

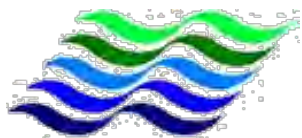


WELCOME

**ASEAN COMMITTEE ON DISASTER
MANAGEMENT (ACDM)**

**ON FLOOD RISK MANAGEMENT CASE
VISIT ASEAN LEVEL IN MALAYSIA**

8-12 JULAI 2019



**National Flood Forecasting and Warning Centre
Water Resources Management and Hydrology Division
Department of Irrigation and Drainage Malaysia**

PROGRAM

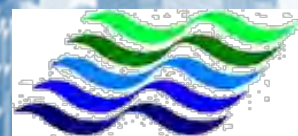
1. BRIEFING ON PRAB
2. MONTAJ
3. Q & A
4. VISIT TO NATIONAL FLOOD FORECASTING AND WARNING CONTROL CENTRE





FLOOD FORECASTING AND WARNING PROGRAM

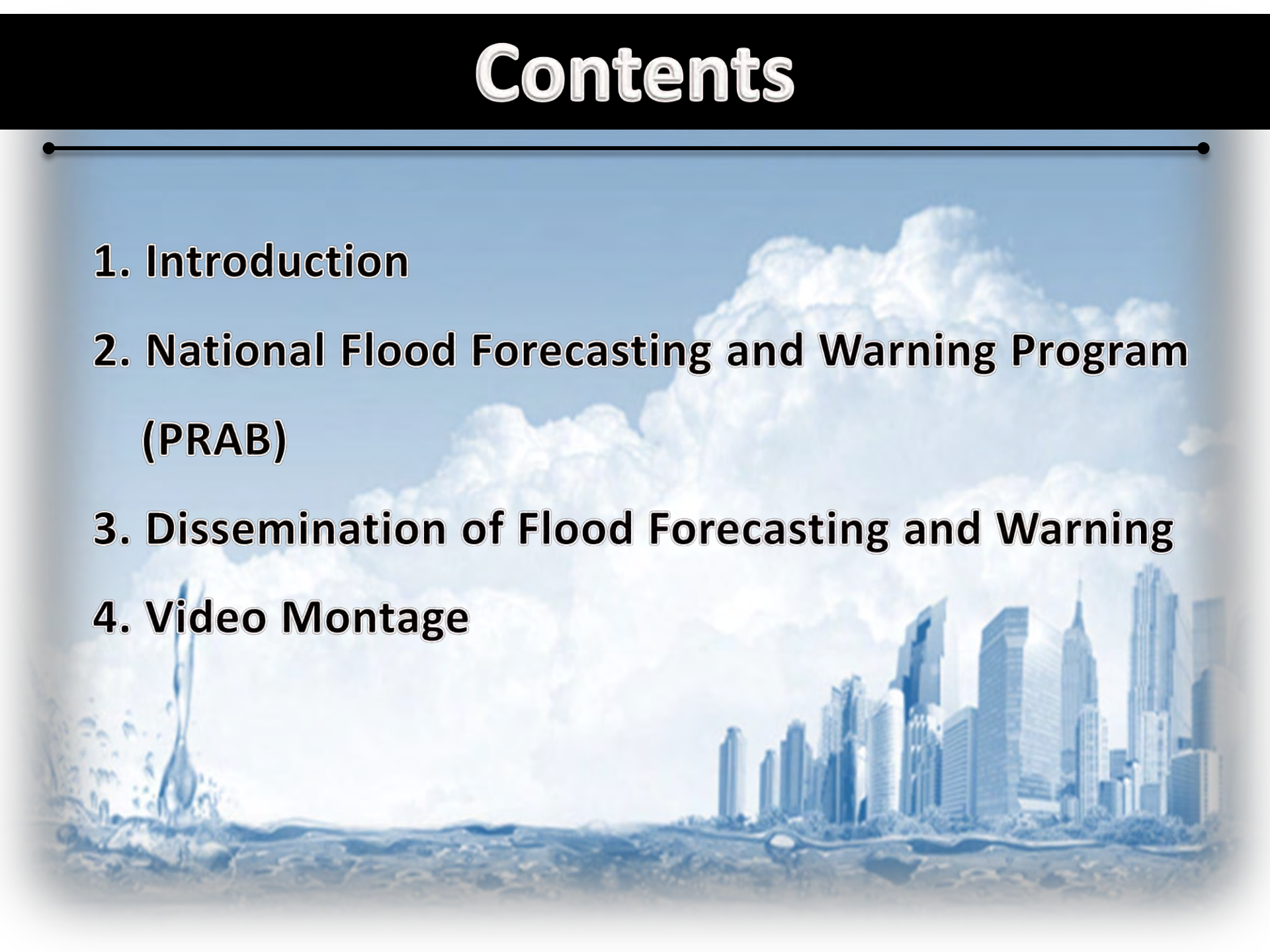
PRN3
PROGRAM RAMALAN DAN AMARAN BANJIR NEGARA
2015 - 2022



National Flood Forecasting and Warning Centre
Water Resources Management and Hydrology Division
Department of Irrigation and Drainage Malaysia

Contents

1. Introduction
2. National Flood Forecasting and Warning Program (PRAB)
3. Dissemination of Flood Forecasting and Warning
4. Video Montage



Introduction

Natural Hazards in Malaysia

Disaster Types

Floods

Landslide

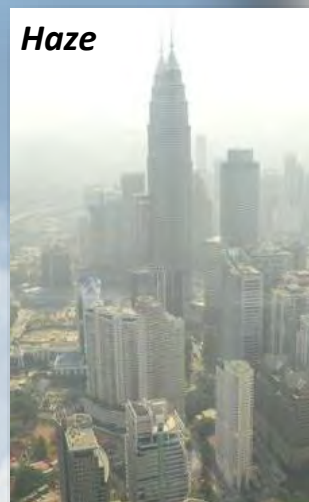
Strong
Winds/
Storms

Forest/
Peat
Forest
Fire

Haze



Bukit Lanjan, KL
(2003)



Kuala Lumpur
(2004)



Kajang Town (2014)

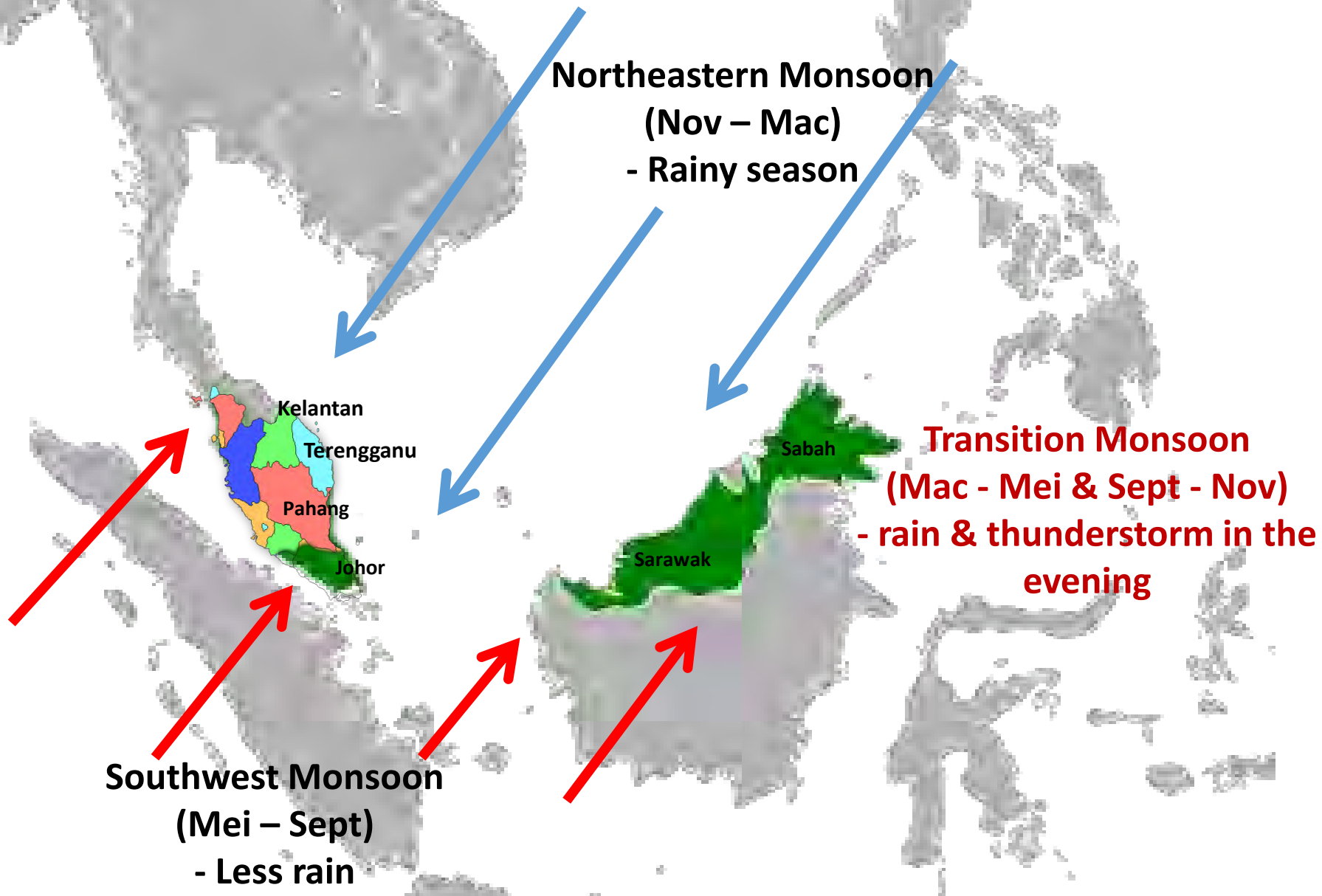


Pendang & Alor Setar (2014)



Selangor (2013)

Malaysia Weather Pattern



FLOODs IN MALAYSIA

Type of floods:

MONSOON FLOOD:

Flood that caused by the continuous and high intensity of rainfall (> 6 hours)



FLASH FLOOD:

Flood that caused by the localize and high intensity rainfall, resulting rapid increase and decrease of water level / depth (< 3 hours)



COASTAL FLOOD:

Flood occurs when normally dry, low-lying land is flooded by seawater due to high tide



FLOOD PRONE AREA

Kelantan

- Sungai Kelantan
- Sungai Golok
- Sungai Semerak

Terengganu

- Sungai Besut
- Sungai Dungun
- Sungai Kemaman
- Sungai Marang
- Sungai Chalok

Pahang

- Sungai Pahang
- Sungai Kuantan
- Sungai Rompin

Johor

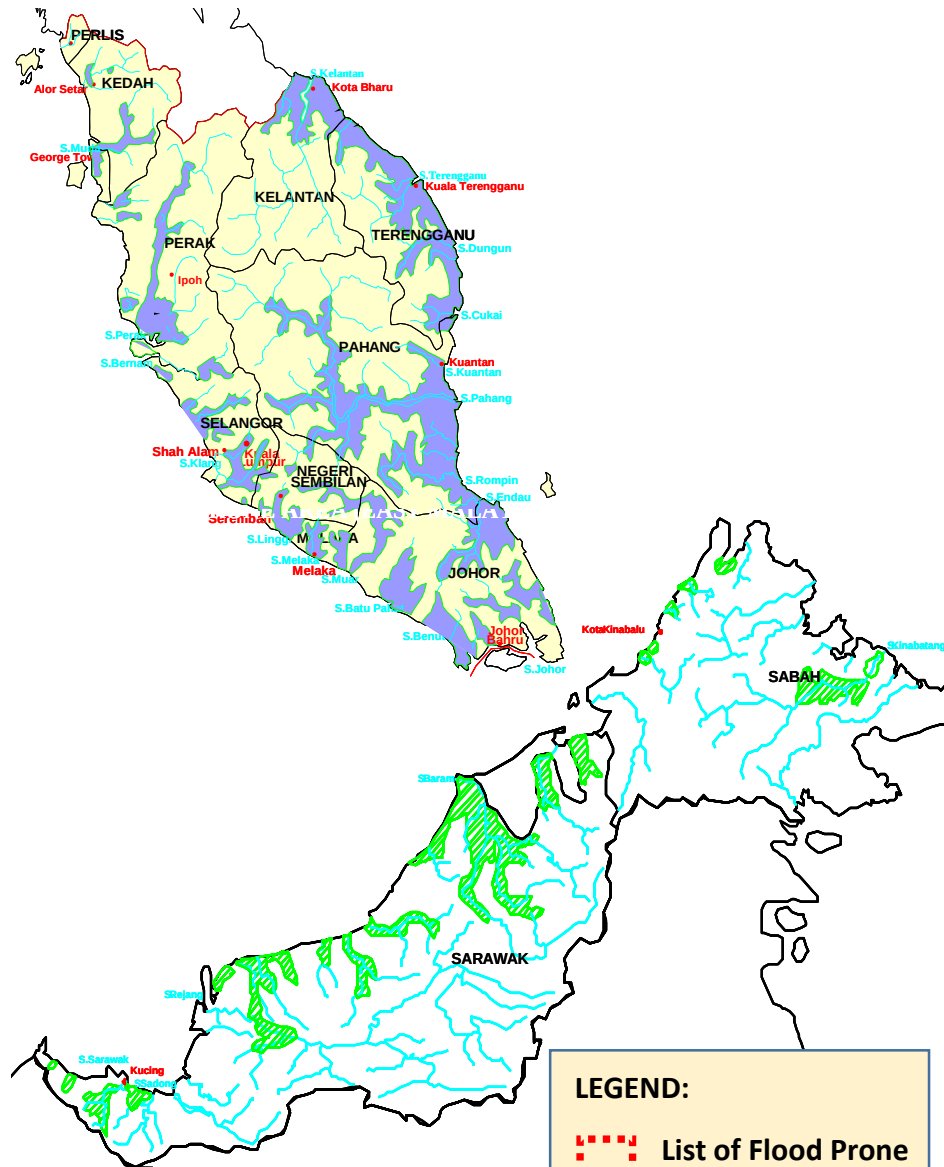
- Sungai Benut
- Sungai Johor
- Sungai Batu Pahat
- Sungai Muar
- Sungai Endau
- Sungai Sedili
- Sungai Skudai/Tebrau

Selangor

- Sungai Langat
- Sungai Buloh
- Sungai Kelang
- Sg. Selangor

W.Persekutuan KL

- Sungai Klang
- Sungai Gombak
- Sungai Kerayong



LEGEND:

- List of Flood Prone River Basin

Melaka

- Sungai Melaka

Negeri Sembilan

- Sungai Linggi
- Sungai Pahang
- Sungai Muar

Perak

- Sungai Perak
- Sungai Kerian
- Sungai Kurau
- Sungai Slim

Kedah

- Sungai Kedah
- Sungai Muda
- Sungai Kulim

Pulau Pinang

- Sungai Juru
- Sungai Muda
- Sungai Pinang
- Sungai Perai
- Sungai Jawi

Perlis

- Sungai Perlis
- Sungai Arau

Sabah

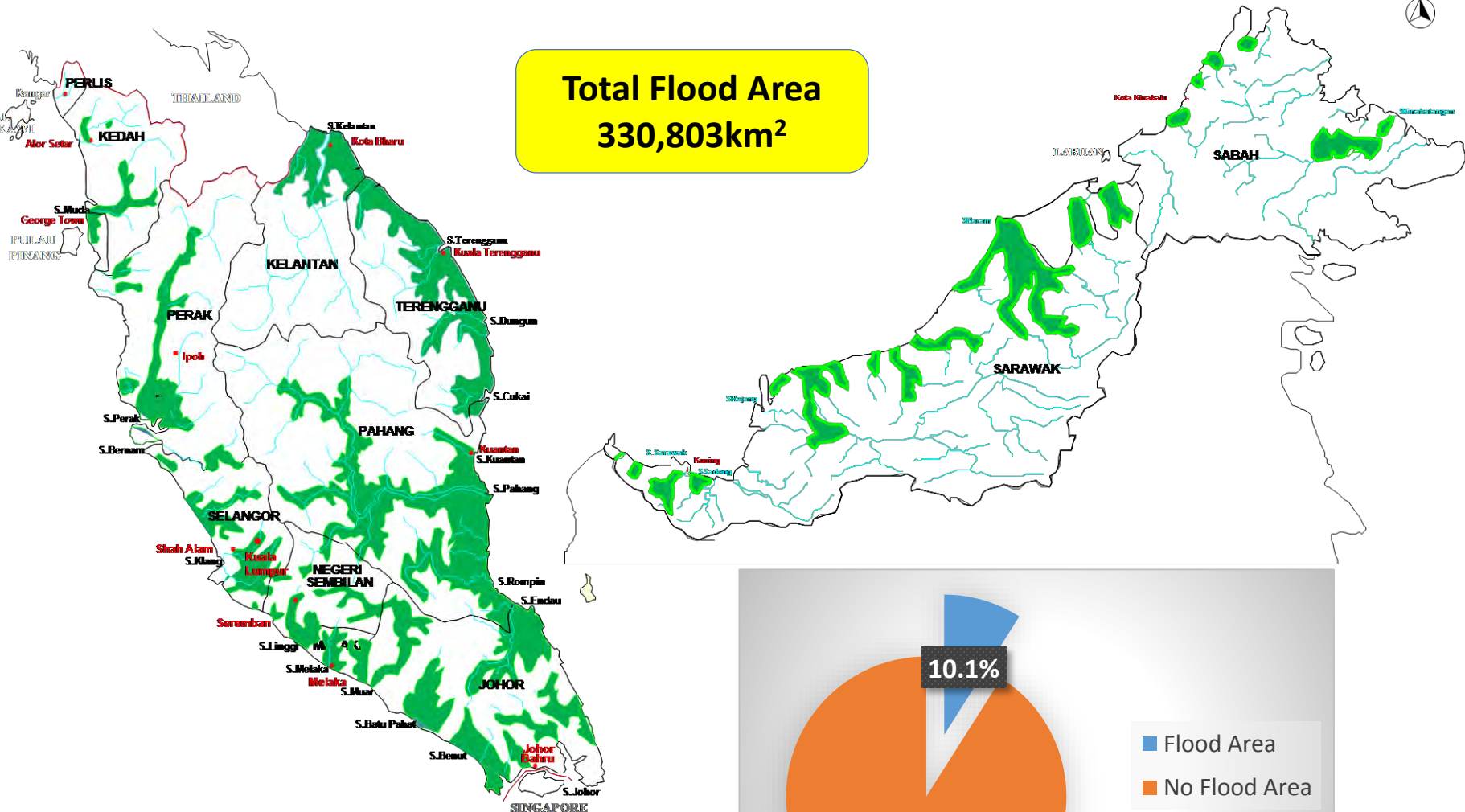
- Sungai Kinabatangan
- Sungai Padas

Sarawak

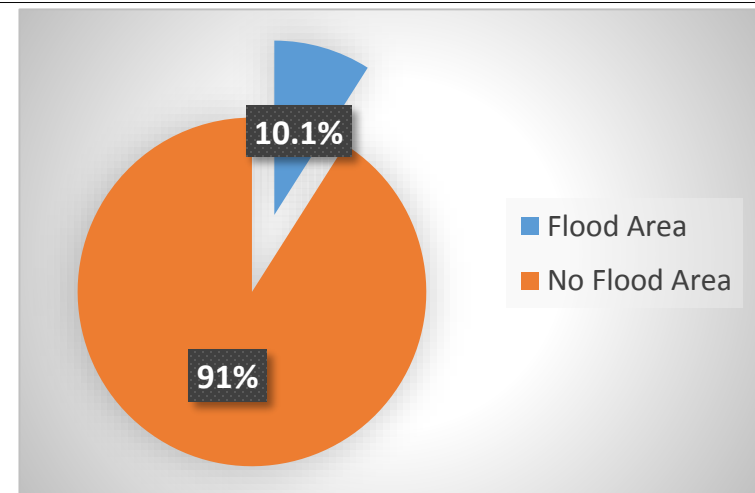
- Sungai Batang Sadong
- Sg. Sarawak
- Sg. Rajang
- Sg. Serian

UPDATING OF FLOODING CONDITIONS STUDY 2012

**Total Flood Area
330,803km²**



**5.7 million
people affected
by floods**



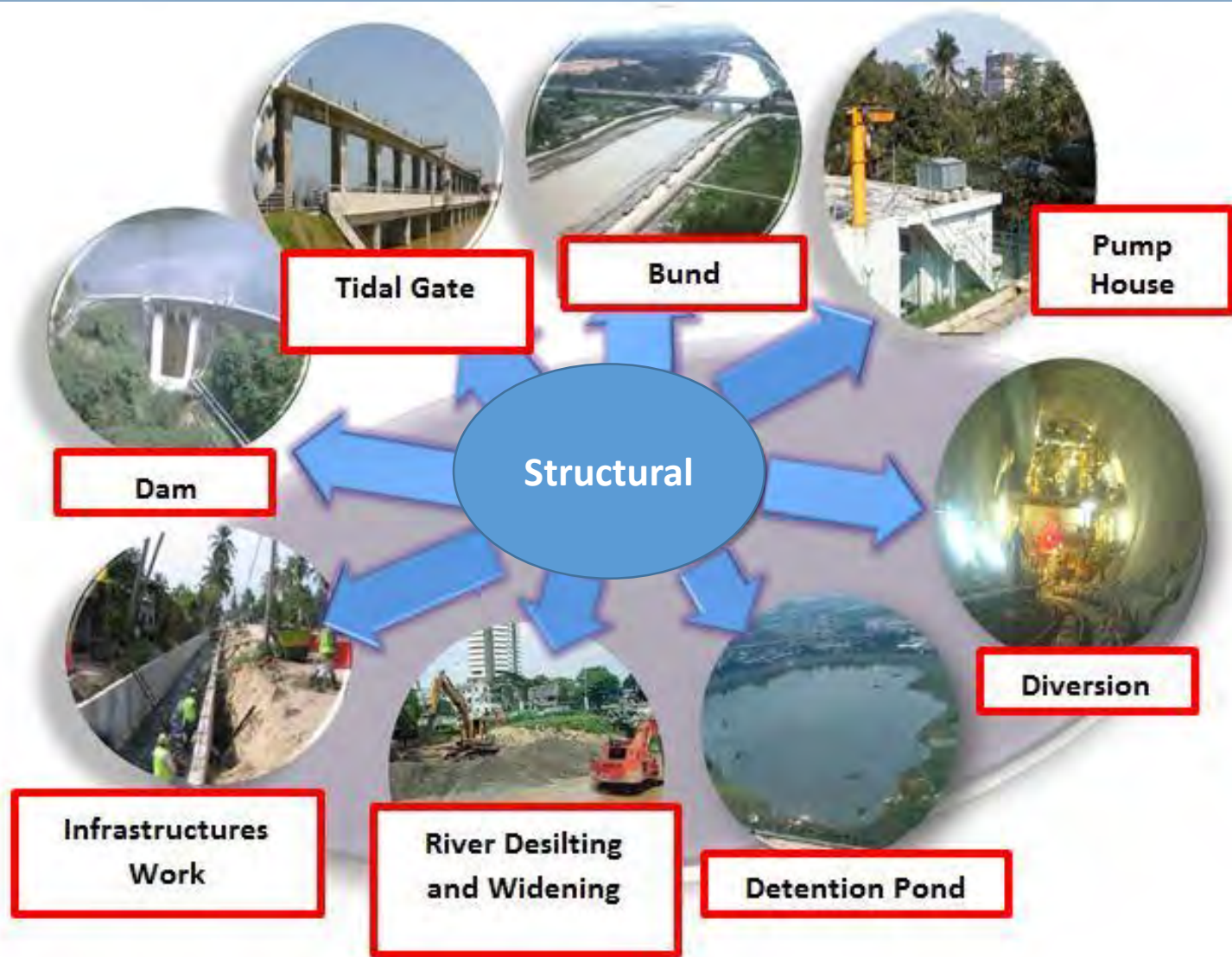
INTERGRATED FLOOD MANAGEMENT (IFM)

At Drainage and Irrigation Department (DID) Malaysia, we are managing flood using:

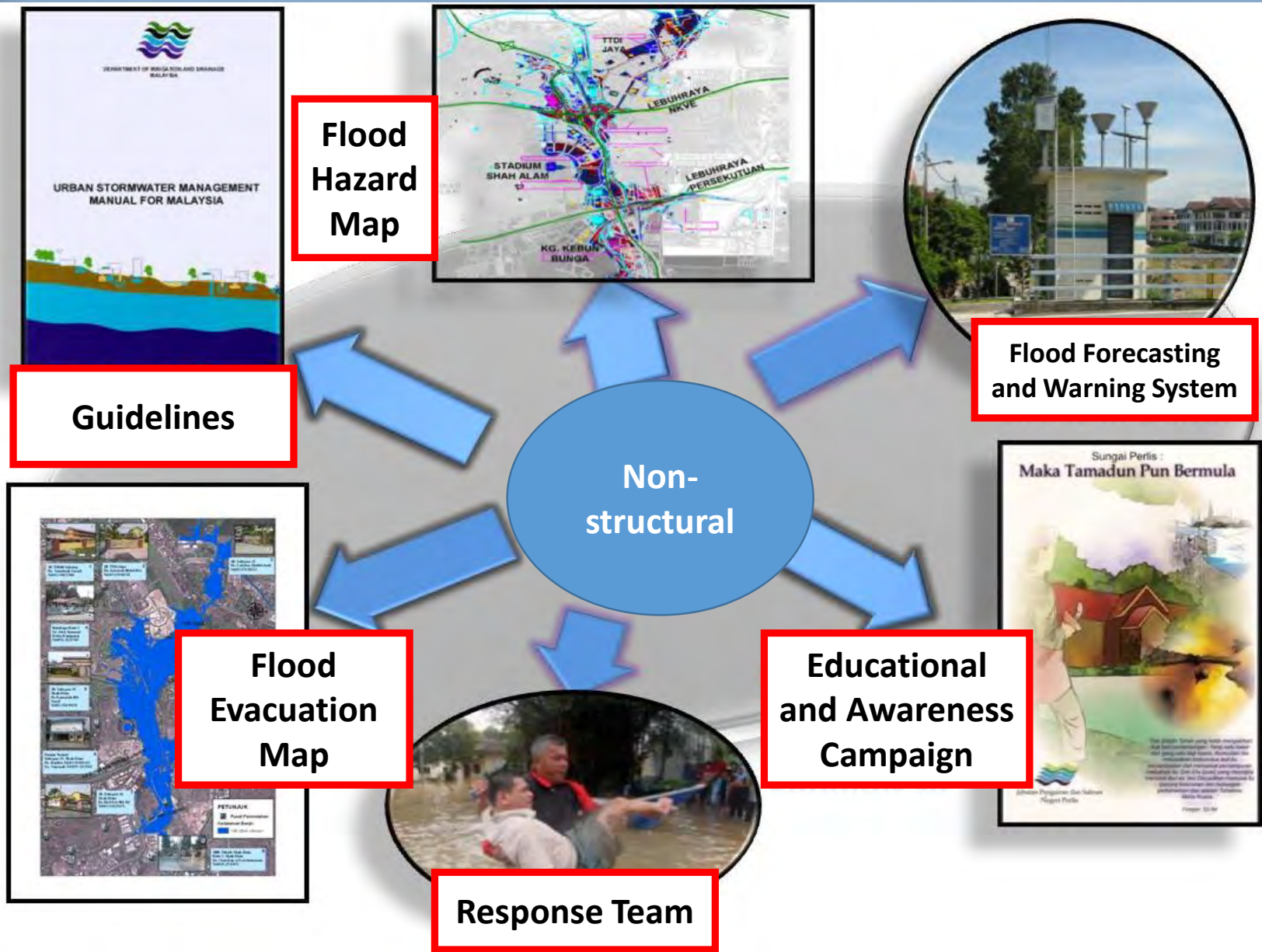
- 1) Structural method
- 2) Non-structural method.



STRUCTURAL METHOD



NON-STRUCTURAL METHOD



National Flood Forecasting and Warning Program (PRAB)



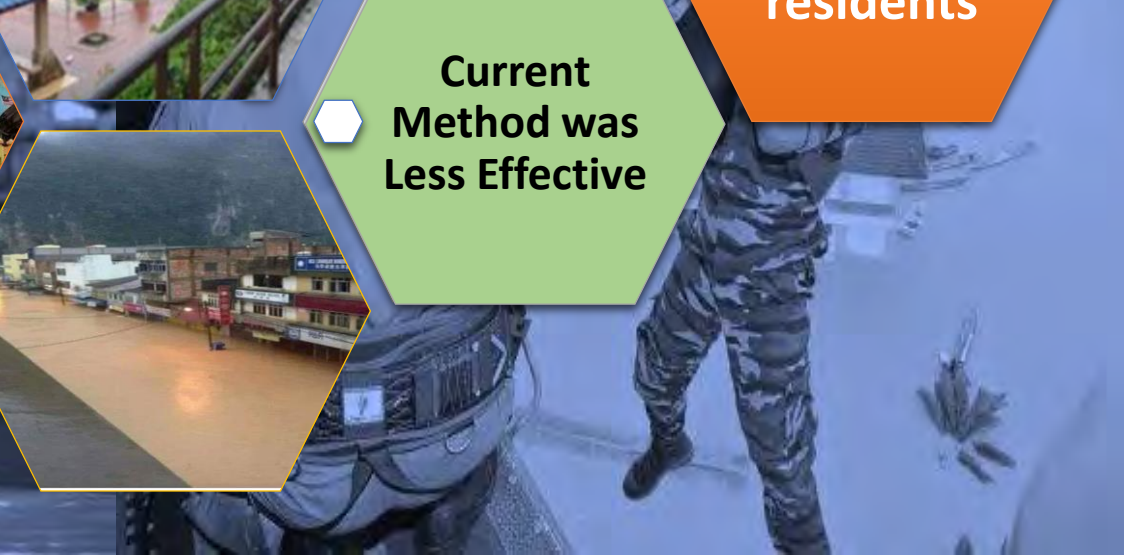
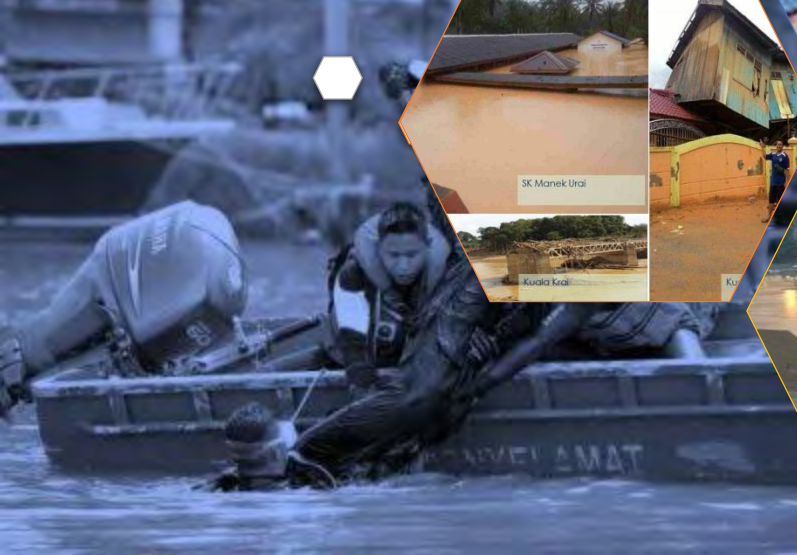
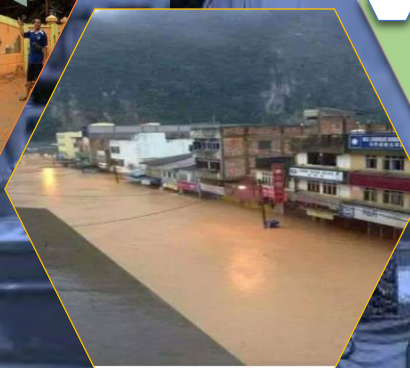
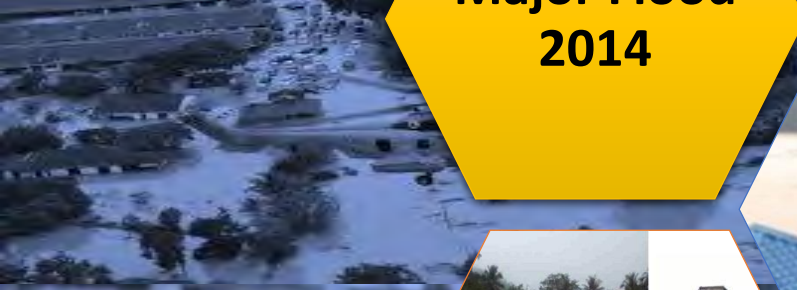
25 Casualty

Major Flood
2014

144 Average
Flood Event
per Year

Evacuation
of 500 000
residents

Current
Method was
Less Effective



Flood Event (14 December 2014 - 10 January 2015)



SK Manek Urai



Kuala Krai



Muara Sg Kelantan



Kuala Krai



Lata Rek



Gua Musang



Kuala Tahan

FLOOD FORECASTING AND WARNING PROGRAMME

EXISTING SYSTEM

RAINFALL/ WATER LEVEL
(DID)

WEATHER FORECAST BY
METEOROLOGICAL
DEPARTMENT (MMD)

(1981-2014)
FORECAST MODEL
FOR 6 RIVER BASIN

FORECAST

0.5-1

DAYS
BEFORE
FLOOD

WARNING

6

HOURS
BEFORE
FLOOD

PRAB SYSTEM

PRAB

40 RIVER
BASIN

2015-2022
DEVELOPMENT PERIOD

2015-2018
PHASE 1 – 3 RIVER BASIN

FORECAST

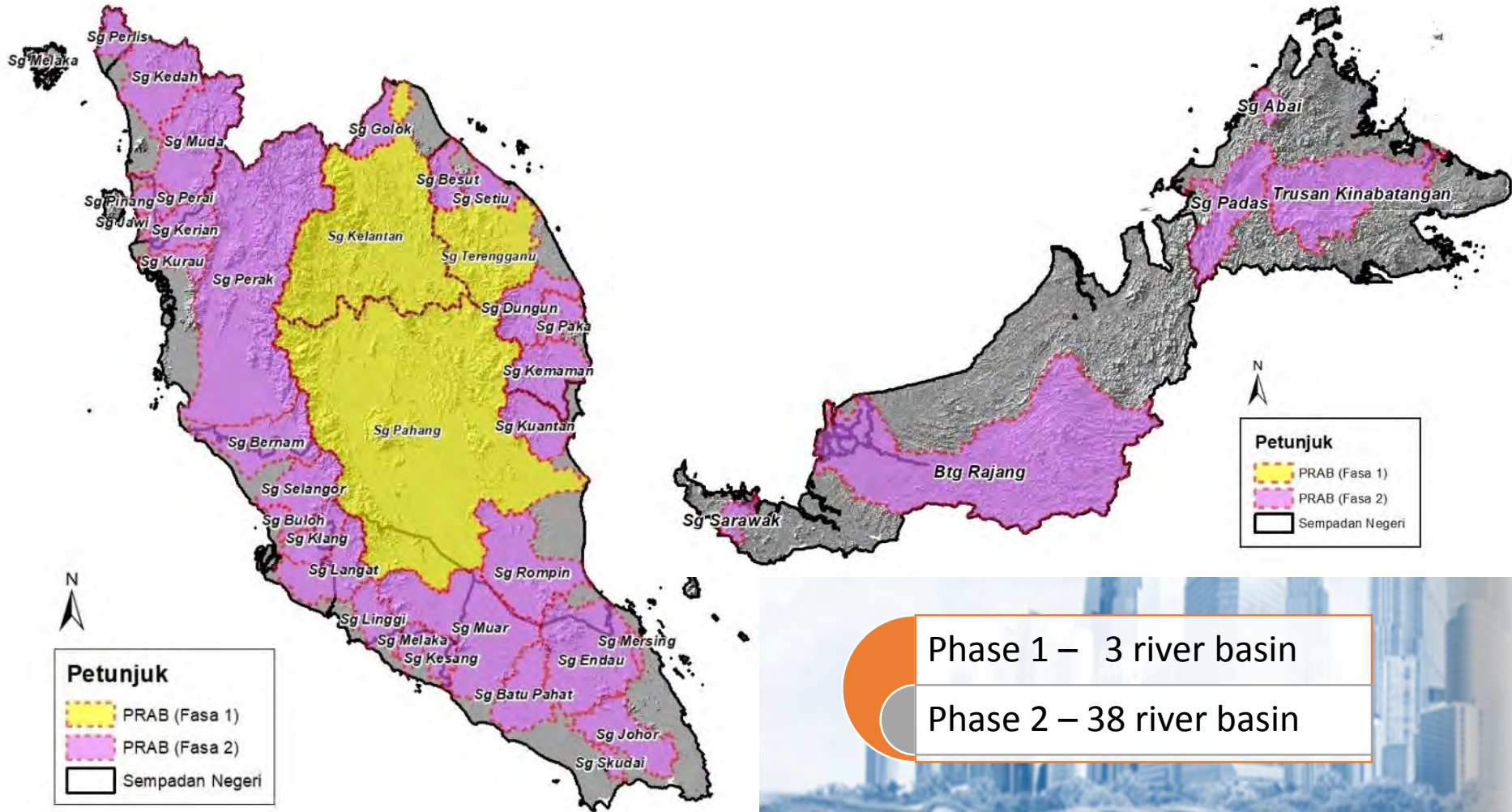
7

DAYS
BEFORE
FLOOD

WARNING

2

PROJECT AREA



RIVER BASIN

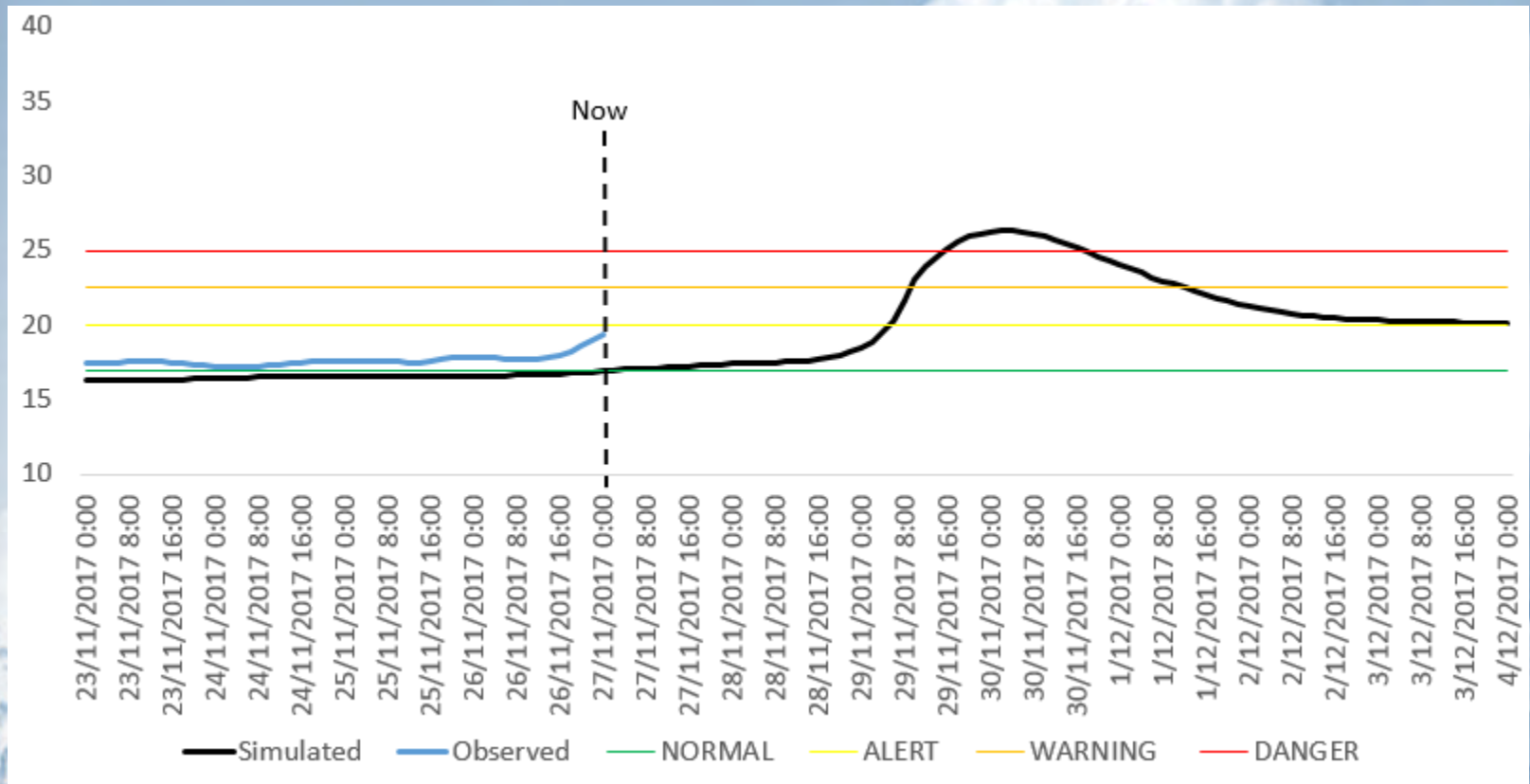
PRAB PHASE 1

No.	River Basin
1	Sg. Kelantan
2	Sg. Terengganu
3	Sg. Pahang

PRAB PHASE 2

No.	River Basin	No.	River Basin
1	Batang Rajang	20	Sg. Linggi
2	Sg. Padas	21	Sg. Pinang
3	Sg. Sarawak	22	Sg. Endau
4	Sg. Kinabatangan	23	Sg. Skudai
5	Sg. Perak	24	Sg. Mersing
6	Sg. Kemaman	25	Sg. Kesang
7	Sg. Kelang	26	Sg. Setiu
8	Sg. Johor	27	Sg. Kerian
9	Sg. Kuantan	28	Sg. Kurau
10	Sg. Besut	29	Sg. Muar
11	Sg. Dungun	30	Sg. Abai
12	Sg. Selangor	31	Sg. Kedah
13	Sg. Langat	32	Sg. Melaka di Langkawi
14	Sg. Muda	33	Sg. Perai
15	Sg. Golok	34	Sg. Juru
16	Sg. Bernam	35	Sg. Jawi
17	Sg. Batu Pahat	36	Sg. Rompin
18	Sg. Perlis	37	Sg. Paka
19	Sg. Melaka	38	Sg. Buloh

EXAMPLE OF FORECAST MODEL (7 DAYS AHEAD)



SAMPLE OF FORECAST DISSEMINATION NOTICE



**JABATAN PENGAIRAN DAN SALIRAN
KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR**

RAMALAN ARAS AIR
Disediakan pada

26 Januari 2018 ;09:00 AM

NEGERI PAHANG

Sekiranya hujan masih berterusan, stesen-stesen berikut diramalkan melepasi aras **BAHAYA**

Lembangan Sungai	Daerah	Stesen	Aras Semasa (m)	Aras Waspada (m)	Aras Amaran (m)	Aras Bahaya (m)	Aras Ramalan (m)	Tarikh/ Masa	Indikasi	Trend
Sg. Pahang	Raub	Sg Lipis di Batu Malim	114.52	114	114.24	114.8	114.92	26/01/2018 11:00 AM	Aras air Sg. Pahang di stesen Sg Lipis di Batu Malim diramalkan melepasi ARAS BAHAYA sebanyak 0.12m pada 26/01/2018 11:00 AM	Menaik

SAMPLE OF WARNING DISSEMINATION NOTICE



JABATAN PENGAIRAN DAN SALIRAN KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR

AMARAN BANJIR

Dikeluarkan pada 27 November 2017; 12:00 tengahari

Susulan Amaran Cuaca Buruk oleh Jabatan Meteorologi Malaysia bertarikh 27 November 2017 pada jam 12.00 tengahari, banjir diramal berlaku pada 29 November 2017 mulai pada jam 6.00 pagi di lokasi seperti berikut:

<i>Negeri</i>	<i>Lembangan Sungai Utama</i>	<i>Sungai</i>	<i>Daerah</i>	<i>Lokasi Banjir</i>
Kelantan	Sungai Kelantan	Sungai Galas	Gua Musang	Kg. Lembaga, Limau Kasturi, Kg. Pulau dan kawasan sekitarnya
		Sungai Lebir	Kuala Krai	Kg. Tualang, Kg. Manik Urai, Kg. Karangan, Kg. Pahi, Loji Air Manik Urai, dan kawasan sekitarnya
		Sungai Kelantan	Tanah Merah	Kusial, Kusial baru dan kawasan sekitarnya
Terengganu	Sungai Terengganu	Sungai Nerus	Setiu	Kg Pengkalan Merbau, Kg Sg Tong, Kg Bukit Nenas 2, Kg Alor Lik, Kg Banggol Setar, Kg Pak Ba, Kg Sg Nas dan kawasan sekitarnya
		Sungai Terengganu dan Berang	Hulu Terengganu	Kg Kepah, Kg. Mesah, Kg Nasi Dingin, Kg. Telaga, Kg Kuala Berang, Kg Felera Pasir Pelata, Kg Felera Pasir Pelata, Kg. Menerong, Kg Padang Setar, Sg Berang di Menerong dan kawasan sekitarnya
		Sungai Nerus	Kuala Terengganu	Kg Padang Air, Kg Tok Jiring, Kg Tanjung Bunut, Kg Teluk Pasu dan kawasan sekitarnya

Semua penduduk terutamanya di kawasan rendah diminta berwaspada dan sentiasa berhubung dengan Pusat Kawalan Operasi Banjir yang berhampiran.

Dikeluarkan oleh:
Pusat Ramalan Dan Amaran Banjir Negara (PRABN)
Jabatan Pengairan dan Saliran, Malaysia

No. Rujukan: JPS-PRABN-KLTTRG-271117-1200

Warning by Malaysia Meteorological Department



JABATAN METEOROLOGI MALAYSIA
KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

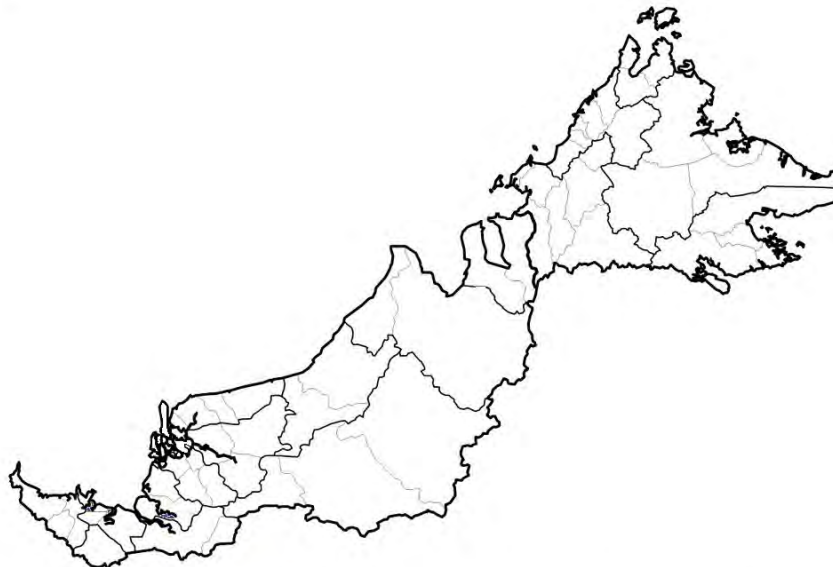
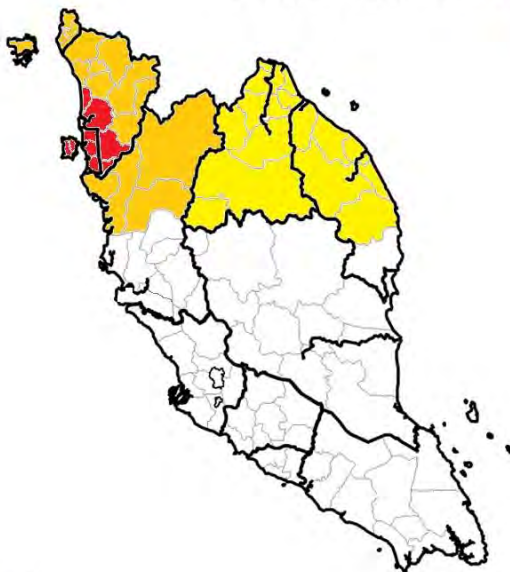
AMARAN CUACA BURUK

Masa dikeluarkan: 9:30 Malam; 4 November 2017

Tempoh berkuatkuasa:



} Sehingga 5 November 2017



Petunjuk:

-  Kawasan yang dijangka/sedang mengalami hujan berterusan
-  Kawasan yang dijangka/sedang mengalami hujan lebat berterusan
-  Kawasan yang mengalami hujan sangat lebat berterusan

-  Kawasan yang sedang/dijangka mengalami ribut petir

OPERATION CENTRE (COMMAND AND CONTROL)





Montaj



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THANK YOU

By: Ir. Yuhaslin binti Yusof