in Suratthani is a good example of wetlands with this type of management.

Management Introduced and Supported by Local People

In line with the increasing awareness of the general public, some wetlands have been conserved by various groups of local people, many of whom rely to some extent on the wetlands. Without support from the government, this type of management may lead to resource-use conflicts because some other groups sometimes want to make different uses of the same wetlands. It is, however, believed to be most cost effective and more in line with new legislation and modern resource management paradigms—the integrated and participatory approach, in particular.

Also, there are several projects funded by overseas organizations also suggesting a similar approach. Whereas the first strategy will likely remain essential, this management practice is gaining more acceptance. A good example of wetlands with this type of management is Talenoi, Phattalung. There are several other examples in Songkhla Lake Basin and some intertidal mangrove areas in Suratthani and Pattani.

Owned by the Government but Accessible Freely by the General Public

This type of management is common in most midstream wetlands such as flood plain grass swamps and some peat forests, most of which are of lower value compared to the other natural wetlands. The government usually designates these areas as public lands but has paid less attention to control of their utilization. As a result, it is considered less efficient and often leads to misuses or deterioration of these wetlands or both. These practices also result in many conflicts either among different users or between villagers and the government. Several grass wetlands in Suratthani and Nakhonsrithammarat are obvious examples of these wetlands.

Experimental Management by Researchers

Several action research projects have been conducted by many organizations including universities, international organizations, and some government agencies. Important

research teams include, among others, Prince of Songkla University, Kasetsart University, Wetlands International, ASEAN, USAID-CRMP, DANCED, National Research Council of Thailand, Department of Fisheries, and Royal Department of Forestry. These research projects usually led to a set of management guidelines, some of which were adopted by responsible authorities. Some also led to actual management practices based on scientific data and reasoning. Local people also support many research outputs.

Many organizations including responsible government agencies, universities, nongovernment organizations, local administrative organizations, and local people have played different roles in wetlands management, sometimes leading to resource-use conflicts. A more integrated approach to management, which takes into account different people or organizations or both, their expectations, responsibilities, and underlying legislation have gained more acceptance and would likely result in restructuring of the region's wetlands management scheme. The Songkhla Lake management is one good example of the new paradigm.

Research into Wetlands in Southern Thailand

Numbers of research into intertidal wetlands in Southern Thailand were and have been carried out using satellite imagery, aerial photography, ground surveys, and laboratory testing to examine various aspects of major wetlands in the region. Among many, the extent of wetlands, the ecosystems, waterfowls, and other biological species have been known to some degree. Research into the only remaining primary peat forest at Phru Toh Daeng has also been carried out, and an integrated management plan for the site was developed. Several aspects of Songkhla Lake, the largest and most important lagoonal wetland complex, were and have also been studied. Many management proposals have been presented.

Apparently, past research into wetlands in this region had paid more attention to estuarine wetlands, mangroves in particular. More recent research has also extended to cover rain-forested wetlands and some peat forests. Most of the midstream wetlands, such as flooded grasslands, have been left unexplored. So have many small upstream and isolated wetlands.

Different research teams have collected various information about wetlands flora and fauna. Research interests have, however, focused upon the wetlands being habitats for wildlife, various bird species in particular. Some research into proper management has been carried out. Most research in the past aimed at each particular wetland although many are interrelated and could affect one another. A few projects applied systems approach to wetland research. Songkhla Lake management is among those who based their investigation on the wetlands system.

Just recently, Prince of Songkla University, in cooperation with Wetlands International, has set up a group of research projects aiming at wetlands inventory and management in Southern Thailand. Only a few issues have yet been handled so far.

RECOMMENDATIONS

The authors suggest that wetlands in Southern Thailand, based on recent investigation, should be categorized into three groups.

Mountainous Upstream Riverine Wetlands

These wetlands should include upper perennial rivers and hilly water storage reservoirs.

Lowland Midstream Riverine Wetlands

These wetlands should include lower perennial rivers, freshwater lakes, ponds and associated marshes, freshwater swamp woodlands, lowland water storage reservoirs, and rice paddies.

Lowland Coastal and Marine Wetlands

These wetlands should include open sea coast, sandy beaches and offshore islands, intertidal mudflats and mangroves, and peat swamp forests.

The new scheme takes into consideration the system of wetlands and thus should emphasize the interrelationships among different wetlands, which call upon more systems approach to management and further research.

Future research into wetlands should extend from lowland intertidal mudflats and mangroves and a few major upstream wetlands to peat forests, both intact and degenerated, and lowland midstream wetlands, which also support various forms of wildlife, natural conservation, and human activities. Issues for investigation should extend from biology or ecology or both to include human activities, problems and their causes, and appropriate management practices that would lead to sustainable wetlands in this region.

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