



National Conference on Stormwater Management

1-4 Oktober 2019 | The Light Hotel, Penang

“Erosion and Sediment Control Approach”

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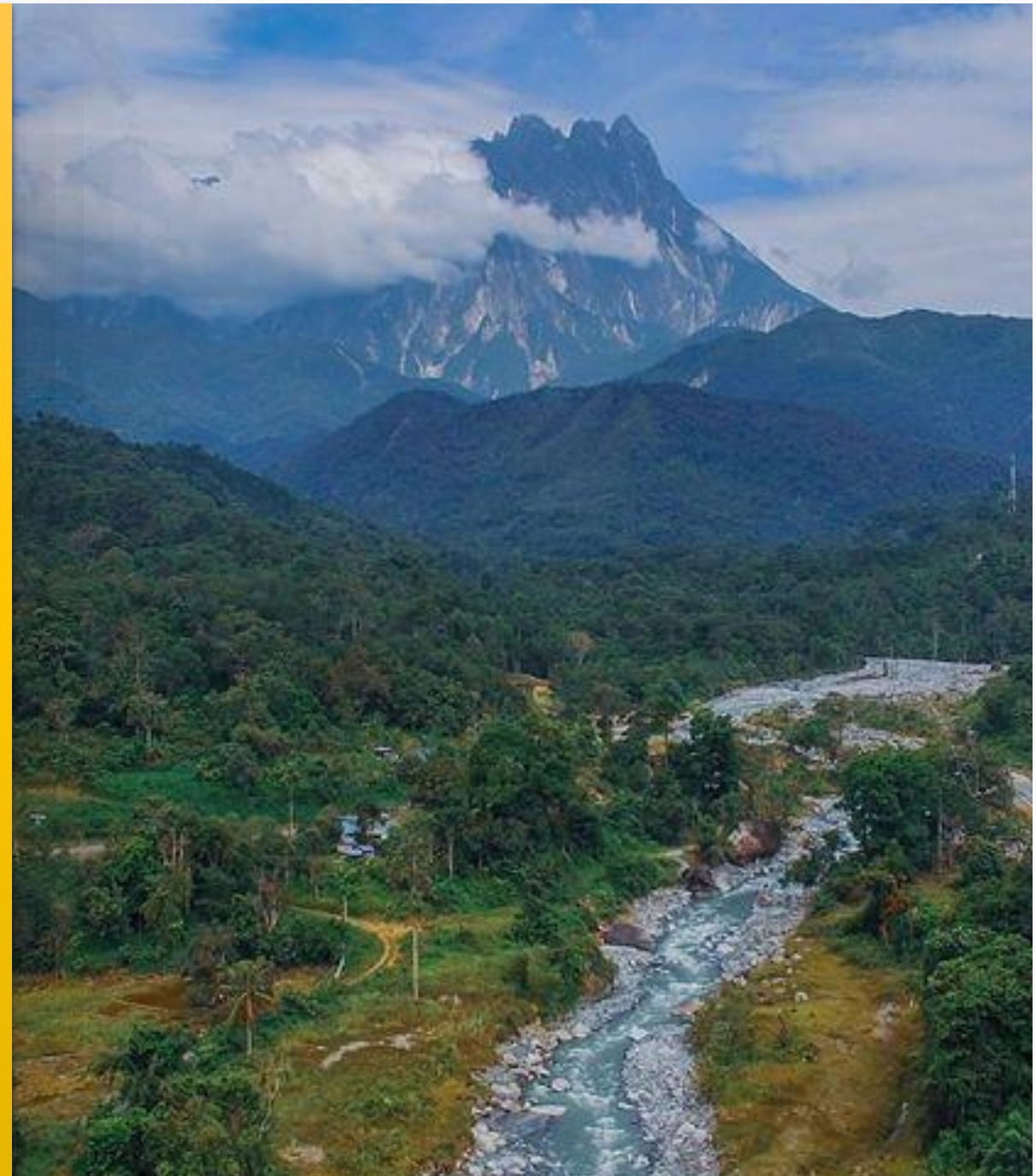
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Malaysia Water Scenario

Source : NWRS 2010-2050

Peninsular Malaysia

2496 mm

Precipitation
331 BCM

Evaporation
170 BCM

51%

Groundwater
20 BCM

6%

Surface Runoff
141 BCM

43%

Available for use
21 BCM

15%

13.7 BCM

Sarawak

3640 mm

Precipitation
453 BCM

Evaporation
156 BCM

34%

Groundwater
30 BCM

7%

Surface Runoff
268 BCM

59%

Available for use
40 BCM

15%

2.1 BCM

Sabah

2560 mm

Precipitation
189 BCM

Evaporation
88 BCM

47%

Groundwater
14 BCM

7%

Surface Runoff
87 BCM

46%

Available for use
13 BCM

15%

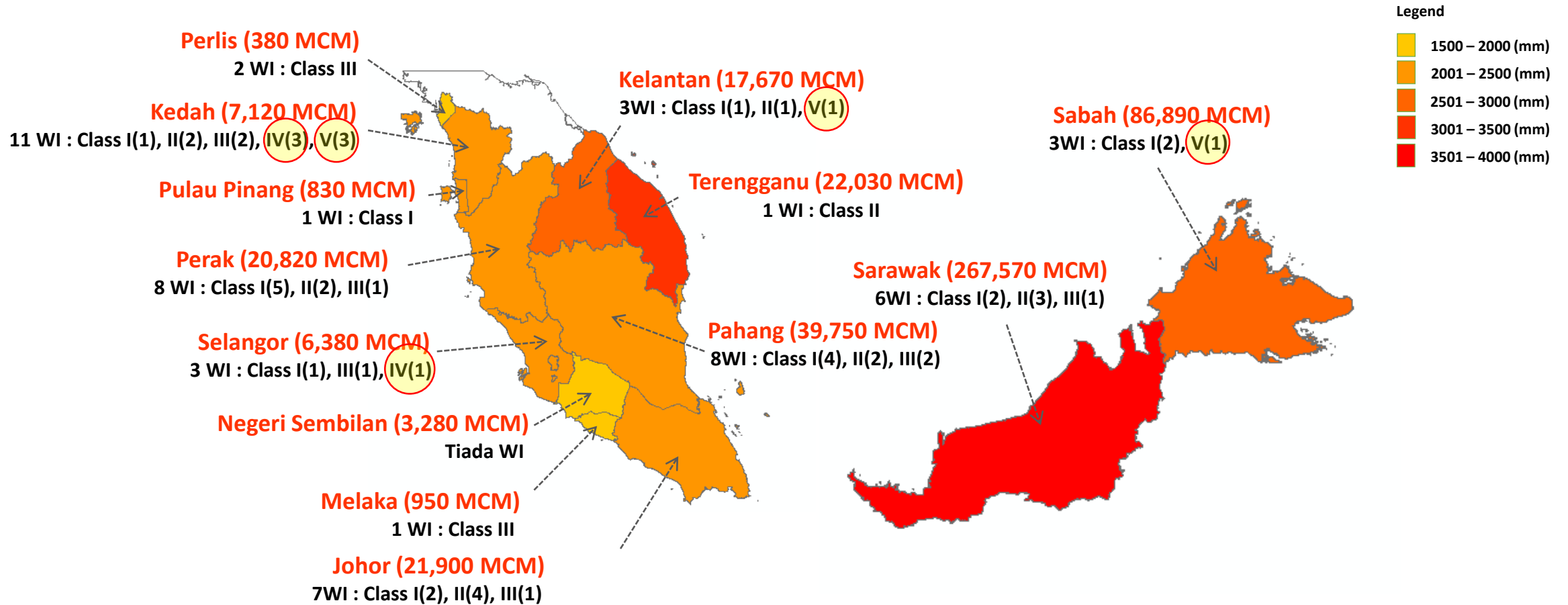
1.4 BCM

Total Surface
Runoff
495.71 BCM

Total Consumptive Water Demand in 2020

Malaysia Water Scenario

(Surface Runoff vs Water Intake(WI) & Suspended Solid Class)



Parameter	Class I	Class II	Class III	Class IV	Class V
Total Suspended Solid (mg/L)	<25	25-50	50-150	150-300	>300

Note : Surface Runoff refer to National Water Resources Study (NWRS 2010 – 2050)

Malaysia River Quality (SS)

296  245
2016 2017

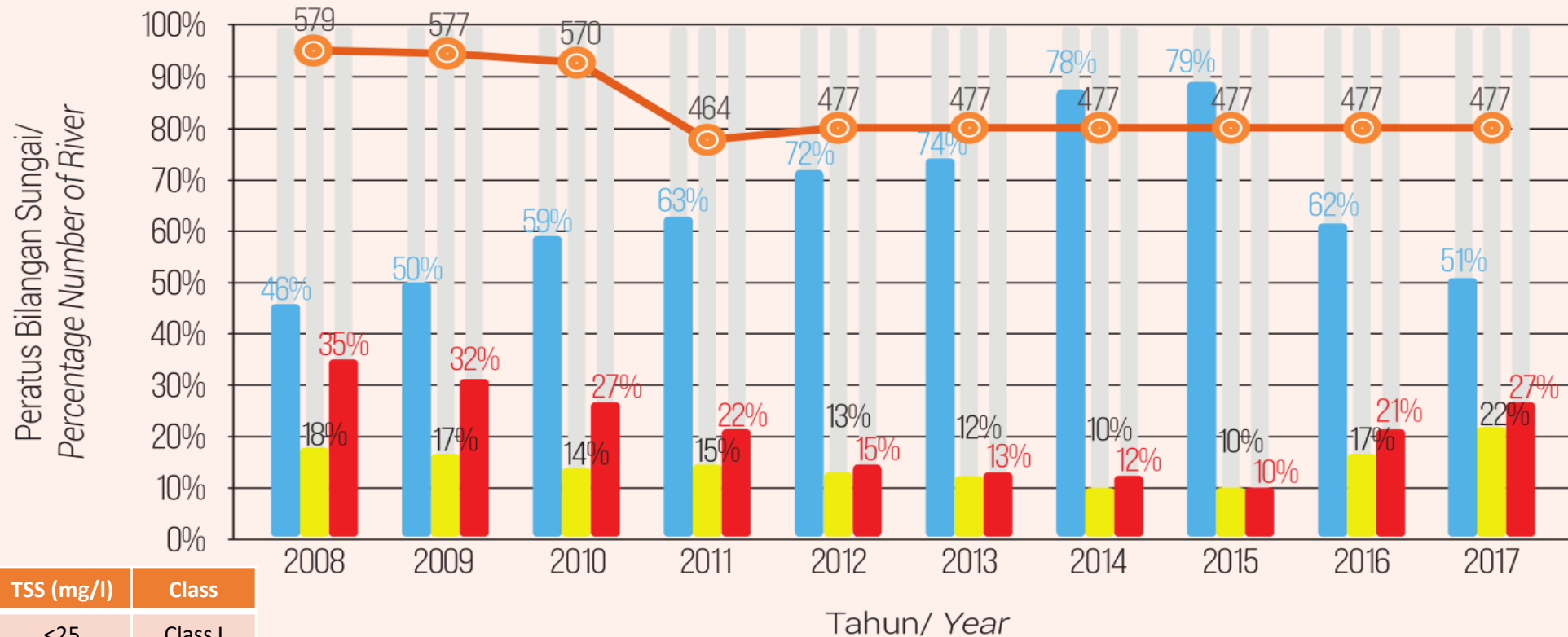
Clean River

82  105
2016 2017

Slightly Polluted River

99  127
2016 2017

Polluted River



TSS (mg/l)	Class
<25	Class I
25-50	Class II
50-150	Class III
150-300	Class IV
>300	Class V

■ BERSIH/ CLEAN ■ TERCEMAR/ POLLUTED
■ SEDERHANA TERCEMAR/ SLIGHTLY POLLUTED  JUMLAH SUNGAI/ TOTAL NUMBER OF RIVER

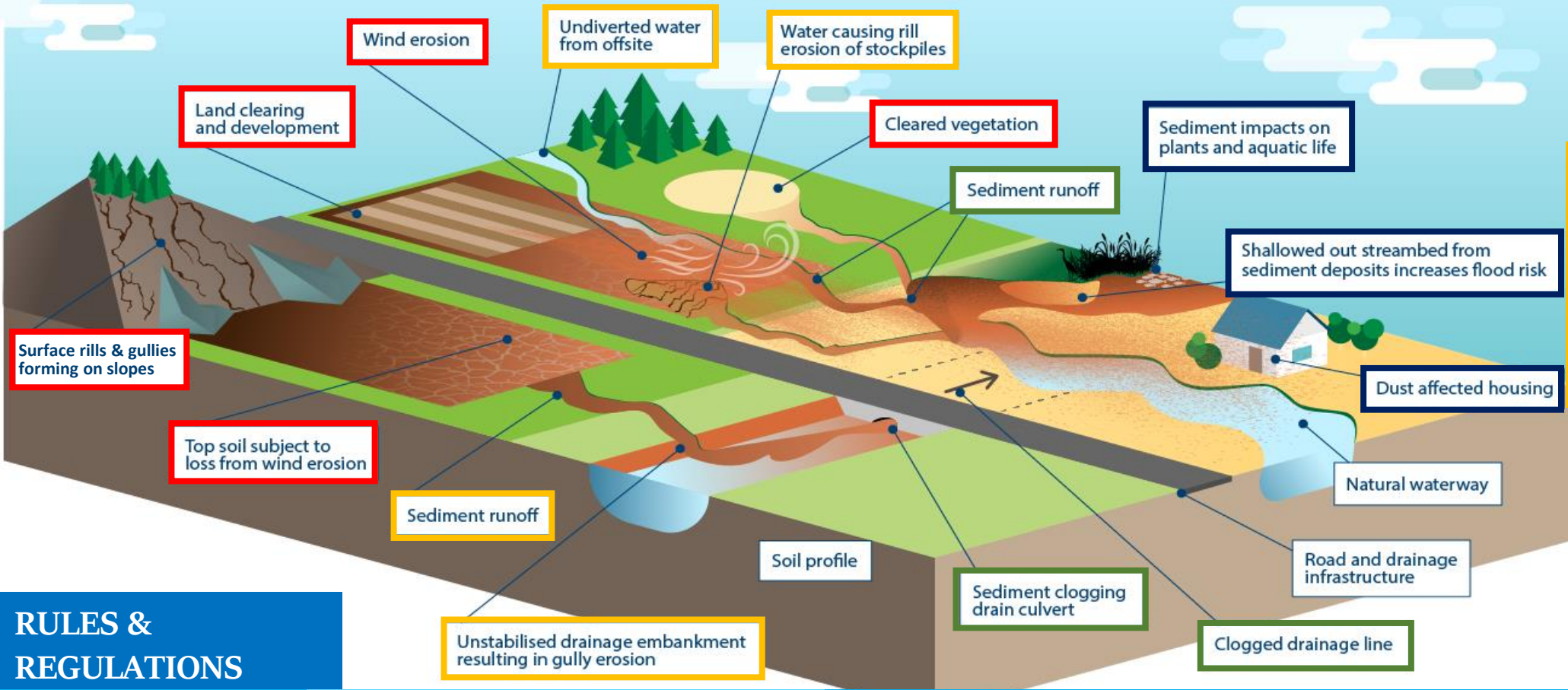
River Water Quality Trend Based on SS Sub-Index (2008-2017)

“The deteriorations in river water quality due to the suspended solids pollution by **inefficient control** against **improper earthworks** and **land clearing activities** in certain areas”

ESCP IN MALAYSIA

A **plan** that details **temporary measures** that will be implemented during the construction phase and may include permanent measures that will remain in place once development is complete to **control** the **environmental impacts of erosion and sedimentation**.

<https://www.epa.vic.gov.au/business-and-industry/guidelines/erosion-and-sedimentation-impacts-guidance>



3 TYPE OF BMP's Erosion Prevention

Emphasize on ground covers (vegetation, riprap, mulch, and blankets) that prevent any of the types of erosion from occurring

Runoff Management Control

Prevent further erosion in flowing water. Diversions, check dams, slope drains and storm drain protection are used to trap the sediment and avoid rill and gully erosion from starting

Sediment Control

Prevent soil particles that are already being carried in storm waters from leaving the site and entering streams or rivers

RULES & REGULATIONS

Project < 1 ha
Best Management Practices Plan & Encouraged to submit ESCP

Project 1-50 ha
Submit ESCP Plan Monitored by OPS Lumpur Task Force (DID & Local Authority)
Enforcement by Local Government using Local Authorities Act

Project >50 ha
Submit EIA (incl. ESCP) Monitored by DOE by DOE Enforcement Officers

Project >50 ha
Submit EIA (incl. ESCP) Monitored by DID through DOE-DID Enforcement
Enforcement by DOE using Environmental Quality Act 1974

STATUTORY CONTROLS SUBJECT TO ESC

- Hill Land
- Forestry
- Mining
- Quarries
- River & Stream
- Town Planning
- Fisheries

Impact of Poor Erosion & Sediment Control

Erosion Control



Dust Pollution



Severe Erosion



Land slide

Runoff & Sediment Control



Mud Flood



Waterways Pollution



Sedimentation reduce river capacity

BARRIERS IN ESC IMPLEMENTATION

River Pollution & Mud Flood

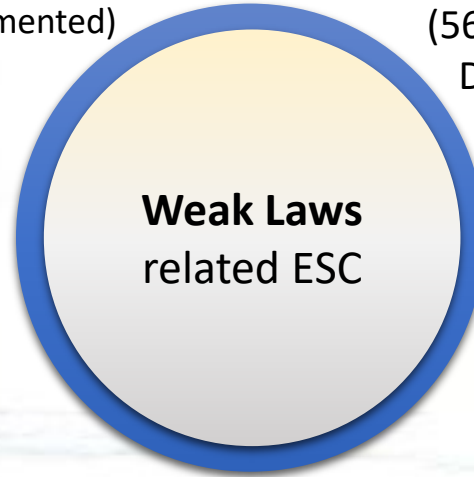
(27% of monitored river is polluted by suspended solids)



Poor Enforcement
on ESC

ESCP not mandatory

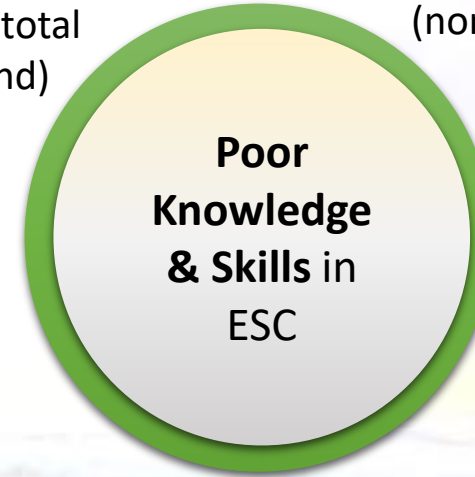
on project < 1 ha
(not implemented)



Weak Laws
related ESC

High Agriculture

Water Usage
(56% of total Demand)



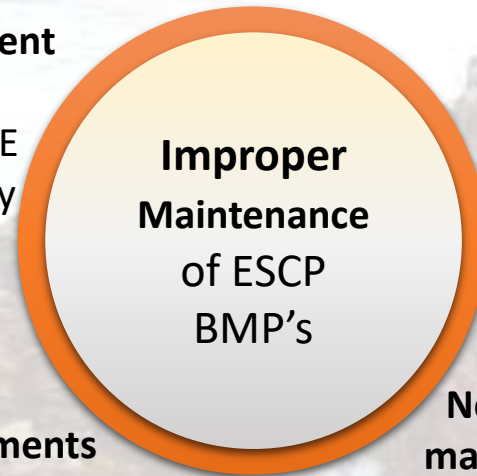
Poor Knowledge & Skills
in ESC

Poor Design, Implementation & Audit

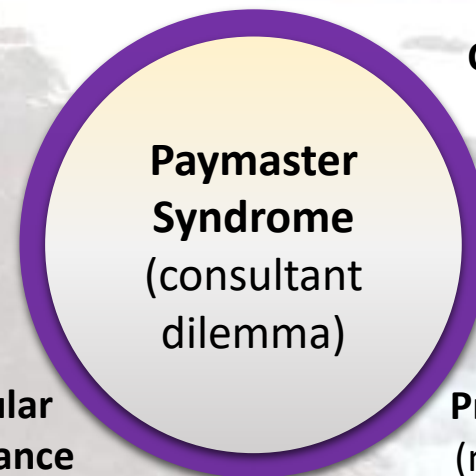
(non-compliance to MSMA / ESCP)

Multiple Enforcement Authorities

- EIA project by DOE
- Non EIA project by local government



Improper Maintenance
of ESCP
BMP's



Paymaster Syndrome
(consultant dilemma)

Cost Limited Design

(non-compliance to MSMA / ESCP)

Profit based Design

(non-compliance to MSMA / ESCP)

Maintenance practices contrary to ESC requirements
(hill turfing, grass cutting, soil exposure & use of coagulants)

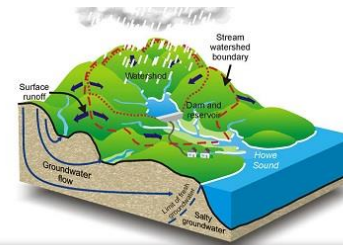
No regular maintenance
(inspect within 48 hours after >15mm rainfall)

ENABLERS OF ESC

State Government is responsible for **water, rivers**, land, and forest including gazetting the water catchment areas and control of development in the states



State Government **control** and **regulate** on the ground pertaining to IWRM, while Federal Government promoting legislations uniformity, providing financial support, technical advice and capacity building with **IWRM** approach



DID produced manual & guidelines to handle ESCP

Manual Saliran Mesra Alam (MSMA),
Guidelines for ESCP,

DOE & Local Government handling ESCP violation by enforcement

DOE >50 ha
Local Gov <50Ha

DOE-DID Enforcement & Ops Lumpur (Local Government & DID)

DOE-DID Enf. >50 ha
Local Gov & DID <50Ha

Water Resources Act (RUU), a holistic water law

Implement IWRM & IRBM approaches to control river pollution

Debris & Mudflow Warning Model

Gives warning 3-4 hours before a mud flow event & landslide at hill areas (Cameron Highland)

Capacity Building through certification

CPESC – 124 ESC professionals
CPSWQ – 6 water quality professional
CISEC – 26 ESC inspector
CESSWI – 144 storm water inspector

MANUAL & GUIDELINES



- ❖ DID as the technical expertise produced manual & guidelines to indulge the long term nationwide directions and needs in ensuring sustainable urban drainage systems and stormwater managements
- ❖ Cabinet gave full approval and directive for this manual to be referred and followed by every development project starting from 1st January, 2001.
- ❖ The utilization of ESCP for developed areas becomes compulsory since October 2005 after being endorsement by the National Council for Local Government (MNKT).

ESC ENFORCEMENT

Project Size 1-50 ha



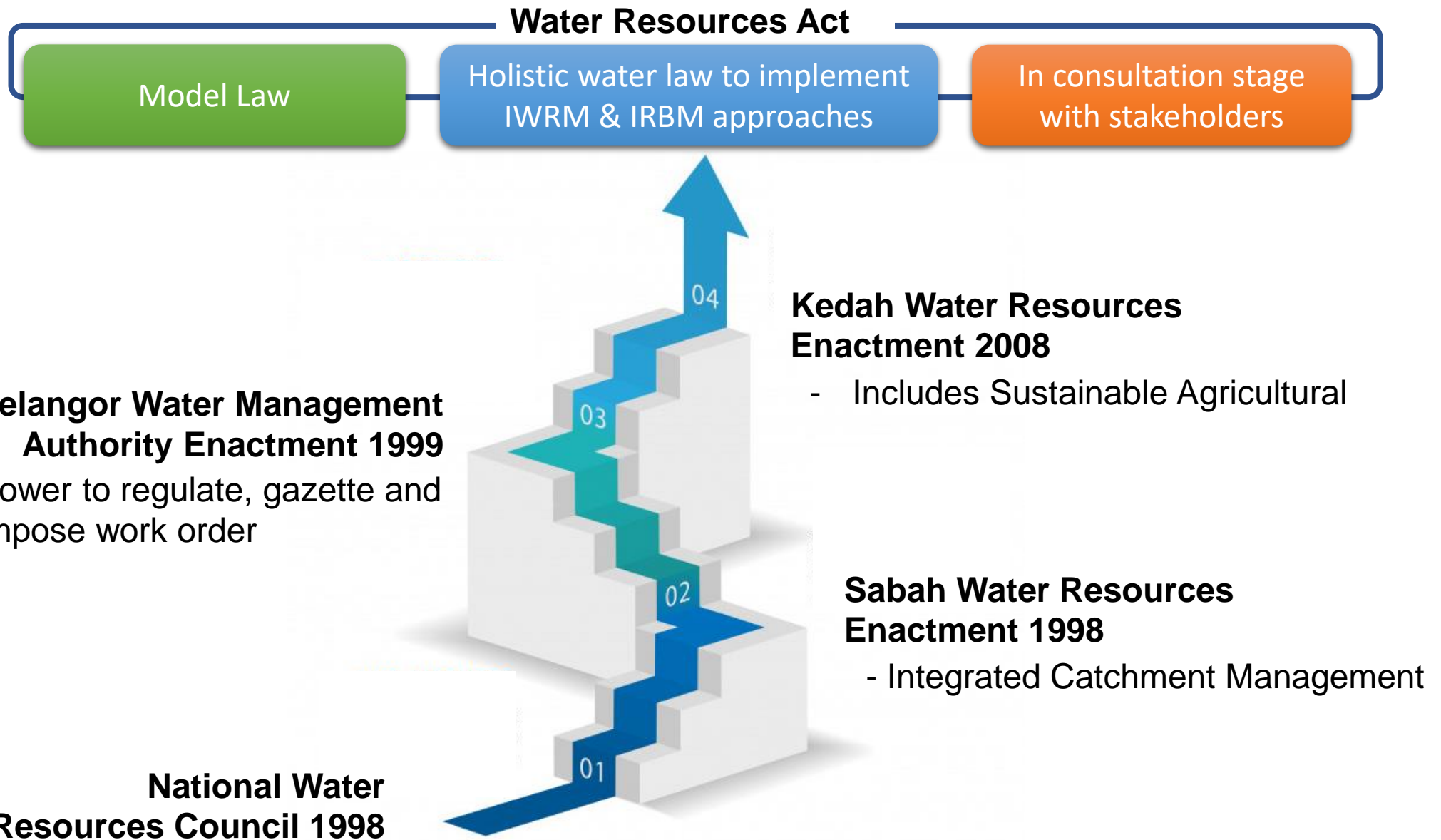
- ❖ Need to submit ESCP & Earthwork Plan
- ❖ Monitored by Local Authority & DID through OPS Lumpur Task Force
- ❖ Enforcement by Local Authority using Local Authorities Act

Project Size > 50 ha

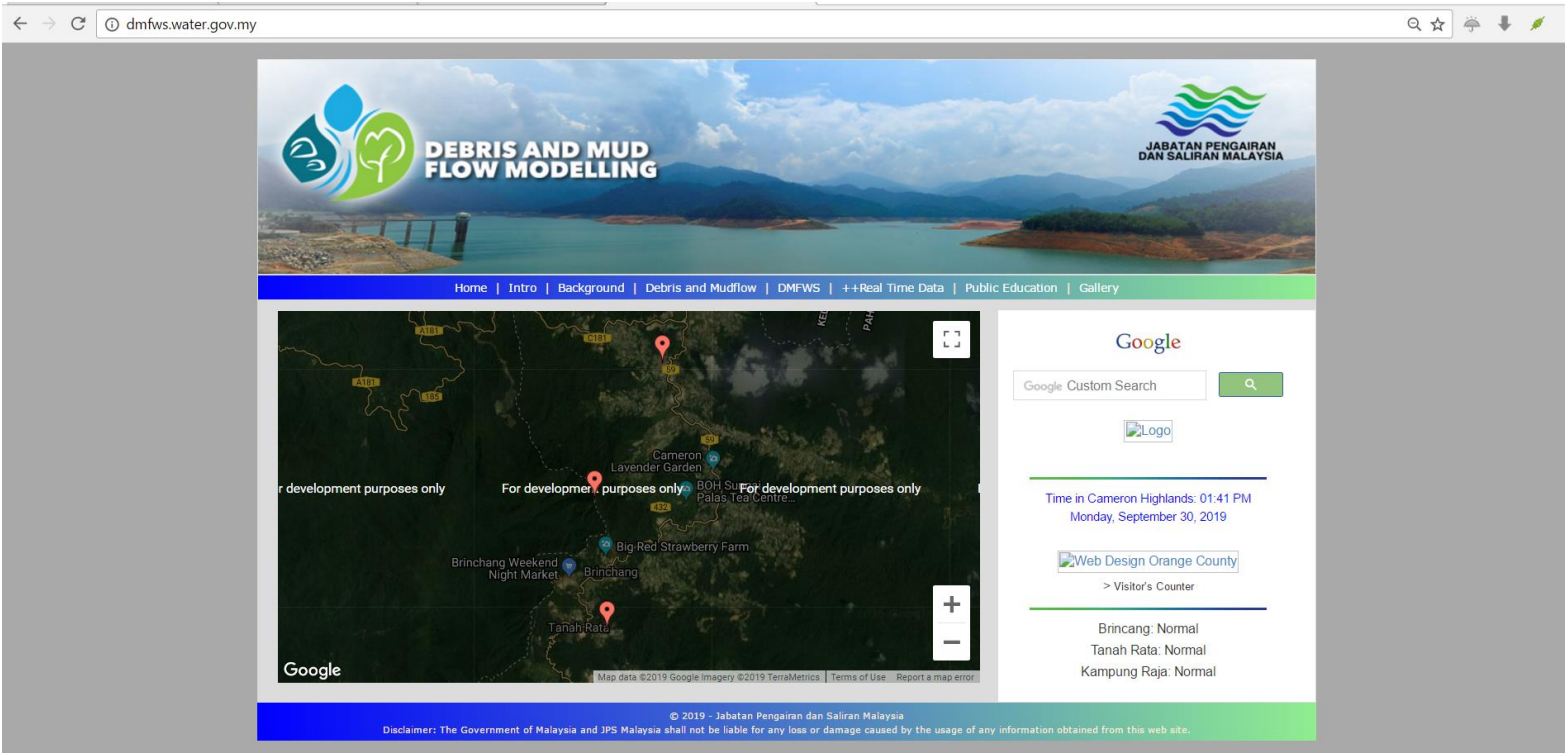


- ❖ Need to submit EIA including ESCP & Earthwork
- ❖ Mostly Monitored by Department of Environment (DOE)
- ❖ DOE-DID Enforcement platform for DID to monitor the selected projects (Devolution of Power)
- ❖ Enforcement by DOE using Environmental Quality Act, 1974

WATER RESOURCES ACT



DEBRIS MUD FLOW



- ✓ Debris flows are a common type of fast-moving landslide that generally occurs during intense rainfall on water-saturated soil.
- ✓ They usually start on steep hillsides as soil slumps or slides that liquefy and accelerate to speeds as great as 10 -30 Km per hour or more.
- ✓ They continue flowing down hills and into channels and deposit sand, mud, boulders and organic material onto more gently sloping ground.
- ✓ Their consistency ranges from watery mud to thick, rocky mud (like wet cement), which is dense enough to carry boulders, trees, and cars.
- ✓ Debris flows from many different sources can combine in channels, where their destructive power may be greatly increased.

Main objectives

Provide advance warning to the public and relevant agencies for disaster relief on the possibility of occurrence of an impending **landslide** or **mudflow** in high-risk and sensitive areas, like cut shapes of highway and recreation areas.

CAPACITY BUILDING THROUGH CERTIFICATION



124 Erosion and Sediment Control Professionals

A Certified Professional in Erosion and Sediment Control (CPESC) embraces the science of surface erosion and sediment control.



6 Water Quality Professionals

Professionals with a comprehensive knowledge & understanding of stormwater and erosion control regulations.



26 Erosion and Sediment Control Inspectors

Inspection Professionals with a Comprehensive Knowledge & Understanding of Controlling sediment and erosion and storm water pollutants



144 Storm Water Inspectors

Inspection Professionals with a Comprehensive Knowledge & Understanding of Erosion, Sediment and Stormwater Regulations.

WAY FORWARD



Dealing pollution using traditional 'end of pipe' treatments is expensive, energy-intensive and unsustainable. We're calling for an approach that tackles pollution at source. Reducing pollution by changing the way land is managed offers a better deal for both water customers and the environment.

(Source : <https://nt.global.ssl.fastly.net>)

The proposed Act is expected to protect the water resources in Malaysia & with the support & commitments of the state governments, would create uniformity in our approach in managing our water resources. With this act in place, it allows deterrent enforcement to be carried out to keep our waterways clean.

Contractor has to deposit a certain amount of estimated cost of project to the project owner or developer for the purpose of ESC planning, design, installation, maintenance, training & monitoring and to convert the BMP's into permanent structure.

Education and awareness at all levels (contractor/consultant/ clients) including farmers and agriculture land developers and project less than 1 ha to improve & implement ESC in their projects. This includes capacity building among consultants & enforcement officers.

TACKLE POLLUTION
AT SOURCE

UNIFORM WATER LAW &
DETERRENT ENFORCEMENT

ESC SECURITY
DEPOSIT

EDUCATION
AND AWARENESS

CONCLUSION



Erosion and sediment control to be done in a integrated manner since many parties are involved

DID don't have the enforcement but we shall never stop to get the issues of pollution and ESC to the related agencies and ensuring their actions

We are going towards a water ready nation, therefore, pollution by suspended solid need to be taken seriously which could effect the national water security

Existing law related to ESC need to be reviewed to strengthen the enforcement