In conjuction with Malaysia World Water Day 2010

Symposium on Harmonising Environmental Considerations with Sustainable Development Potential of River Basins
24th-26th March 2010
Prince Hotel & Resident Kuala Lumpur, Malaysia.

Developing A Strategy Plan for Lakes and Reservoir Management in Malaysia

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Presentation Outline

- Introduction/Background
- Resources within Lake and Reservoirs
- Lake Issues in Malaysia
- Lake Management Initiatives in Malaysia That Lead to Strategic Plan
- Strategic Direction

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INTRODUCTION/BACKGROUND

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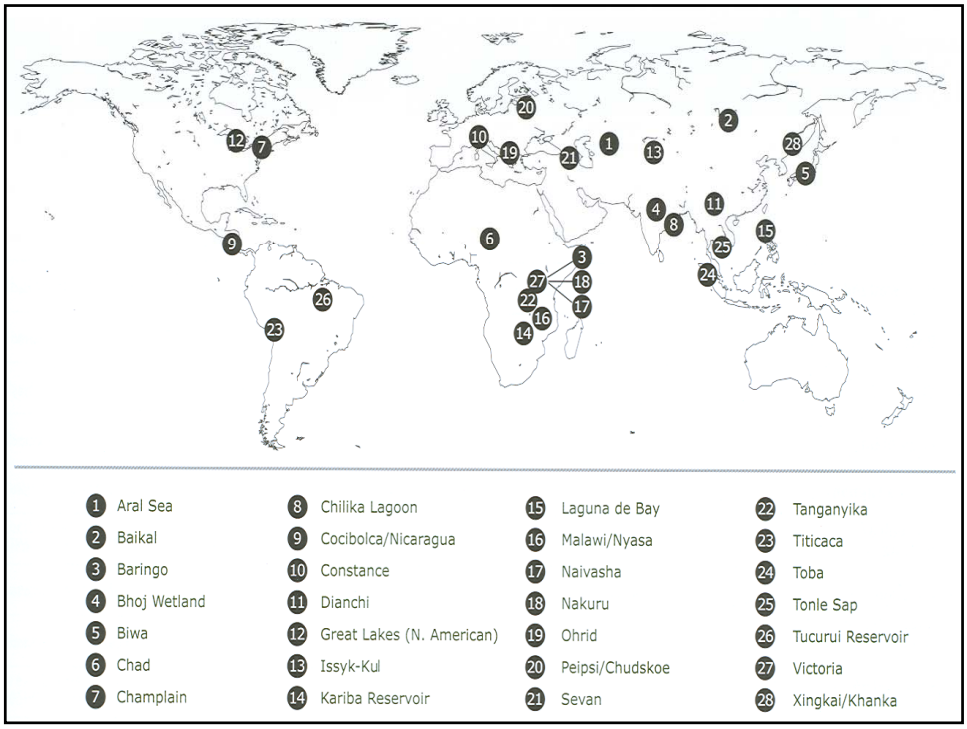
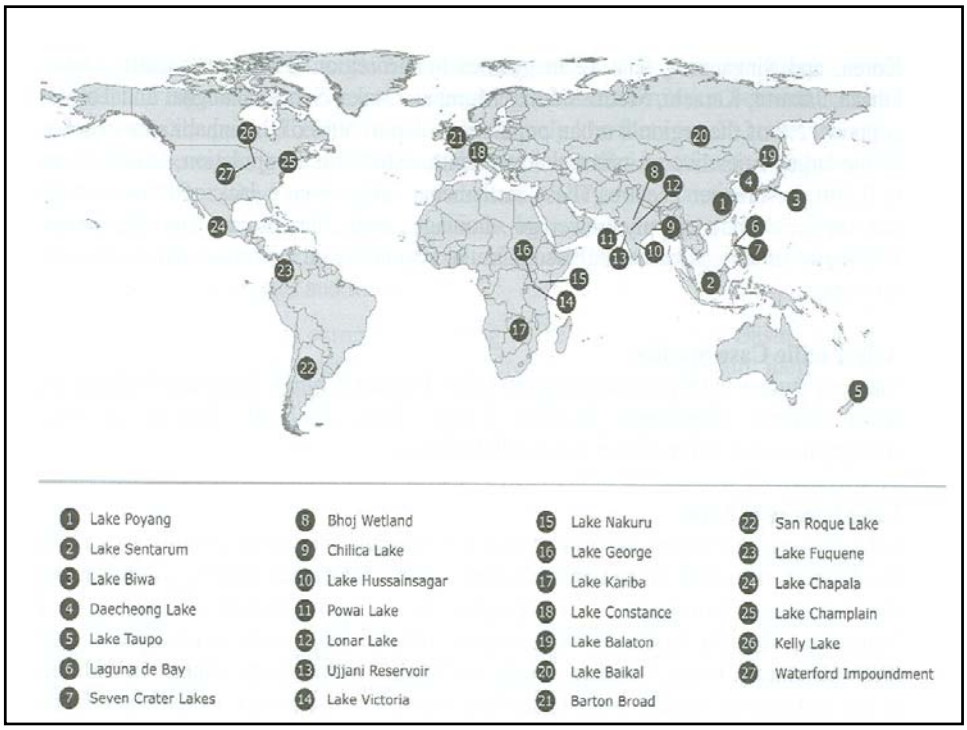

1 Aral Sea
2 Baikal
3 Baringo
4 Bhoj Wetland
5 Biwa
6 Chad
7 Champlain
8 Chilika Lagoon
9 Cocibolca/Nicaragua
10 Constance
11 Dianchi
12 Great Lakes (N. American)
13 Issyk-Kul
14 Kariba Reservoir
15 Laguna de Bay
16 Malawi/Nyasa
17 Naivasha
18 Nakuru
19 Ohrid
20 Peipsi/Chudskoe
21 Sevan
22 Tanganyika
23 Titicaca
24 Toba
25 Tonle Sap
26 Tucurui Reservoir
27 Victoria
28 Xingkai/Khanka


1 Lake Poyang
2 Lake Sentarum
3 Lake Biwa
4 Daecheong Lake
5 Lake Taupo
6 Laguna de Bay
7 Seven Crater Lakes
8 Bhoj Wetland
9 Chilica Lake
10 Lake Hussainsagar
11 Powai Lake
12 Lonar Lake
13 Ujjani Reservoir
14 Lake Victoria
15 Lake Nakuru
16 Lake George
17 Lake Kariba
18 Lake Constance
19 Lake Balaton
20 Lake Baikal
21 Barton Broad
22 San Roque Lake
23 Lake Fuquene
24 Lake Chapala
25 Lake Champlain
26 Kelly Lake
27 Waterford Impoundment

Lakes and reservoirs in Malaysia are **natural or man-made**.

Common uses of lakes in Malaysia are:

1) Domestic water supply;
2) Industrial;
3) Agricultural irrigation;
4) Hydroelectric power generation;
5) Urban Stromwater Control;
6) Navigation;
7) Recreation.
8) Eco-age Civilization/Green-city.

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RESOURCES WITHIN LAKE AND RESERVOIRS

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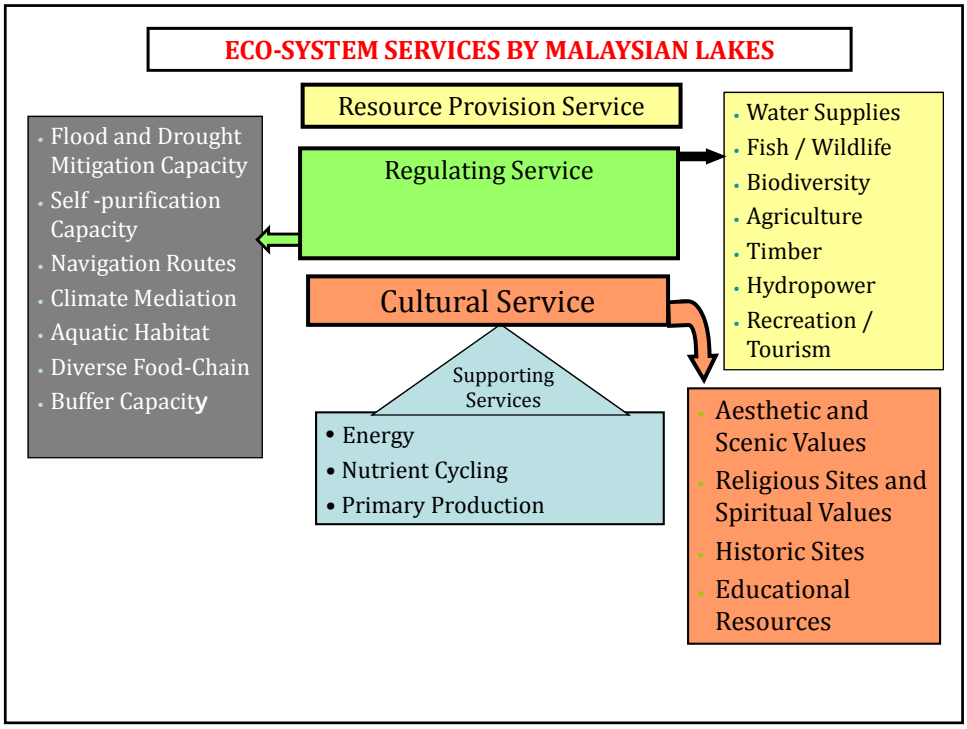
Inventory of Malaysia Lakes and Reservoirs

Bil	State	Nos	Area (km^2)	Volume Mm^3
1	Perlis	2	**13.3**	40
2	Kedah	7	**95.0**	1,637
3	Perak	11	**284.7**	6,766
4	Selangor	15	**11.4***	511
5	Pahang	10	**94.7**	355
6	Kelantan	4	**11.3**	77
7	Johor	13	**84.2**	940
8	Melaka	4	**8.8**	81.3
9	N Sembilan	5	**2.3**	182.3
10	P. Pinang	4	**0.9**	47.2
11	Terenggannu	2	**370.8**	13,600
12	Sarawak	4	**97.1**	6,080
13	Sabah	5	**1.8**	29.6
14	Labuan	3	**0.5**	5.4
15	Putrajaya	1	**7.5**	45
	Total	**90**	**1,095**	**30 400**

Lakes/ Reservoirs Types and Owners

Bil	Type of Lakes or Reservoirs	Nos	Owner / Manager
1	Natural Lakes	3 (4)	**State UPEN/ Perhilitan**
2	Irrigation /Agriculture Reservoirs /Water Resources	9	**DID/MOA/MADA**
3	Power supply Reservoirs	12	**TNB/ SEB**
4	Flood Mitigation/ Silt Retention Reservoirs	7	**DID**
5	Water Supply Reservoirs	47	**Water Supply Entities**
6	Urban Recreational lakes	13	**Local Authority**
	Total	**91 (92)**	

Compiled by NAHRIM - Not official



Values of Our Lakes and Reservoirs

Direct Values

- Domestic and Industrial Water Supply
- Transportation
- Fishing
- Recreation
- Breeding Ground
- Power Supply

Indirect values

- Flood Mitigation
- Local Climate Moderation
- Waste Sink

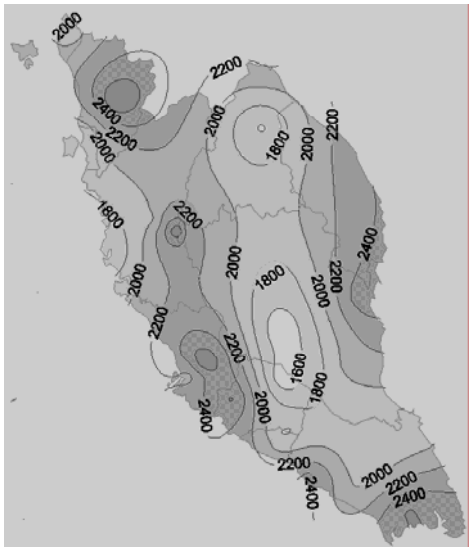
Option Values

- Biodiversity /Endemic Species

Non Use Values

- Legend and Myths
- Religious and Sacred

Average Rainfall of Peninsular Malaysia

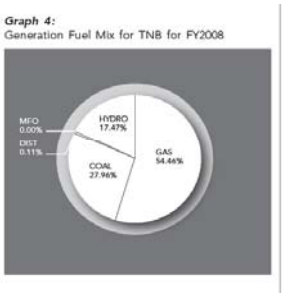


Values of Malaysia Lakes & Reservoirs

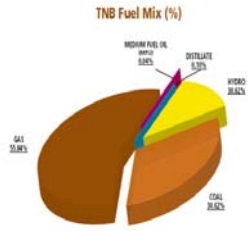
Flood Mitigation : 5.7 million population (20%) with an area about 29,800 km^2 (9%) affected by flood (DID)

Fisheries : Relatively small as compared to total aquaculture production in Malaysia - 70% brackish but offer great potential if propoerly managed (FOA) e.g. Batang Ai 2000 cages : 300 tonnes

Direct Values of Malaysia Lakes & Reservoirs



Hydroelectric : 3600MW – 6% of the power demand –potential commercial revenue generation RM35 million/day



Values of Malaysia Lakes & Reservoirs

Water Supply : about 75 % surface water are from reservoirs (most flood mitigation dams are also tapped for water supply)

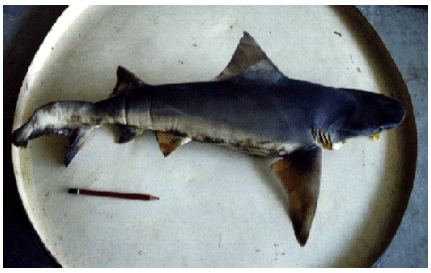
Irrigation : Major : Muda Irrigation Project & Kerian Sg. Manik Irrigation Scheme. Small schemes eg. Pontian : Total irrigation acreage 2450 km^2 with farm families : 138 000 nos

Hot spell drought and lake management

Paloh & Kluang, Johor are facing their worst water crisis

Values of Malaysia Lakes & Reservoirs

Biodiversity : Malaysia fresh water biodiversity exceeds 1000 species. Endemic to Malaysian lakes include False Ghairal, Kelisa Emas, Freshwater Shark etc.
Recreational : Kenyir, Urban lakes (Putrajaya & others)
Heritage and patrimony : Chini, Bera & Bunut



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LAKES ISSUES IN MALAYSIA

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Common Lakes Complexity

3 main characteristics which make lakes so unique:

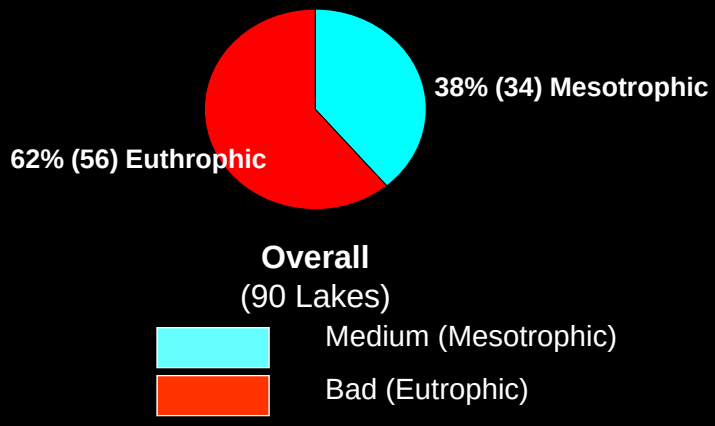
- Contiguous body of water
- Long water retention time
- Complex response dynamics

Eutrophication

- A process whereby water bodies, such as lakes receive *excess nutrients* that stimulate excessive plant growth (algae and nuisance plants weeds). This enhanced plant growth, often called an *algae bloom*
- It reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die.
- Water with a low concentration of dissolved oxygen is called *hypoxic.*

1. ASM/NAHRIM Study on Eutrophication of Lakes in Malaysia – 2005

Classification of Lakes Studied



Number of lakes & reservoirs in selected states and its eutrophication status

State	Nos	Eutrophic
WP. Putrajaya	1	0
Sabah	6	0
Sarawak	4	0
Kelantan	3	2
P.Pinang	4	1
Terengganu	2	2
Labuan	3	3
Perlis	2	2
Melaka	4	4
N. Sembilan	5	5
Kedah	7	5
Selangor	15	6
Johor	13	8
Pahang	10	8
Perak	11	10

Number of lakes & reservoirs and its eutrophication status

State	Nos	Eutrophic	%
Kedah	7	5	71
Perak	11	10	90
Selangor	15	6	40
Johor	13	8	61
Pahang	10	8	80
Kelantan	3	2	66
Terengganu	2	2	100
Melaka	4	4	100
N. Sembilan	5	5	100
P.Pinang	4	1	20
Perlis	2	2	100
Sabah	6	0	0
Sarawak	4	0	0
Labuan	3	3	100
WP. Putrajaya	1	0	0

Major Environmental Problems in Malaysian Lakes

- Eutrophication (aquatic plant infestation)
- Rapid siltation (plantation and land clearing)
- Pollution (urban lakes)

Main Issues in Lake Management

1. **Lack of** a national policy, associated legislation, appropriate action plans and guidelines on lake management and development, with an associated lack of enforcement,
2. **Unclear** roles and responsibilities among agencies currently undertaking different aspects of lakes management, leading to either overlaps or gaps in lake management, and stakeholder conflicts
3. **Lack of** awareness and commitment from public and politicians in part due to apathy, self-interest, and poor stakeholder participation,

Main Issues in Lake Management

4. **Lack of** relevant research and technical knowledge on lake management, insufficient critical mass of local expertise, and poor information exchange locally and international,
5. **Poor** data management of available data,
6. **Lack of** funds for lake management
7. **Lack of** thorough understanding of lake basin ecosystem
8. Limitation of legislation applying **Malaysia Waters Act 1920**. Applies to almost all States in Peninsular Malaysia except Selangor and Kedah.

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LAKE MANAGEMENT INITIATIVES IN MALAYSIA THAT LEADS TO STRATEGIC PLAN

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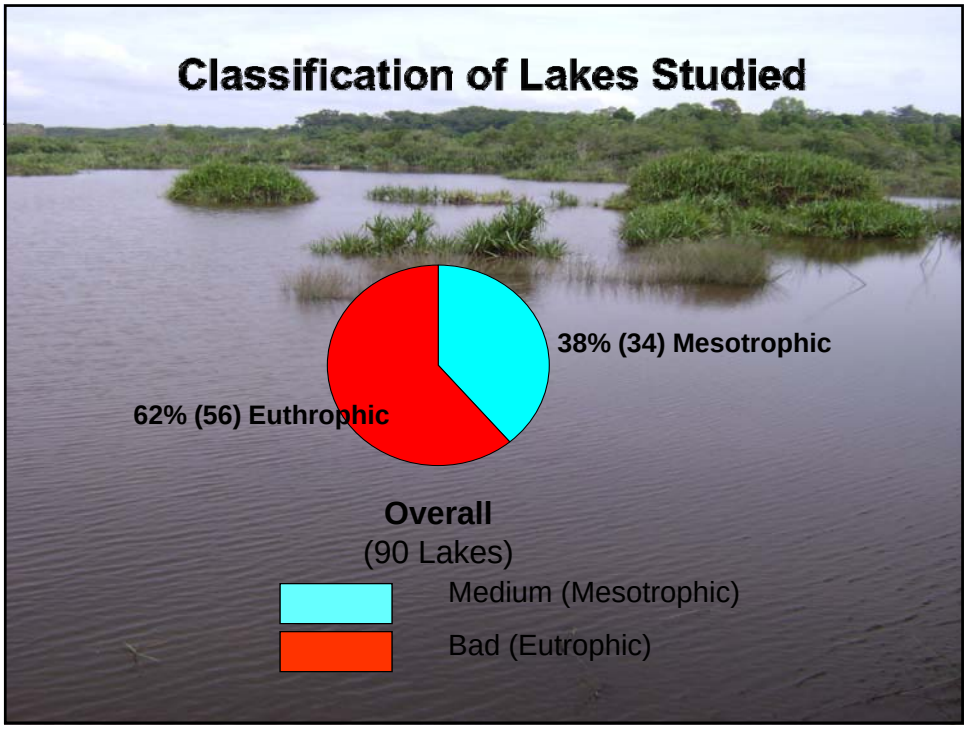
Lake Management Initiatives in Malaysia

1# Initiated by Academy of Sciences Malaysia under the **Inter-Academy Panels (IAP)** Global Water Programme in 2004. The impetus for this initiative was underscored by the deteriorating conditions of lakes & reservoirs worldwide and the crucial strategic and financial value of country's lake resources, holding 6 million cubic meters of water and supporting numerous economic, recreational and social functions

2#ASM & NAHRIM collaborated in the program and undertake a **Desktop Study on Lake Eutrophication in Malaysia** end 2004 . The study looked at the status of Eutrophication for 90 major lakes & reservoirs in Malaysia. 34 lakes (38%) mesotrophic & 56 lakes (62%) eutrophic



3# Colloquium on the Management of Lakes and Reservoirs in Malaysia

- Following the findings of the desktop study and in dealing with the issues affecting lakes and reservoirs .
- Held in **August 2007**
- 120 participants from the public and private sector including NGOs.
- 2 keynote addresses and 2 lead papers by 3 international experts from **Japan, Poland and Brazil.**
- **8 case studies** by lake managers and researchers from Malaysia focusing on lakes in Malaysia used for various purposes

- Panel Discussion by 6 nominated Discussants to discuss *The Way Forward* from the following perspectives:
  - **Governance**
  - Lake **Management**
  - Research Needs
  - **Stakeholder** Participation
  - Capacity Building, and
  - Lake **Information** Management.

- Colloquium Highlights and Outcomes
  - Varying **standards in lake management** – largely sectoral
  - **Networking Lesson Learned**: Good lessons and new knowledge to be learned from within and from overseas through closer cooperation/collaboration and effective networking especially with regard to the World Lake Vision and ILBM initiatives driven by ILEC
  - Need for a **National Plan for Integrated Lake** Management building on the momentum provided by the Colloquium.

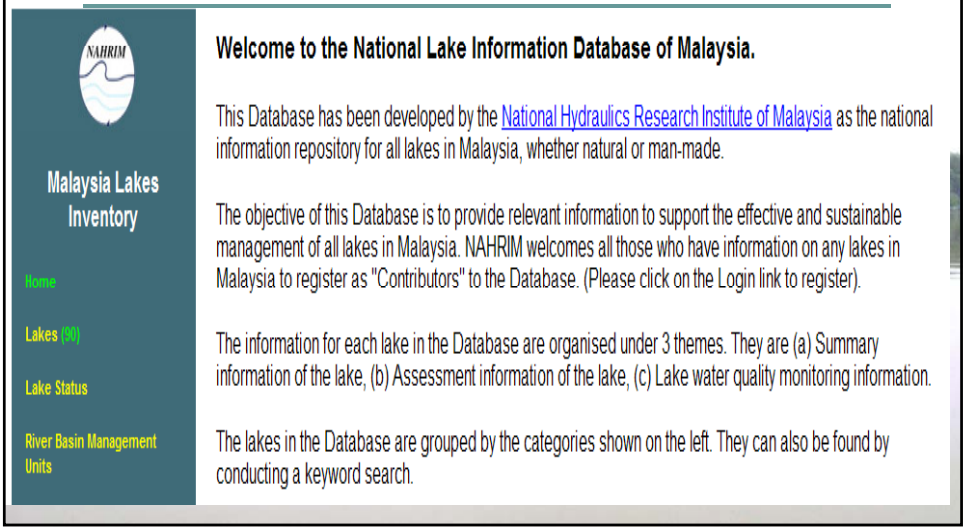
5# NAHRIM is pursuing three studies associated with lake and reservoirs management:

1. Study on the physical-biochemical processes in Lake Chini (2008 – 2010);
2. Lake Nutrien Responce Model (2006 – 2010);
3. Study on the impacts of minimum flow from dams – analyzing water quality trend downstream of Klang Gate dam (2008 – 2010)

Current Development on Lake Management in NAHRIM

6# NAHRIM has obtained the permission from the government to be a permanent member in ILEC since last year. Malaysia participated in ILEC Integrated Lake Basin Management Governance Meeting (March 2009)

7# To support the management of information of Lakes and Reservoirs, a National Lake Information Database in Malaysia was developed



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THE STRATEGY PLAN DEVELOPED IN MALAYSIA

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THE DIRECTION THRUSTS

1# Development of **National Vision** for Malaysia lakes.

2# Development of **Policy Framework** that reflect vision statement and takes into account management experiences of lakes.

3# Development of **Mission Statement** for lakes.

4# Development of **Strategic Frameworks** for the development and management of Malaysian lakes.

Development of National Vision for Malaysia Lakes

- The development of this vision would be the first step in engendering a common approach to lake management. Can be draw from **World Lake Vision** " ***Engender the sustainable use of lakes for their ecosystem services and economic value***

Development of **Policy framework** that reflect vision statement and takes into account management experiences of lakes

- Current lack of policy framework is a major shortcoming

- OPP3 called for National Water Policy, currently being formulated by the government.

- Proposed policy statement will be as follows : ***Lakes and Reservoirs will be sustained, restored and protected through the adoption of an Integrated Basin Management Approach***

Development of **Mission Statement** for Lakes

•Development of mission statement is important towards setting strategic goals.

•Current adopted national thrust of IWRM to be adopted since **ILBM is sub set to IWRM**.

Mission statement proposed:
"***To engender sound management practices of lakes through the adoption of IWRM principles and practices***"

ILBM = INSTITUTIONS

+PARTICIPATION

+ POLICIES

+ TECHNOLOGY

+ INFORMATION

+ FINANCE

Development of **Strategic Frameworks** for the development and management of Malaysian lakes

The Strategic frameworks to support policy and management of lake and reservoirs are as follows :-

Strategy 1 : Identify and Empower Lead **Ministry/ Agency**
Strategy 2 : Establish Lake **Resources Centre** under NRE
Strategy 3 : Establish a **Standing Committee** on lakes within the purview of National Water Resources Council
Strategy 4 : Establish Lake Management Committee at **State Level**
Strategy 5 : Development of a Detailed **Action Plan**
Strategy 6 : Support the role of **Local Community** in lake Management
Strategy 7 : Pass appropriate **Legislation** to strengthen legal Frameworks
Strategy 8 : Enhance **Networking** and strengthen strategic Alliance

Strategy 1 : Identify and Empower Lead Ministry/ Agency

- To identify suitable **dedicated ministry** to implement policy
- To identify associated implementing agency to garner resources and coordinates **implementation** of action plans
- To developed **capacities within existing agencies**.
- Management has to be **decentralized**.
- Role and **scope of jurisdiction** of existing managers to be retained.
- Must conform to ILBM Principles.

Strategy 2 : Establish Lake Resources Centre

- A **one stop agency** to play the role of centre for excellence for research on lake and lake management
- A **reference centre** with data and information repository system on lake resources
- To develop with all lake managers/ stakeholders an agenda for sustained **lake research**

Strategy 3 : Establish a Standing Committee on Lakes within the purview of National Water Resources Council

- This proposal takes into account that lakes comprise of one of the three source of water, the other two are **rivers and groundwater**.

Strategy 4 : Establish Lake Management Committee at State Level

- A political level committee that allows coordination between various agencies that are involved in the management of the lakes
- Main task to gazette lake and reservoirs and their buffers as ESA(Environmental Sensitive Area)s
- Development within the catchment must be approved by this committee
- To determine control and regulatory measures within lakes and its catchment
- Review of plans **from time to time**

Strategy 5 : Development of a Detailed Action Plan

- To utilize the generic action plan developed under the LFA exercise
- To work on the detailed action plan for the **respective lakes**

Strategy 6 : Support the role of Local Community in Lake Management

- To garner support on lake management from **public** and community stakeholder or Rakan Tasik as exemplified in Chini and Kelana Jaya

Strategy 7 : Pass appropriate Legislation to strengthen legal Frameworks

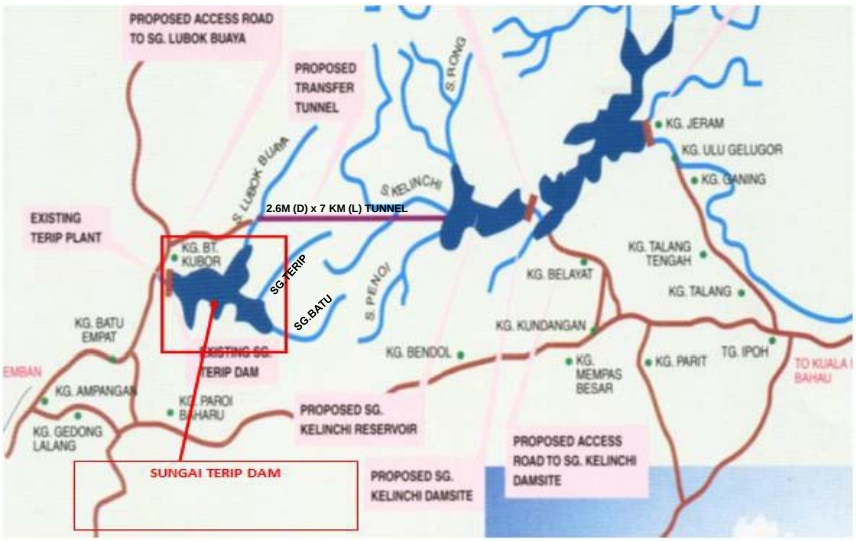
- To review **existing legislation** to capture lake management components.
- To entrust **current river catchment** management entities such as LUAS to look into lake catchment management requirements .
- To enact laws for lake management if needed

Strategy 8 : Enhance Networking and strengthen strategic Alliance

- To recognize that lakes in other places are facing **similar problems**
- **International and regional networking** is very important and crucial
- Malaysia can play major role at the regional level view in forging better understanding on lake and lake basin management

Trichogaster, Pectoralis

Arowana Malayan Gold Sanctuary


PROPOSED ACCESS ROAD TO SG. LUBOK BUAYA
PROPOSED TRANSFER TUNNEL
S. RONG
S. LUBOK BUAYA
S. KELINCHI
KG. JERAM
KG. ULU GELUGOR
KG. GANING
2.6M (D) x 7 KM (L) TUNNEL
EXISTING TERIP PLANT
KG. BT. KUBOR
SG.TERIP
SG.BATU
S. PENOH
KG. BELAYAT
KG. TALANG TENGAH
KG. TALANG
KG. BATU EMPAT
KG. KUNDANGAN
KG. BENDOL
KG. MEMPAS BESAR
KG. PARIT
TG. IPOH
TO KUALA BAHAU
EMBAN
KG. AMPANGAN
KG. PAROI BAHARU
KG. GEDONG LALANG
PROPOSED SG. KELINCHI RESERVOIR
PROPOSED ACCESS ROAD TO SG. KELINCHI DAMSITE
SUNGAI TERIP DAM
PROPOSED SG. KELINCHI DAMSITE

Tasik Dayang Bunting, Langkawi, Malaysia

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Thank You

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