River Restoration in Malaysia

Nov.06

RIVER RESTORATION IN MALAYSIA

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Director
River Division
Dept of Irrigation and Drainage Malaysia
9 November 2006

River Restoration in Malaysia

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Contents

- Rivers and its functions in Malaysia
- Issues and Problems
- River Restoration / River Management Efforts in Malaysia
- Conclusion

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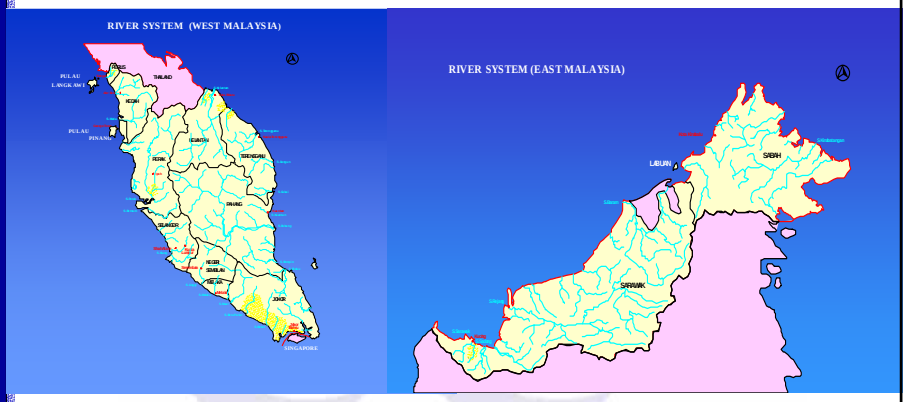
Malaysia is rich in rivers



- *Peninsular Malaysia = 89*
- *Sarawak = 22*
- *Sabah = 78*
- *Total = 189 (57,300 km length)*

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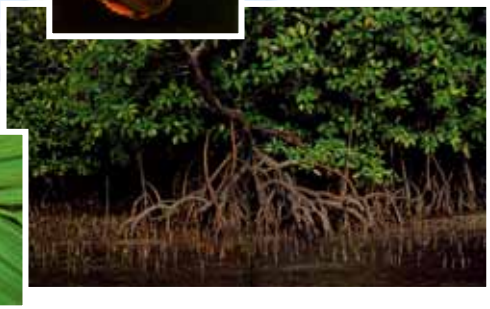
Floral



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Recreation

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Transport

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Source of Food and Income

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Religious Functions

Historical Function

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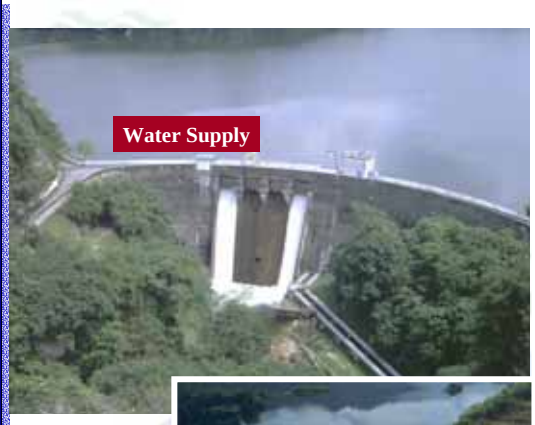
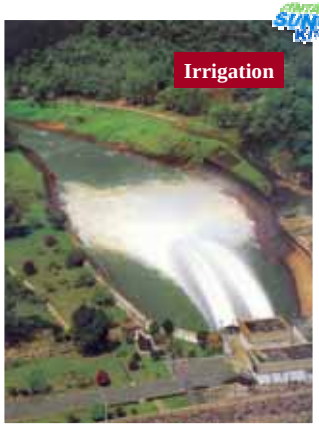
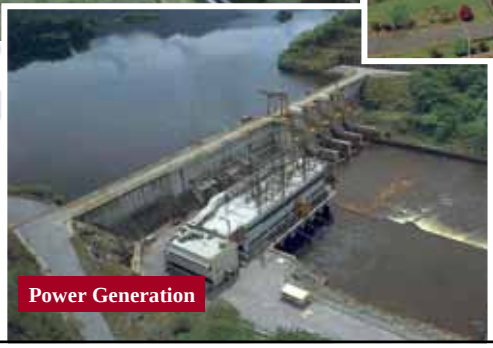


Water Supply



Irrigation



Power Generation

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RIVERS PROVIDE 97 % OF ALL THE WATER USED IN MALAYSIA

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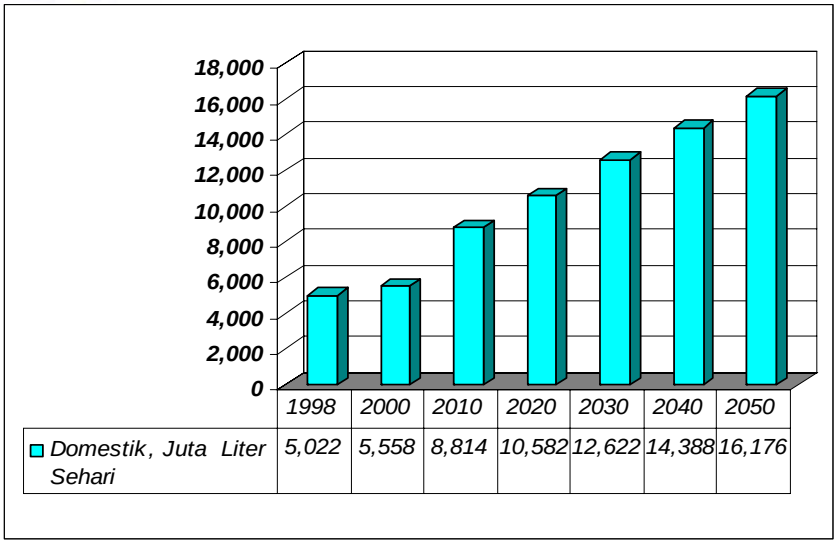
DEMAND FOR DOMESTIC WATER SUPPLY



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ISSUES & PROBLEMS

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Floods

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Drought

Senior citizens hard hit by water rationing

Dry spell can hit Kedah's 63,000 padi farmers soon

Planting season delayed by a month

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Sedimentation

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Rivers silting up

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Effect of siltation

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River Bank Erosion

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Water Quality Deterioration

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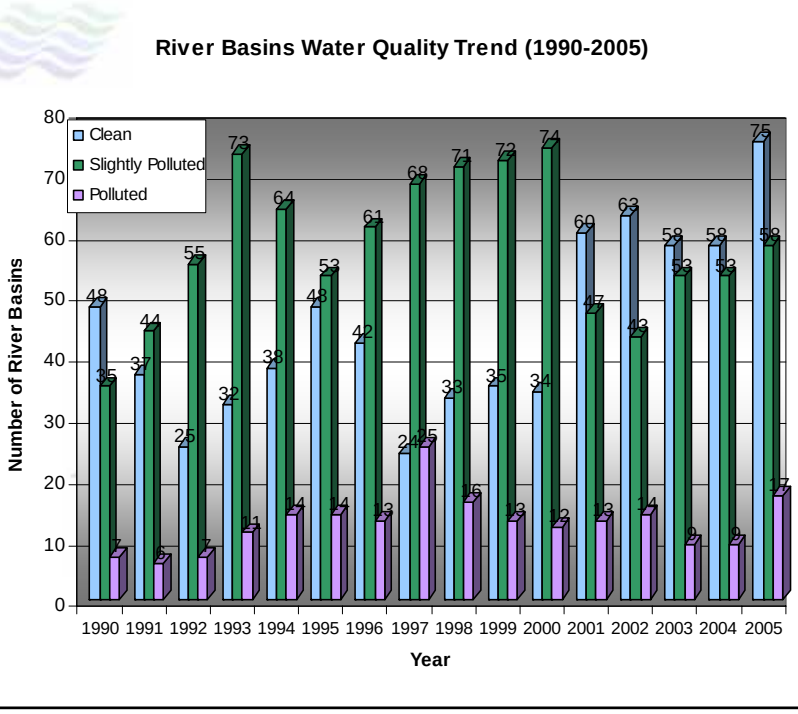

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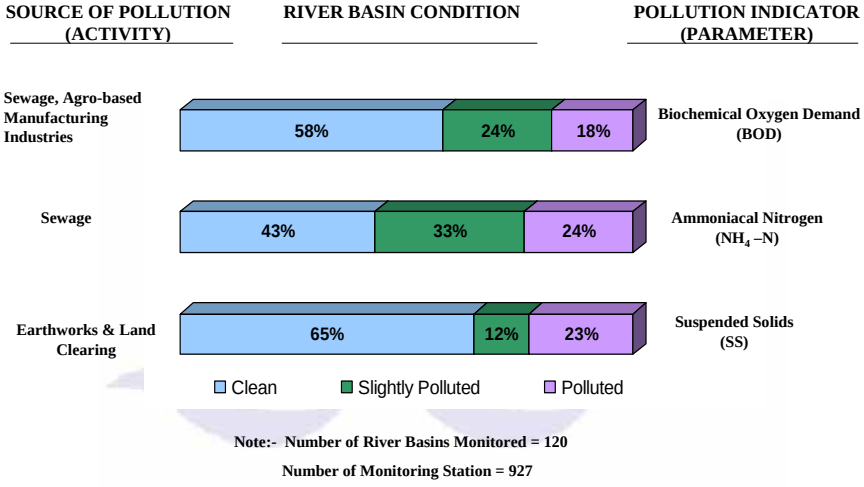
Status of River Basin Water Quality, 2002



Note:- Number of River Basins Monitored = 120

Number of Monitoring Station = 927

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Why is this happening?

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Logging

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Clearing of Land for Agriculture and Development

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Sand Mining

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Encroachment of River Reserves

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Squatters

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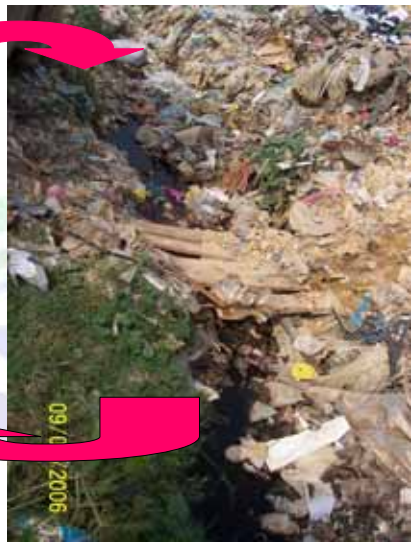
Landfills



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Direct Discharges into Rivers

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River Restoration in Malaysia

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2 City News

NEW STRAITS TIMES, MONDAY, MARCH 26, 2001

Urgent need for cleaner rivers

SOURCE OF LIFE... SK St John and SRJK (Tamil) Batu Caves students at the water treatment pond with Puncak Niaga staff in colourful costumes.

Pollution cited as one main cause of water supply disruptions

DISRUPTIONS of water supply can be avoided if there is greater effort by the public to preserve the cleanliness of waterways.

Puncak Niaga Sdn Bhd executive chairman Tan Sri Rozali Ismail said river pollution was one of the main reasons for water supply disruptions as treatment procedures had to be stopped until the affected water source was cleaned.

"The public must understand that sometimes it is their own doing which leads to water cuts."

He was speaking to reporters at Puncak Niaga's Open Day held in conjunction with World Water Day on March 22.

Also present was Works Minister Datuk Seri S. Samy Vellu, who officiated at the event held at the company's water treatment for public consumption," he said.

Due to the increasing level of river pollution, Rozali said Puncak Niaga had to deploy more staff to monitor the quality of the waterways, which is the source of its water supply.

Samy Vellu said the Klang Valley water crisis should serve as a reminder to consumers to value water and use it wisely.

"It is a lesson to be learnt ...our rivers and waterways are the source of the water which we have come to take for granted," he said.

In conjunction with the event, eight Puncak Niaga water treatment plants were opened to visits by the public until yesterday.

They were the Wangsa Maju, Ampang Intake, Sungai Selangor Phase

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NEW STRAITS TIMES — EARTH MATTERS — TUESDAY, JUNE 19, 2001 3

Time to manage our rivers better

A fresh approach is needed to arrest the damaging effects of development on river basins, but can it be done? asks IDROS ISMAIL.

> The longer remedial and preventive measures are delayed, the greater the environmental deterioration, the more costly the reparations.

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New Straits Times Life & Times

WEDNESDAY, JUNE 13, 2001

Back to nature

We should be so lucky as Taman Negara, a forest that is 130 million years old, is right in our backyard. As hundreds of visitors have discovered, exploring the national park is an adventure of a lifetime. ROSLI ZAKARIA writes.

COOL DIP ... Visitors can't resist the temptation of swimming at Lata Berkoh, but be warned that certain parts of the pool are 40m deep.

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Now want to "Bring Nature Back" to our Rivers

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CLEAN, LIVING & VIBRANT

River Restoration in Malaysia

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DEFINITION

River Restoration

Defined as :

"the return of a river ecosystem to a close approximation of its condition prior to disturbance"

The objective is to emulate a natural, self-regulating system that is integrated ecologically with the landscape in which it occurs

Ref : National Research Council (NRC) United States

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River Management

- Corrective Measures
- Curative Measures
- Preventive Measures

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River Management

- Corrective Measures
- Curative Measures
- Preventive Measures

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River Maitenance Works

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Riverbank Protection & Re-vegetation :
w/high river traffic @ Sg. Sarawak river mouth, Kuching

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Riverbank Protection :
River embankment protection w/flexible green system
Sg. Bentong, Pahang

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Trash booms constructed

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Workers removing rubbish dumped into rivers

In Klang Valley about 50 tons collected daily

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River clean-up program

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Landscaping of Rivers

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Major Rivers Identified For Rehabiitation / Restoration.

- Sg. Pinang, Penang (RM30 m.)
- Sg. Melaka, Malacca (RM160 m.)
- Sg. Tebrau, Sg. Skudai and Sg. Segget in Johor (RM 900 m.)

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SG MELAKA, Malacca

Before – July 2003

After – Nov 2004

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River Management

- Corrective Measures
- Curative Measures
- Preventive Measures

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Some Pilot Projects in Malaysia

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Use of Effective Micro-organism (EM) for Sg. Perlis (2006)



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25 April 2006

23 Jun 2006

100 mm

Substantial decrease of sludge after 58 days

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River Water Purification Experiment in Malaysia (2003-2005)

Infrastructure Development Institute - Japan
Nihon Suido Consultants Co., Ltd., Tokyo, Japan

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Location and Structure of the Experiment

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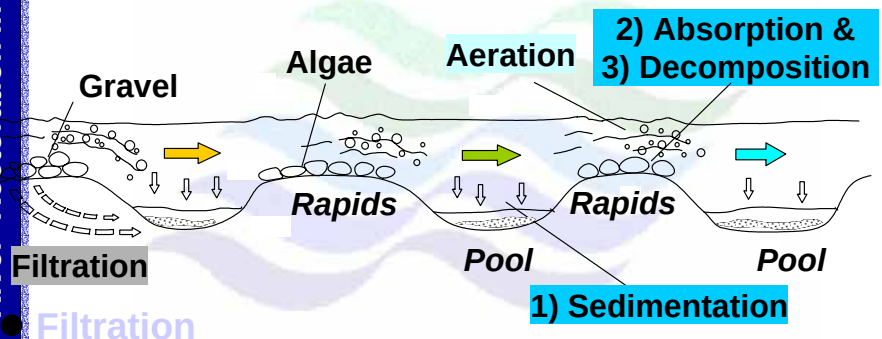
PURIFICATION FUNCTIONS OF THE GRAVEL CONTACT OXIDATION PROCESS

1. Self-purification Mechanisms of Rivers



- Filtration
- 1) Sedimentation
- 2) Biological Absorption & 3) Decomposition

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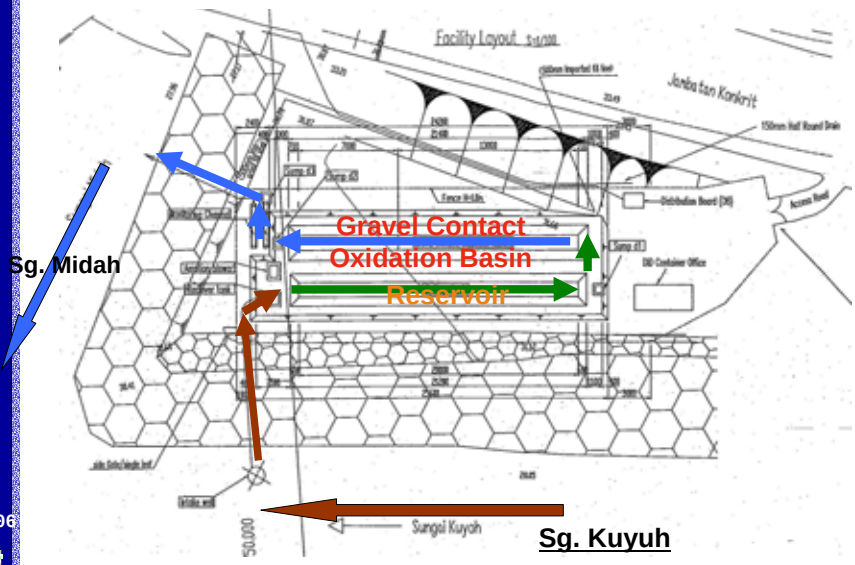
Facility Layout and Water Flow



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The Flow

Intake Pump

Inflow

Measuring Tank

120m³/day

Reservoir

Discharge

Monitoring Channels

Effluent
Purified water

Influent
Raw River Water

Gravel Contact Oxidation Basin

50-150mm

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Results of the Experiments - Water Quality of the Inflow Water

Parameter	Water Quality of Influent			Water Quality Standard
	Ave.	Min	Max	
NH_4-N(mg/l)	7.58	2.88	11.20	V
BOD(mg/l)	25.0	8.1	67.4	V
COD_{Cr}(mg/l)	82.8	34.0	186.0	IV
DO(mg/l)	3.7	0.68	6.0	III
pH	7.2	6.6	7.8	I
Conductivity(μS/m)	310	118	424	II
SS(mg/l)	322.9	21.0	1200.0	V

No.1 Heavily Polluted Influent

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Water Purification Effects (1st Monitoring)

Items		Sample Number	Influent (A)	Effluent from the reservoir (B)	Effluent (C)	Removal ratio (%) Whole facility [(A-C)/A]
Transparency	(cm)	12	6.6	8.3	38.5	—
SS	(mg/l)	12	283.3	109.3	8.5	97%
Turbidity	(NTU)	12	177.7	98.4	28.7	84%
BOD	(mg/l)	12	22.2	14.7	6.5	71%
D-BOD	(mg/l)	12	11.3	8.0	3.9	65%
DO	(mg/l)	12	3.5	3.1	4.8	—
NH_4-N	(mg/l)	4	6.08	5.97	0.54	91%
Fecal Coliform	(cfu/100ml)	4	3.9×104	3.5×104	1.0×103	97%

Good Purification Efficiency!!

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Pilot Project on Use of Activated Crystal Carbon, Tuang River, Malacca

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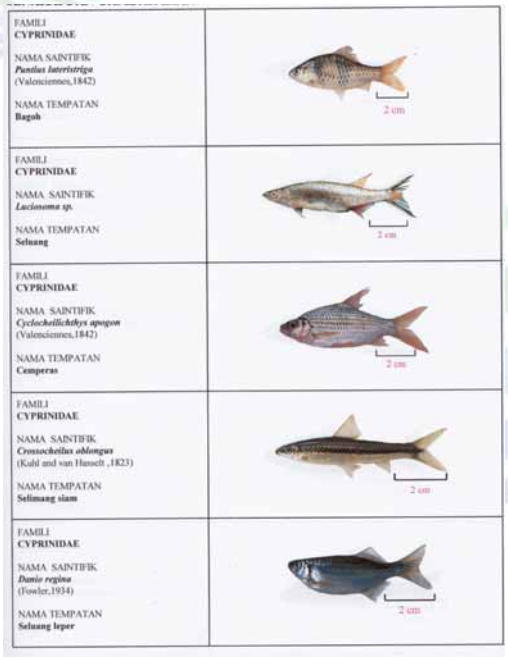

Restocking of Fishlife

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River Management

- Corrective Measures
- Curative Measures
- Preventive Measures

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Cintailah Sungai Kita

Love Our Rivers Campaign

Started in 1993

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River adoption program

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Public awareness and education

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Pelajar-pelajar dari salah sebuah sekolah yang terlibat sedang mengambil sampel air untuk dianalisis bagi menentukan tahap kualiti air sungai

'River Watch' program in schools

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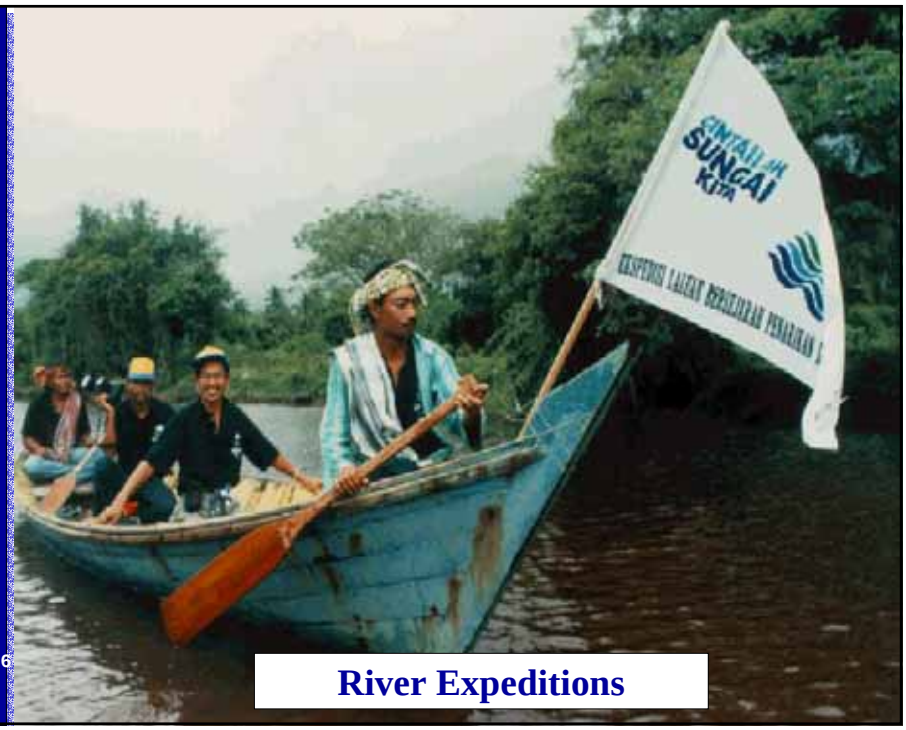

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River Expeditions

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Recreation facilities for Rivers

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Posters dan pamphlets

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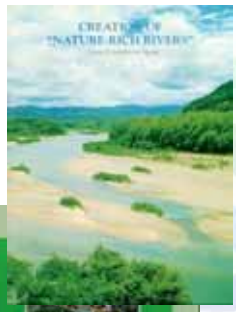
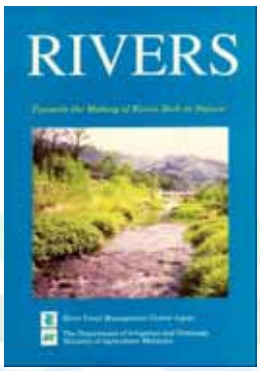
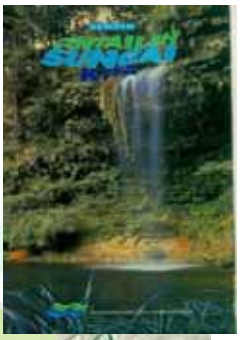
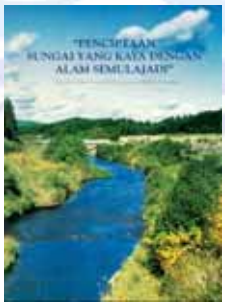
Manuals and Guidelines









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Other Measures

Implementation of zero contribution to peak discharges arising from development. (2001)

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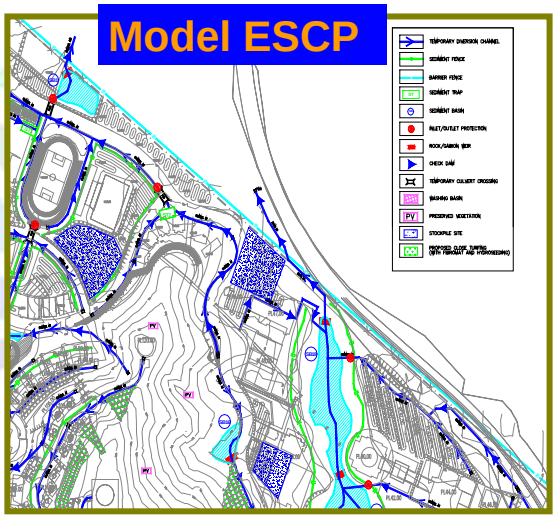
Other Measures

Mandatory Erosion and Sediment Control Plan (ESCP) for development projects.



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Other Measures

Installation of Food, Oil and Grease Trap for all food outlets.

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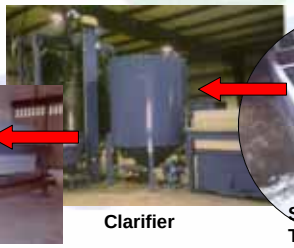

Batik Factory Discharge Treatment

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River Basin Master Plans provide overall framework for development in a river basin

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NEW STRAITS TIMES

NATI

Master plan for river basins

Monitoring land use for development

By Jaswinder Kaur
news@nstp.com.my

KINABATANGAN, Mon. — The Drainage and Irrigation Department will formulate a master plan on land use at 150 river basins in the country, its director-general Datuk Keizrul Abdullah said.

The master plan would become a basis for all local authorities to use as it was impossible for the department's enforcement officers to monitor the almost 12,000 rivers in the country.

He said a master plan was necessary as "every inch" of the country was part of a river basin and all ac-

About 40 people representing government agencies, non-governmental organisations, students and members of the media participated in the expedition which was organised by DID under the "Love Our River" campaign.

Keizrul said integrated plans would be made for major rivers like Sungai Klang and Sungai Langat in Selangor first, while in Sabah, the plan would be for Sungai Kinabatangan which, at 560km, is the longest river in the State.

He said the department aimed to rehabilitate rivers back to Class Three and then down to Class Two.

(Class One refers to pristine riv-

"DID sees rivers as a heritage we should care for. Rivers provide 98 per cent of our drinking water while the remaining two per cent is from underground water," Keizrul said.

"Rivers are also a source of protein in terms of fish, and provides recreation, economic income, ecotourism and transportation," he added.

Mannan, who represented Deputy Chief Minister Datuk Lajim Ukin, said the Government was committed in its efforts to keep rivers clean.

"In 1998, the State Government passed the Water Resources Enact-

National Water Resources Council at its meeting on 29 July 2003 agreed to the preparation of River Basin Master Plans

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Other Measures

- IRBM Plan for Sg. Kedah and Sg. Selangor in progress. (2002-2007).
- Blueprint for IRBM plan being prepared.
- Efforts being taken to convince State Governments to gazette river reserves.
- Efforts being taken to convince Federal Government to place rivers as concurrent list with the intention to finally draft a River Law to govern all activities in a river basin.

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Other Issues

Gaps in Knowledge Base

- **Insufficient evaluation on success of river restoration pilot projects**
- **Insufficient understanding of how key river management tools impact on rivers**
- **Insufficient understanding of the natural recovery processes of streams and rivers under monsoonal conditions**

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Summary

- River restoration possible with proper control and techniques
- Restoration can provide multiple benefits e.g. biodiversity enhancement, cleaner water, enhanced water storage, reduced flood risk
- Restoration more successful using eco-system approach within framework of IRBM

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Summary

- Protection and rehabilitation of forests and wetlands in river basin an important strategy for restoration
- Natural hydrological regimes and habitat diversity should be restored
- Weightage should be placed on scientific viewpoint, engineering knowledge and local experience in restoration projects

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Conclusion

- Rapid urbanisation and industrialisation → problems/issues relating to river and riverine environment expected to intensify
- For sustainable development, river basins need to be managed in an integrated and holistic manner (IRBM)
- A major component is River Restoration

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Conclusion

- River restoration needs involvement and commitment of all parties
- All stakeholders need to actively contribute resources (user and pollution pay principles) and work together to protect and restore river systems for the benefit of present and future generations
- Need to share experiences and co-operate with others

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Conclusion

- To build awareness and capacity at local, national and regional levels
- Regional River Restoration Network or Centre should be established to link activities, & document and share knowledge and experiences

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