BIOFIN Thailand's Policy and Institutional Review: Wetlands Ecosystem

Background and Coverage of this Report

The purpose of preparing this document is to supplement the initial PIR Report submitted earlier focusing on wetland ecosystem which within the working definition of BIOFIN Thailand refers to inland wetlands only. The information presented will be integrated into a single PIR report which will cover all three ecosystems, namely terrestrial, coastal and marine and wetlands. The report has been prepared with the joint efforts of Thailand BIOFIN Team Leader, Dr. Orapan Nabangchang, Dr. Rawadee Jarungrattanapong and Ms. Prinyarat Leangcharoen with support of information from Ms. Nirawan Pipitsombat of the Office of Natural Environmental Policy and Planning.

The contents are divided into 5 sections. The status of Thailand's wetlands is covered in Section 1 and, based on limited information, some discussion of the trends at least in terms of changes in area coverage. Section 2 lists out some of the Pressures and Negative Policy Environment, the key negative drivers are policies that gives priority to the interest of the economic sectors and seeing wetlands more as a supply source of land, rather than an ecosystem that generates direct and indirect benefits, i.e., infrastructure development, agricultural policies that advocate expansion of commercial crops, water resources development. Section 3 moves on to discuss positive policy environment. Apart from classifying wetlands into different categories according the levels of importance, the 'Protected' status of selected wetlands are also discussed. Also included as a positive policy environment are several national level plans, the NBSAP being among these.

The legal framework and institutional structure and of wetlands management is discussed in Section 4 followed by observations over some of the challenges and opportunities in the final section.

1. Status and Trends of Thailand's Wetlands

According to the Cabinet Resolution on November 3, 2009. The total wetland area of Thailand is 22,555,100 rai equivalent to around 7.5% of the total areas of the country. Around 45% of this area are inland wetlands.

and is classified into the following:

	e				
1.	Wetlands of international importance		69		sites
2.	Wetlands of national importance		47		sites
3.	Wetlands of local level importance	19,295	sites		
4.	Wetland areas registered as RAMSAR sites	14		sites	

According to the Millenium Ecosystem Assessment, wetlands generate both direct and indirect benefits as illustrated in Table 1. Apart from the direct benefits from wetlands, as with terrestrial, coastal and marine ecosystems, the ecosystems services are more often than not unrecognized and undervalued. In reviewing the situations regarding wetlands, the vulnerability of wetland ecosystems more reflect Hardin's description of common resources in the sense that multiple agencies are responsible for wetlands, yet no one is truly responsible for wetlands. Details of different types of wetlands and benefits are briefly summarized below:

	Types of wetlands													
Benefits	Rivers and canals	Swamps, Ponds	Lakes	ลมุ่กตุ	บสุ่ำทาม	Peat	River outlets	Mud beach	Sandy beach	Beach forest	Mangroves	Corals	Seagrass	หนอง น น ักรย่ ตะกาศ
Direct benefits	from di	fferent typ	es of w	etlands	5									
Food										0				
Water											۲		۲	
Wood and firewood			0					0	۲					۲
Herbs	0	0	0				0	0	0	0	•	0	•	0
Flora and fauna genetic resources	•	•	0						0		•	0		0
Indirect benefit	s													
Floods and drought prevention		•						۲	۲	۲	۲		۲	۲
Natural protection								0	0					۲
Preventing intrusion of salt water		•						۲	۲					۲
Water purification											•			
Climate regulation														
Preserving ground water														۲
Transportation		0		0	0	0							۲	
Recreation		•		0	0	0		۲			•			
Research														
Cultural and historical						0	0			0				

Table 1: Types of wetlands and ecosystems services

Source: Millenium Ecosystem Assessment, 2005. Ecosystems and Human Well-Being : wetlands and water synthesis

Type of wetlands	Name
RAMSAR sites	1. Kuan Khi Sian
	2. Bung Khong Long
	3. Don Hoi Lod
	4. Krabi river mouth
	5. Nong Bong Kai non Hunting Zone
	6. Chalermprakiat non Hunting Zone (พรุโต๊ะแดง)
	7. Haad Chao Mai National Park-Libong Non Hunting Zone
	8. Laemson National Park- Kapoe river outlet, Kraburi river outlet
	9. Ang Thong Islands National Park
	10. Phang Nga Bay National Park
	11. Sam Roi Yod National Park
	12. Kud Ting
	13. Kra Island
	14. Koh Ra and Koh Phra Thong Island
Wetlands of	Northern Region (7 sites): 1) Chiang Saen valley, 2) Kwan
international importance	Phayao, 3) Yom river, 4) Bung Si Fai, 5) Bung Boraped, 6) Inthanon
69 sites	National Park 7) Salawin river
	Eastern Region (15 sites): 1) Bang Phra Non Hunting Zone, 2)
	Kwae Noi river, 3) Mae Klong river 4) Wat Phai Lom and Wat
	Amphuwararam Non Hunting Zone, 5) Koh Chang
	6) Khao Sam Roi Yod National Park, 7) Huey Kha Kaeng National
	Park, 8) Thung Yai Naresuan National Park, 9) Kaeng Kracharn
	National Park, 10) Kwae Yai river, 11) Don Hoi Lod, 12) Weru
	estuary, 13) Khao Laem Ya-Koh Samet National Park, 14) Khao
	Y at National Park, 15) Pasak Chollasit Non Hunting Zone,
	Huey Jarakae Mak reservoir Non Hunting Zone (1) Sanambin Non
	Hunting Zone 5) Lam Dom Vai 6) Pa Vod Dom Wildlife
	Sanctuary 7) Kud Ting 8) Nong Han Kumpawapi 9) Bung Khong
	Long Non Hunting Zone. 10) Huev Talad Non Hunting Zone. 11)
	Mekong river, 12) Lam Plai Mas, 13) Phukhiew Wildlife Sanctuary,
	14) Songkram river
	Southern Region (33 sites): 1) Khao Sok National Park, 2) Thale
	Noi Non Hunting Zone, 3) Thalesap Non Hunting Zone, 4) Nong
	Thung Thong Non Hunting Zone, 5) Saiburi river, 6) Tapi river, 7)
	Chalermprakiat Somdej Phrathep Wildlife Sanctuary, 8) Laem Son
	National Park, 9) Similan Islands National Park, 10) Phang Nga
	Bay, 11) Sirinat National Park, 12) Nopparat Thara Phi Phi islands
	National Park, 13) Haad Chao Mai National Park, 14) Libong
	islands Non Hunting Zone, 15) Thaleban National Park, 16) Tarutao
	National Park, 17) Ang Thong National Park, 18) Lanta

Table 2: Classification of Thailand's wetlands according to their level of importance.

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Table 2: Continued

Type of wetlands	Name
	islands National Park, 19) Surin islands National Park, 20) Thunka-
	Sawi Bay, 21) Krabi river estuary, 22) Trang river estuary, 23) Pak
	Klong Kaper, 24) Palian Langu mangrove, 25) Kraburi river
	estuary, 26) Ban Don Bay, 27) Pattani Bay, 28) Pak Panang Bay,
	29) East coast of Phuket island, 30) Koh Ra, 31) Koh Phra Thong-
	Koh Kra, 32) Haad Tai Muang, 33) Khantulee peatlands
Wetlands of national	Northern Region (9 sites): 1) Ya Tha Ton peatlands, 2) Nong
importance 47 sites	Luang, 3) Nong Hang, 4) Ping river, 5) Wang river, 6) Yom river,
	7) Nan river, 8) Kok river, 9) Mae Yom National Park
	Central and Eastern Region (23 sites) : 1) Lower central region, 2)
	Gulf of Thailand, 3) Chao Phraya river, 4) Pasak river, 5) Tha Chin
	river, 6) Bang Pakong river, 7) Nakhon Nayok river, 8) Phetburi
	river, 9) Thung Po(Thung Thongkham Yad), 10) Khao Soi Dao
	Wildlife Sanctuary, 11) Bung Chawak Non Hunting Zone, 12) Haad
	Wanakorn National Park, 13) Wat Tarn En Non Hunting Zone, 14)
	Khao Laem, 15) Sri Nakharin Dam National Park, 16) Pang Sida
	National Park, 17) Salak Phra Wildlife Sanctuary, 18) Khao Khiew-
	Khao Chompoo Wildlife Sanctuary, 19) Khung Kraben Bay, 20)
	Ang Rue Nai Wildlife Sanctuary, 22) Mae Rampeung peatland, 23)
	Bung Samnak Yai Nong Jamrung
	Northeastern Region (12 sites): 1) Doon Lampan, 2) Nong Pla
	Koon, 3) Nong Sam Meun, 4) Huey Sua Ten, 5) Nong Hua Koo Non
	Hunting Zone, 6) Sob Mun Chi river, 7) Nong Kom Koh, 8) Bung
	Klua Bor Kae, 9) Kaeng Lawa, 10) Lower Mong river basin, 11)
	Mun river and Bung Tam, 12) Nong Waeng Non Hunting Zone
	Southern Region (3 sites): 1) Ban Mai Khao peatlands, 2) Nong
	Plak Phraya and Raya Bangsa, 3) Koh Taen
Wetlands of local	Distributed in all regions
importance 19,295 sites	

The area defined as wetlands in general is observed to have followed a state of decline both in terms of area coverage and the conditions of the wetlands. Based on aerial photographs of the Department of Land Development, between 2006-2009, the surface areas of swamps and lakes was about 1.5 million rai. River plains in the same period was estimated to be 1.7 million rai. Peatlands covered about 0.7 million rai. These estimates, compared with those of Thailand Institute of Scientific and Technological Research (TISTR) estimated for the period between 2008 and 2012 showed a decline in all categories of wetlands.



Figure 1: Changes of wetland areas over two time periods

2 Pressures and Negative Policy Environment

2.1 Infrastructure development, expansion of built up areas and urban amenities.

Among the pressures is the physical infrastructure, such as construction of roads, expansion of built up areas. First and foremost, that can do much harm to the wetland ecosystems are infrastructure development projects. Conversion and degradation of vast areas of wetlands in the name of economic development oftentimes fail to take into account the costs of those projects in terms of the loss of natural capital. This is particularly the case where there are no well-defined boundaries of what constitutes 'wetlands'.. The impact is not only the reduction of the wetlands, but also in the changes in the wetland ecosystem where this results in changes in natural drainage of the area or even changes in the water channels. Incredible though it may seem, but wetlands have also been destroyed to build government offices and educational establishments. Examples include the development of land in the lower central region around Ayudhaya province where wetlands have been developed into industrial estates and residential areas and construction of school buildings in Uttaraditr province. Among the explanations as to how this could have been allowed to happen be traced to the fragmented nature of management of wetlands and to the failure to communicate the importance of the various dimensions of benefits. Seasonal flooding for example, could be interpreted as a 'natural disaster' calling for construction of dykes and other engineering methods to control and regulate quantity and water flow. Other agencies could well see wetlands, not for ecological functions, but as wasteland, hence seeing only the benefits of what it could be turned into and not a loss of natural capital. If the impacts on the hydrology of the wetlands had been recognized not to mention the impacts of biodiversity resources that rely on the wetlands described. Moreover, with increasing construction activities, comes the demand for soil and open access wetlands can often be the supply of soil for landfill in construction sites.

2.2 Water Resources Development.

This would involve constructing dykes, digging ponds among other actions that would alter the water flow and the natural drainage systems within the wetlands.

2.3 Agricultural Development Policies

Agricultural production is another source of pressure either through conversion of wetland for agricultural production by draining water out. One main driver has been the policy to promote increase in production of biofuel crops and in particular, the goal to expand area under oil palm production by 2 million rai. This expansion target could be beneficial if the target areas is restricted to only farm land that is no longer used for rice production, 46,134 rai in land reform areas. On the other hand, the net benefit of targeting other types of land such as 146, 991 rai of peat lands in the southern provinces of Thailand and 37,291 rai in the Pak Panang river basin. Since the conversion of existing wetlands itself would have adverse impact on the wetland ecosystems, the MOAC would need to weigh the benefits of trying to meet energy supply target against the costs of losing the wetlands.

Impact does not only stop at conversion of land for agriculture, but also the uses of chemical inputs and risk of contamination of water sources from chemical residues. The other common practice is to pump in salt water for aquaculture (shrimp farming) is yet another common practice. This can increase the overall level of salinity of the water. Discharge of waste water from shrimp farms also introduces the problem of water contamination.

2.4 Changes Driven by other Causes.

Other causes of deterioration of the wetland ecosystem include the rapid expansion of alien invasive species such as water hyacinth and snails, the discharge of water from industries and residential areas.

3 Sectoral practices underlying positive trends

3.1 Registrating wetlands and resulting enabling policy framework

At the policy level, there is recognition of the importance of wetlands. Back in 2000, the most concrete action undertaken seem to have been to register wetlands considered to be of ecological importance. The 2000 list have been revised in 2009 with the numbers of each type of wetlands of varying importance described in the earlier section. At least this is the first step leading towards identification of conservation measures, the leading and supporting agencies. Thailand became a signatory on September 13, 1998. To date, we have 14 RAMSAR sites. Some of these are located in Protected Areas namely areas designated as National Parks or No Hunting Zones. Some are located in common lands

The acquired the status of being a RAMSAR site will be followed by protective measures. The area will become for instance a Non-Hunting Zone. Landfilling will no longer be permitted and any construction work will only be allowed if there are no impacts. Since restoration measures will also have to be identified, the responsible agencies will have to formulate Master Plans which in principle should lay out measures to be undertaken in the short and the long run.

The commitment under RAMSAR can also be said to have provided the 'nudge' to taking some concrete measures. The key areas addressed by the wetland conservation policy approved by the Cabinet in 2009 include:

- 1. Creating awareness of the importance of wetlands
- 2. Management and coordination in conservation
- 3. Capacity building of concerned agencies
- 4. Promotion of basic researches to generate information that can be used in establishing a database
- 5. Setting conditions for land use and obtaining land rights
- 6. Promoting active and effective enforcement of the laws.
- 7. Promoting cooperation in conservation of transboundary wetlands.

To date, 14 wetlands have already been declared as RAMSAR Sites. The names, location, estimated area coverage are presented in Table 2. Within RAMSAR sites, there can also be areas which have 'Protected Status' and these are also indicated.

Name	Location	Area	Significance	Other
		(rai)		Protected
				Status
Kuan Khi Sian	Phattalung	3,085	Habitat of migratory birds. Altogether 217 bird species	Thale Noi No Hunting Zone
			have been identified, most	
			whereas 121 are non-	
			migratory. Some of these	
			have been classified as	
			being 'critically	
			endangered' or	
			'endangered'.	
Bung Khong	Nongkhai	13,837	This wetland is part of Sri	
Long			Songkhram river basin. It is	
			habitat of at least 33 bird	
			species which migrate here	
			during the winter. Among	
			these, some are classified as	
			critically endangered	
			whereas others are	
			'threatened'.	

Table 3: Thailand RAMSAR sites

Table 3: Continued

Name	Location	Area	Significance	Other
		(rai)		Protected
				Status
Don Hoi Lod	Samut	546,875	Comprises both land and	
	Songkhram		coastal ecosystem created	
	0		by accumulation of	
			sediments at the river	
			outlet There is a high	
			concentration many types	
			of muscles. There is a high	
			demand for these muscles	
			but these are also major	
			but these are also major	
			sources of food for the	
			birds.	
Krabi river	Krabi	133,120	This is a coastal wetland	
mouth			consisting of	
			Mangroves, mudflats,	
			beach forests and seagrass.	
			At least	
			221 bird species have been	
			identified and among these,	
			many	
			have been classified as	
			endangered	
Nong Bong Kai	Chiang Rai	2.712	Small swamp located	Officially a
non Hunting	Chinang rum	_,,	among the hills	non-Hunting
Zone				Zone
Chalermprakiat	Narathiwat	125 625	This is the largest	Officially a
non Hunting	1 varatin wat	125,025	remaining peat forest in	non Hunting
Zono			SEA There are at least 50	Topo
Zone			SEA. There are at least 50	Zone
			\mathbf{T}	
			hind appaired have hear	
			bird species have been	
			bird species have been identified, 52 amphibian	
			bird species have been identified, 52 amphibian species and 62 fish species	
Haad Chao Mai	Trang	515,745	bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of	National Park
Haad Chao Mai National Park-	Trang	515,745	bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds,	National Park And
Haad Chao Mai National Park- Libong Non	Trang	515,745	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds,	National Park And non Hunting
Haad Chao Mai National Park- Libong Non Hunting Zone	Trang	515,745	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding	National Park And non Hunting Zone
Haad Chao Mai National Park- Libong Non Hunting Zone	Trang	515,745	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs	National Park And non Hunting Zone
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson	Trang Ranong	515,745	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of	National Park And non Hunting Zone National Park
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park-	Trang Ranong	515,745 677,625	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as	National Park And non Hunting Zone National Park
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river	Trang Ranong	515,745 677,625	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific	National Park And non Hunting Zone National Park
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river outlet, Kraburi	Trang Ranong	515,745 677,625	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific Region. This site is also	National Park And non Hunting Zone National Park
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river outlet, Kraburi river outlet	Trang Ranong	515,745 677,625	hative plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific Region. This site is also registered with UNESCP	National Park And non Hunting Zone National Park
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Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river outlet, Kraburi river outlet	Trang Ranong	515,745	hadve plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific Region. This site is also registered with UNESCP as a Man and Biosphere Reserve	National Park And non Hunting Zone National Park
Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river outlet, Kraburi river outlet	Trang Ranong Surat Thani	515,745 677,625 63,750	hadve plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific Region. This site is also registered with UNESCP as a Man and Biosphere Reserve Many types of wetlands	National Park And non Hunting Zone National Park
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Haad Chao Mai National Park- Libong Non Hunting Zone Laemson National Park- Kapoe river outlet, Kraburi river outlet Ang Thong Islands National Park	Trang Ranong Surat Thani	515,745 677,625 63,750	hadve plant species; 217 bird species have been identified, 52 amphibian species and 62 fish species Habitat of 212 species of birds, Habitat and feeding grounds of dugongs Largest expansion of mangrove in Thailand as well as the Indo-Pacific Region. This site is also registered with UNESCP as a Man and Biosphere Reserve Many types of wetlands can be found here, i.e., beach forests, mangroves and coral reefs. The site is rich in both terrestrial and marine diversition	National Park And non Hunting Zone National Park National Park
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Phang Nga Bay National Park	Phangnga	250,000	Many types of wetlands can be found here, i.e., beach forests, estuaries, mud flats, mangroves and sea grass.	National Park
Sam Roi Yod National Park	Prachuab Khiri Khan	43,074	There are many ecosystems in this national park, such as wetlands, mangroves, mud flats and beach. It is also a site that is facing both direct and indirect human induced pressures, among this is from rice production in adjacent locations	National Park
Kud Ting	Bung Karn	16,500	This is an ecosystem with diversity of fish species and habitat to the third smallest fresh water fish in the world. It is also habitat to many native bird species as well as many migratory birds.	
Kra Island	Nakhon Sri Thammarat	2,169	This site is important for diversity of species of corals.	
Koh Ra and Koh Phra Thong Island	Phang Nga	122,800	There are many ecosystems in this national park, such as beach forests, mangroves and sea grass. Peat forests can also be found on the island itself. The islands are also the nesting ground of the lesser adjutant, a critically endangered species	

3.2 Protected Status of Selected Wetlands.

Protection measures of wetlands very much depend on the type of 'Protected' status of the wetlands. Thailand has 7 categories of 'Protected Areas', namely (i) National Parks, (ii) Forest Park, (iii) Wildlife sanctuaries (iv) Non Hunting Zones (v) Environmental Protection Zones, (vi) Forest reserves, (vii) Restricted areas to protect herbal plants. Many of the wetlands listed earlier are areas designated as National Parks and will benefit from the protected status as defined by the *National Park Act, 1961*. The main purpose is to protect natural resources such as flora, forest products and wild animals to ensure the sustainability of natural resources and of the natural landscape. The Act prohibits the occupation of any part of the national parks, clearance of areas, collection of forest products, hunting wild animals and collection of any rocks, sand or stones. The Act does allow entry into the national park areas for educational and recreational purposes. Violators are subject to fines or imprisonment as well as confiscation of weapons, tools and vehicles used in committing the crimes.

There were also wetlands located in areas designated as Wildlife Sanctuaries and Non Hunting Zone. The law that provide protection is *The Wildlife Preservation and Protection Act, 1992* support breeding of wildlife species, and to help protect and conserve wildlife species. The principle is also to ensure that Thailand undertakes measures that reflect willingness to cooperate with international communities in the protection and conservation of wildlife and endangered species by declaring designated areas as wildlife sanctuaries and no-hunting zones.

The determination of any kind of wildlife to be protected shall be made by the ministerial regulations with the approval of the committee. The National Wildlife Preservation and Protection Committee have power and duty to approval of any determination of Wildlife Sanctuaries, to determine the Non-Hunting Wildlife Areas as well as the kind or category of wildlife hunting which is prohibited in such areas.

3.3 The Environmental Quality Management Plan 2011-2016

The strategy within this plan that is relevant to wetlands is strategy 2 on conservation and restoration of natural resources to ensure sustainability. The strategy highlights the importance of local community participation in reducing the pressure on biodiversity resources, in situ and ex situ conservation, restoration and sustainable uses of wetlands biodiversity resources.

3.4 Strategic Plan for Water Resources Management

To date, there are no legal provisions to protect natural water resources within wetlands except in cases where they are located in 'Protected Areas'. There are thus high risks that these natural water resources maybe over utilized, misused or converted for other purposes. Within this Strategic Plan, at least there is recognition of the need to protect these water sources.

3.5 The NBSAP

To a great extent, the existence NBSAP can be said to have reiterated the importance of wetland ecosystems both in terms of the number of projects and activities related to wetlands as well as budget estimates. Details in the following Table lists out activities and budget estimates as indicated in the 2015/16 Action Plan and 2017-2020 Action Plan. The total budget estimated to finance activities in NBSAP related to management, conservation and restoration of wetlands amounted to 1,275.1 Million Baht. Estimated budget for the period between 2017-2020 is 49.5 million Baht.

	Budget
	(Million
Plans and Activities	Baht)
Plan 2.1 Conservation and restoration action plan	
2.1.2.2 Preparednesss for Climate change	
• Compiling information on the impacts of climate change on	
biodiversity resources and wetlands	2.00
2.1.2.3 Surveying wetlands, forests, agricultural land and unutilized land to	
prepare measures for restoration	20.00
Plan 2.3 Improving wetlands management	
2.3.1.2 Developing management guidelines	0.50
Compiling information about various types of utilization	2.00
• Land use planning for sustainable uses of resources in the wetlands	5.00

Table 4: Plans, Activities related to wetlands in the NBSAP 2015-16 Action Plan

2.3.1.3 Advocate inclusion of impacts on wetlands in Environmental Impact Assessment	
• Study and analyse environmental impacts on 5 target wetlands of	
national and international importance	125.00
Analyse the impacts of dredging	20.00
2.3.1.4 Ensure that measures are undertaken in accordance to the Cabinet Resolutions	
• Define the boundaries of wetlands and buffer zones with involvement of local communities	2.00
• Monitor the progress of measures undertaken in compliance to the Cabinet decisions	0.50
 Survey and register all wetlands in all provinces 	150.00
 some restoration and conservation measures for the purpose of defining the appropriate boundaries of wetlands 	50.00
2.3.1.5 Coordinate actions undertaken by Non Government Organizations and local communities in order to reduce the rate of loss of wetlands areas	
Promote increasing involvement of local communities	195.00
• Promote better understanding of the value of ecosystem services of wetlands	5.00
• Promote greater involvement of women in conservation of wetlands	5.00
2.3.1.6 Promote formulation of management plan that involve participation of local communities	
• Develop an approach, appropriate rules and regulations for local	
communities so they can protect their wetlands: formulate provincial	
wetlands management plans	20.00
 monitor the progress of the protective measures introduced 	9.00
2.3.1.7 Conduct studies on the impact of changes in land use on wetlands	20.00
2.3.2 Protection measures for wetlands	
2.3.2.1 Measures undertaken in compliance with international agreements	0.50
Monitor the status of RAMSAR sites	2.50
• Restore wetland ecosystems so that it can be used for educational purposes	12.00
• Create national network of wetlands: promote sustainable tourism in	
RAMSAR sites and develop (and enforce?) tourism standards	2.50
2.3.2.2 Propose additional RAMSAR sites	
Propose at least 3 new wetlands as RAMSAR sites	2.50
• Formulate conservation and utilization plan for at least 2 sites	100.00
 Formulate Town Plans that recognizes that natural wetlands should be kept as Green Space 	100.00
• Formulate land use plans for wetlands that are of international importance	60.00
• Survey, classify and develop a database of wetlands that are of local importance	6.00
2.3.2.3 Conducting surveys of the physical, ecological conditions as well as	
the socio-economic context of the wetlands	
• Revise rules and regulations concerning protection of wetlands for greater effectiveness	2.00
• Analyse the outcome of efforts to manage natural resources as well as	
the impacts on land use in Bung Boraped area on the local ecosystem	
and biodiversity resources	12.00

• Revise and update the database on wetlands	37.50
• Conduct studies on migratory birds and in wetlands that are located in	
Protected Areas.	18.00
• Conduct studies on migratory birds and water fowls in wetlands that	
should be given priorities; Pasak dam, islands in the Southern Region,	
Mun river basin, Lower Mekong river basin, Lower part of the plains	
in the Central Region, Yom river basin, Weru estuary and Kung	
Kraben Bay	20.00
• Survey the status of peatlands and fresh water swamps	5.00
Review the status of wetlands nationwide	30.00
• Study the impact of climate change on wetlands ecosystem,	
particularly on birds population and nesting behavior	25.00
• Conduct a study on the population and the distribution of large water	
fowls to generate information for design appropriate protection	
measures	3.00
• Survey and develop a database of swamps, peatlands that are of local	
importance	50.00
• monitor the conditions of wetlands of local importance for purpose of	
defining clear boundaries of wetlands that are of local importance	100.00
• 2.3.2.4 Coordinate the efforts of NGOs and local communities to	
reduce rate of loss of wetland areas	
Organize workshops	2.50
Undertake conservation and restoration measures	50.00

Table 5: Plans, Activities related to wetlands in the NBSAP 2017-2021 Action Plan

Plans and Activities	Budget (Million Baht)
Sustainable management of wetlands to support the tourism sector	2.00
Formulation of management plans for wetlands of international importance	4.00
Formulation Community Master Plan for the restoration of Nong Han	1.00
wetland	
Review the Cabinet Decision of 2009 on the registry of wetlands of	1.50
international and national importance as well conservation measures	
Analyse the effectiveness in management of RAMSAR sites as required by	5.00
COP 12	
Develop a Guideline for protection, conservation and wise use of wetlands	2.00
Develop a Guideline for protection and restoration of wetlands	1.00
Develop a Guideline of standard practices for the management of RAMSAR	0.50
sites	
Organize a workshop for purpose of exchanging experiences and insights of	0.50
concerned agencies	
Improve capacity for protection and control of harmful activities.	20.00
Propose additional RAMSAR sites	2.00
Monitor the status of RAMSAR sites	5.00
Reduce the use of chemicals from agricultural production in areas near and	4.00
around Nong Han	
Conduct surveys to identify invasive species in inland water resources	1.00
Conduct research on the potential to use invasive plant species as materials	3.00
for developing renewable energy or as material for soil improvement	

Conduct research to develop and promote technology that use invasive plant species as materials for developing renewable energy or as material for soil	15.00
improvement	
Conduct research on producing renewable energy from invasive plant	20.00
species found in wetlands as materials for developing renewable energy or	
as material for soil improvement	
Conduct researches on diversity and benefits of insects in Kung Krachao	12.50
wetlands, Samut Prakarn province	

4. Legal Framework and Institutional Structure for Management of Wetlands

4.1 Legal Framework Related to Wetlands

To identify the key actors and institutions therefore and to simplify the issue somewhat, is to start by listing the laws that are relevant to various dimensions of wetlands and then look at the agencies that are responsible for implementing those laws. In Table 6 below, these are pieces of legislation that is related to flora and fauna, fishing, water resources, irrigation, navigation.

Table 6: Legal provisions and regulations related to wetlands.

The Law	Details related to wetland	Responsible agencies
The National Park Act, 1961	Within the National Parks, Section 16 prohibits any actions that might result in changes or alterations of water	Department of National Park, Wildlife and Plants
	swamps, creeks). This also applies to obstruction of water flows, changes or diversion of water channels.	
The National Forest Reserve Act, 1963	Within National Forest Reserve, Section 14 of the Act occupation of land for production purposes, for establishing residents are prohibited. This means that cutting trees, burning and collecting non-timber forest products is not allowed	Royal Forestry Department
	Similarly any actions that result in the	
	obstruction of water flows, changes or diversion of water channels.	
Fisheries Act 1947 amended in 1985	Various sections in this Act provides protection for protection of aquatic species in wetlands, e.g. designating certain zones as fish sanctuary and therefore prohibits all fishing activities, fish farming, building fish traps or fish ponds. Where fishing is permitted, there are also prohibitions against discharging wastewater, contaminants, toxic substances. Uses of any substance in fishing that may cause pollution or toxicity is also restricted (except where this is for	Department of Fisheries

	scientific research purpose and have	
	agencies	
Environmental Quality	Authorizes the National Environment	Pollution Control
Promotion Act 1992	Board to set environmental standards	Department
	which also applies to how land is used	Department
	in wetlands	
	The Minister has the power to specify	
	types and size of projects of both	
	public or private sectors that may have	
	environmental impacts and therefore	
	must conduct EIA. This also applies to	
	projects that might have impacts on	
	wetlands	
	Section 35 of the Act stipulates that an	
	Environmental Quality Management	
	Plan (which also covers wetlands)	
	Under Section 43 and Section 44, the	
	Minister has the power to issue	
	Ministerial Orders to protect any areas	
	of ecological importance which may	
	be adversely impacted or risks being	
	impacted by any human induced	
	actions.	
	Section 69 stipulates that the Minister	
	has the power to identify types of	
	sources of pollution that must be	
	monitored on discharge of wastewater	
	into natural water sources	

In addition to the above, there are also other pieces of legislation which can have direct bearing on wetlands. These include Town Planning Act 1975, Building Control Act 1979, The Wildlife Preservation and Protection Act, 1992, Tambon Council and Tambon Administration Organization Act 1994, Provincial Administration Act 1997, Royal Irrigation Act 1942, Royal Decree Prohibiting the import of aquatic species, The Navigation in Thai Waters Act 1913.

4.2 Institutional Structure for Management of Wetlands

Like coastal and marine and terrestrial forestry resources, there does not seem to be a lead agency. This maybe partly because wetlands can be located in areas already under the responsibilities of other agencies. The other observation is that there is no clear boundary of the wetland itself. Consider the Tha Chin river basin as an example, the length of the river is over 300 kilometers, the basin covers 5 provinces with a whole range of economic activities. In the following Table 7, these agencies and their mandates are summarized.

8		
Agency	Authority and Mandates	
Office of Natural Environmental	National contact point for RAMSAR	
Policy and Planning	• Responsible for formulating policies and plans fo	
	conservation and management of wetlands as well	
	as coordinate with concerned agencies to ensure	
	that plans are implemented	

Table 7: Agencies that have mandates relevant to wetlands

	• As stipulated by Sections 46 and 51 of the Environmental Quality Promotion Act, ONEP is responsible for reviewing EIAs of any
	• projects that might have adverse environmental impacts on wetlands of international and national importance. This include projects of both public and private sectors.
Department of Fisheries	 Manage and conserve aquatic resources in wetland areas which are fish habitats Engage in conservation and management of fishery resources to ensure sustainable use over the long run
Department of National Park, Wildlife and Plants	• Protect and conserve natural resources in wetlands that are located in various categories of Protected Areas under their jurisdiction. This include which include mangroves, peatlands, swamps, canals, waterfalls
Royal Forestry Department	• Manage all types of wetlands in areas under their jurisdiction which include mangroves, peatlands, swamps, canals, waterfalls
Royal Irrigation Department	Manage water resources for irrigation purposes which may involve building dams, dykes, weirs, changing water channels for draining and transportation purposes.
Department of Harbour	Protect water resources including wetlands which are part of the transportation network such as rivers and canals
Pollution Control Department	Set standard, measures as well as formulate plans and action plans to control pollution at source so as to maintain the water quality in both inland and coastal water source. The PCD is also responsible for monitoring and control sources of pollution and has the power to issue Ministerial Orders and regulations when these are necessary to prevent and control pollution
Department of Environmental Quality Promotion	Create awareness of the importance of preserving the environmental quality which also include conservation and restoration of wetlands. The Department is also involved in developing educational curriculum as a channel for communicating understanding and create recognition of the importance of wetlands. The Department could also communicate such information through various media channels.
Department of Marine and Coastal Resources	Is responsible for conservation and restoration of coastal wetlands such as mangroves, sea grass, beach forests.

Table 7: Continued

Agency	Authority and Mandates
Department of Mineral Resources	As with the DWR, the mandates of this Department is not directly related to wetlands. However, in setting
	may well be located in wetlands), the actions
	undertaken to prevent adverse impacts can have positive effects by reducing potential harm to wetlands
Department of Water Resources	This Department is responsible for formulating policies and plans as well as identify measures a for management, conservation and restoration of water resources. It is also responsible for transferring technologies on water resources management to ensure sustainability of supply. This involve capacity building of local government units and water resources management network. Although the prime mandate of this department is to ensure stability of water supply and prevent water shortage crisis, actions undertaken do indirectly contribute to the protection and conservation of the wetlands.
Department of Lands	Is responsible for issuing title deeds which recognizes private property rights of land holders. The role of this department will only be relevant if there are claims of private ownership on wetlands or if any area of wetlands should be reclaimed for development.
Department of Local Administration	Is responsible for looking after communal lands or land belonging to the public domain which will include many wetland sites. The department has the authority to restrict or prohibit access to such public domains to protect plant varieties and aquatic species.
Tambon Administration Organization	Is responsible for looking water resources in area under their jurisdiction for multiple uses such as agriculture, water supply production, transportation and drainage. Note that the role is to protect wetlands for these purposes.
Bangkok Metropolitan Administration	Is responsible for inland water sources such as rivers, canal, lakes that are located in the metropolitan area.
Ministry of Education	Is responsible for developing an educational curriculum that will create basic understanding of the importance of conserving and restoring wetland ecosystems,

Conservation Measures	Responsible agency	Supporting Agency
1. Officially declare that	Ministry of Interior	Local Government Units
wetlands nationwide as		• Department of Fisheries
public domain to be		• Department of Lands
reserved for water storage		Royal Irrigation
and retention functions.		Department
		• Department of Water
		Resources
		• Department of Marine and
		Coastal Resources
		Office of National
		Environmental Policy and
		Planning
2. Survey and verify the	MONRE	Ministry of Education
boundaries of wetlands that		• Department of
have been registered as		Administration
wetlands of local importance		• Department of Local
approved by the Cabinet in		Administration (DOLA)
2000. The objective is to		
preserve its ecological		
service in water retention		
benefits (flood prevention)		
and supply of water during		
the dry season.		
3. Monitor the status of	Ministry of Interior	• Department of Harbour
registered wetlands of local		• Department of Lands
importance and undertake		• Department of Water
any necessary measures to		Resources
prevent encroachment.		• Office of National
		Environmental Policy and
		Planning
	MONDE	Educational institutions
4. Create awareness of the	MONRE	Educational institutions
importance of sustainable		• Department of Public
uses of wetlands and involve		Relations
stakenoiders participation in		• Department of Local
normulation of management		Administration (DOLA)
international and national		Ministry of Education
importance		Local Government Units
Importance		• Department of Water
# D	MONDE	Resources
5. Propose wetlands of	MONRE	• Department of National
international importance as		Park, Wildlife and Plants
KAMSAK sites		• Department of Fisheries
		• Department of Local
		Administration (DOLA)
		• Department of Interior
		Local Government Units
		• Department of Marine and
		Coastal Resources

Table 8: Summary of wetland conservation measures and responsible agencies

Conservation Measures	Responsible agency	٠	Supporting Agency
7. Expedite the issuance of documents declaring status of wetlands of international and national importance as public domains. Expedite the demarcation process to clearly define the boundaries of such as areas to prevent encroachment or any activities that might result in adverse environmental impact to the wetlands.	Ministry of Interior	•	Department of Local Administration (DOLA)
8. Restore ecosystems of wetlands of international and national importance that are degraded in order to ensure sustainability of ecological functions.	MONRE	• • • •	Department of Land Development Educational establishments Royal Thai Navy Department of Land Development Department of Local Administration (DOLA) Department of Water Resources
9. Formulate short and long term management plans of wetlands of international and national importance. This would involve zoning of wetlands into conservation and development zones as well as areas that will be designated as buffer zones. Within each zone, activities which are permitted or prohibited should be clearly stated.	MONRE	•	Department of Fisheries Department of Harbour Educational establishments Department of Land Development Department of Local Administration (DOLA) Department of Water Resources

Conservation Measures	Responsible agency	Supporting Agency
10. Conduct EIA for any development project that might adversely affect the ecosystems of of wetlands of international and national importance.	Various government agencies	 Office of National Environmental Policy and Planning Department of Fisheries Educational establishments
11. Study the ecosystems of wetlands of international and national importance and make the findings available to the general public on a regular basis.	MONRE	 Department of Environmental Quality Promotion Office of National Environmental Policy and Planning
12. Monitor changes in the ecosystems of wetlands of international and national importance by developing a set of indicators that can be used for this purpose.	MONRE	• Educational establishments
13. Conduct a routine survey of biodiversity resources as well as modify and update the registry of wetlands of international and national importance.	MONRE	Educational establishments
14. Control and prevent pollution from different sources such as residential areas and commercial areas as well as industries	Local Government Units	 Department of Public Works Educational establishments
 . 15. Control and prevent for wildfires in wetlands of international and national importance which will involve undertaking the following: 1. Controlling water levels 2. Creating wet-line firebreaks (according the concept of His Majesty the King 3. Take proactive outreach campaign to create an 	Local Government Units MONRE	• Educational establishments

Table 8: Continued

		•
understanding of the danger of fires to induce cooperation of local communities 4. Establish forest fire stations within the locality so that actions can be immediately undertaken in the event of fire. 5. Provide training for staff in the skills of firefighting and control 6. Provide adequate tools and		•
equipment needed to for forest		
16. Conduct studies for the purpose of formulate a physical development plan for wetlands of international and national importance which will involve landscaping as well as introducing short and long term measures for conservation and restoration.	Ministry of Interior	 Department of National Park, Wildlife and Plants Local Government Units Department of Lands Royal Irrigation Department Department of Marine and Coastal Resources
17. Prepare routine reports on the status of the above (1-16) to the	MONRE	Office of National Environmental Policy and
Sub-Committee for Wetlands Management		Planning
Source: ONEP	•	

5 Challenges and Opportunities in Management of Wetlands.

- 1) Outdated database. It seemed that the last time a nationwide survey of the wetlands was conducted dated back as far as 1996. Any surveys conducted since that time were mainly sites specific conducted either for the purpose of designating wetlands as RAMSAR sites, or sites of international and national importance.
- 2) Apart from the outdated data base is the lack of clear definition boundaries of what constitutes inland wetland ecosystems. At first glance, Table 2 contains information that is very positive with identification, classification and registration of wetlands according to their levels of importance. The first apprehension is what follows after registration. The second is some of the wetlands, particularly those of national and international importance covers a large area such as the whole river basins, some of which covers a number of provinces. Without clear boundaries, the efforts to officially declare them as being important, may have limited value.
- 3) The absence of a formal champion. This is related to the above observation over the large area coverage of a number of wetlands. Management of Thailand's wetland may somewhat resemble the 'Tragedy of the Commons' situation. When everyone is responsible, in practice no one is responsible. Based on information presented in Tables 5 and 6, it appears as though there are several pieces of legislation that related to utilization, conservation and restoration of wetlands. There are also a number of agencies. These agencies however, are only concerned with wetlands only if the issue is related to their own mandates. What is lacking is an agency that is looking at the big picture which can coordinate the efforts of all concerned agencies. Technically, as the national focal point for RAMSAR, the organization that is most appropriate for assuming this role is ONEP. The extent

to which ONEP can assume this role effectively however is perhaps constrained by fact that ONEP is primarily a planning agency and do not have any operating arms at the area level, neither does ONEP have the authority in the wetlands which are located within the jurisdiction of other agencies such as the DNP, the RFD, etc.

- 4) The impacts on wetland ecosystems from human intervention and from development projects is not always clearly understood by local communities, local government units and even by public agencies. The risk to the ecosystems in wetlands can be all the more greater if public agencies place priority to their prime mandates without recognizing the trade-offs that these actions would have on wetlands. Without thorough trade-off analysis, the harm done to wetlands by agencies such as the Royal Irrigation Department can be greater than the benefits to the agricultural sector and for flood control purposes.
- 5) What the above Table 5 suggests is that if carried out as planned, there will be management plans that cover wetlands of all levels of importance, from RAMSAR sites to wetlands of international importance, national importance to local importance. The question remains to what extent will these plans be merely printed documents and will not be implemented because there is no committed budget. There is also the tendency for these plans to be standalone documents which do not have any practical linkage to other sectoral plans or other area-based plans.
- 6) The policy gesture of declaring wetlands (particularly those of local importance) as public domains may well be novel, but executing this may well intensify existing land conflicts. There have been numerous cases where individuals and local communities have challenged the claims of the state over so-called public domains such as National Parks. Reaching a settlement over rights have proved to be challenging given the lack of evidence on the period of occupation, lack of clarity over the physical boundaries of protected areas. There is a high probability that these disputes will occur over wetlands if many of the above measures are to be carried out. Nevertheless, even if the outcome (reaching an agreement over land claims) is difficult to achieve, there is at least the key lessons learnt that the process must be participatory. In defining boundaries of wetlands, local communities must not be left out. They must be consulted over boundaries.
- 7) Finally, it must be said that at least there is already, a set of actions that are already planned. Indeed, the presence of the NBSAP could be the stimulant to push the delayed actions into movement along the desired directions.

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