



JABATAN PENGAIRAN DAN SALIRAN MALAYSIA

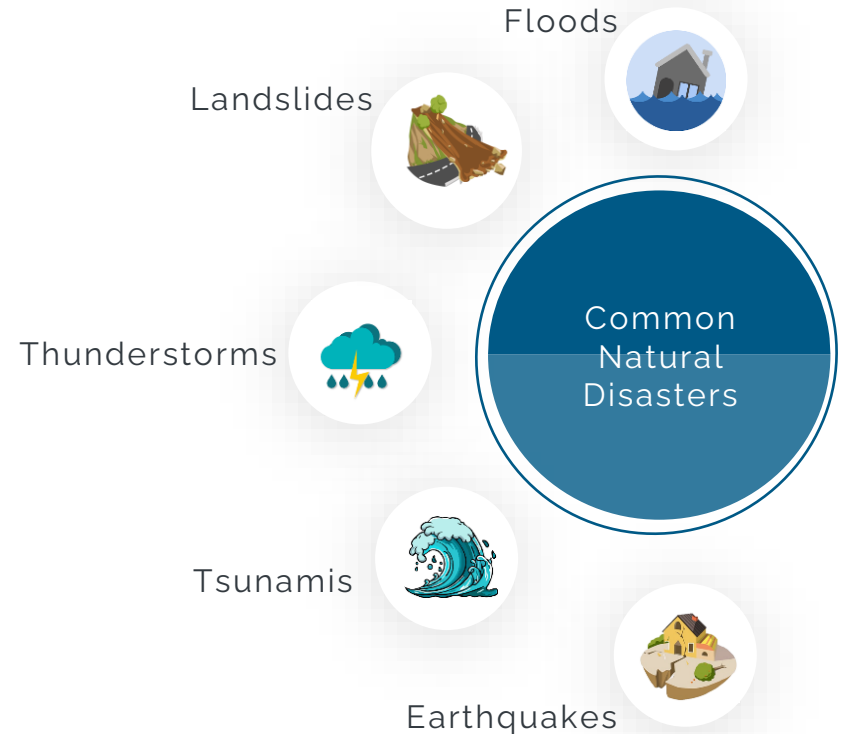
SIMPOSIUM MAKLUMAT GEOSPATIAL KEBANGSAAN (NGIS) KE-9

PENILAIAN KEROSAKAN AKIBAT BANJIR DI MALAYSIA

*Gs. Baharudin Bin Ahmad
Pengarah Bahagian Pengurusan Fasiliti dan GIS
Jabatan Pengairan dan Saliran Malaysia
Kementerian Sumber Asli, Alam Sekitar & Perubahan Iklim (NRECC)*

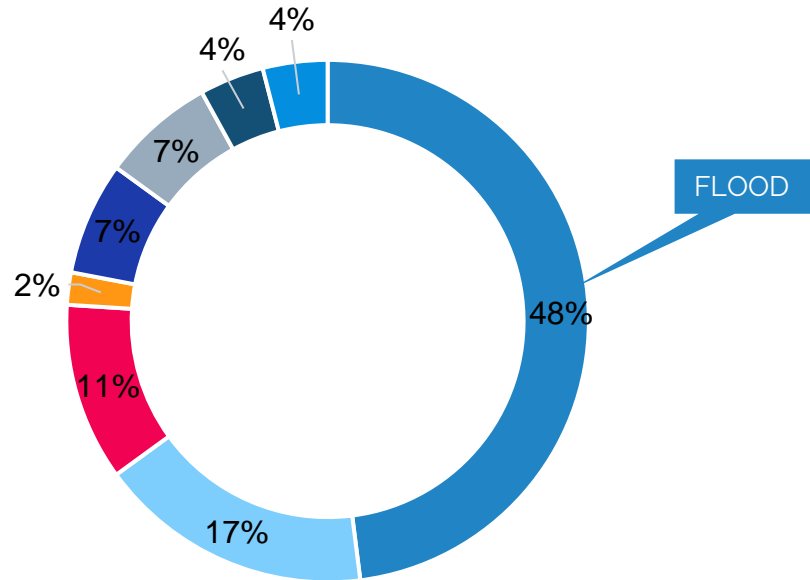
NATURAL DISASTER

- ✓ Natural disasters are unfortunate events that we have faced over time and happens frequently and sometimes unexpectedly
- ✓ Malaysia is exposed to several types of natural disasters



NATURAL DISASTER IN MALAYSIA

Recorded Events From Year 1965 - 2016



- Flood
- Epidemic
- Storm
- Mass movement
- Landslide
- Wildfire
- Drought
- Earthquake



From: BH Online



From: BH Online

DISASTER RISK REDUCTION CYCLE

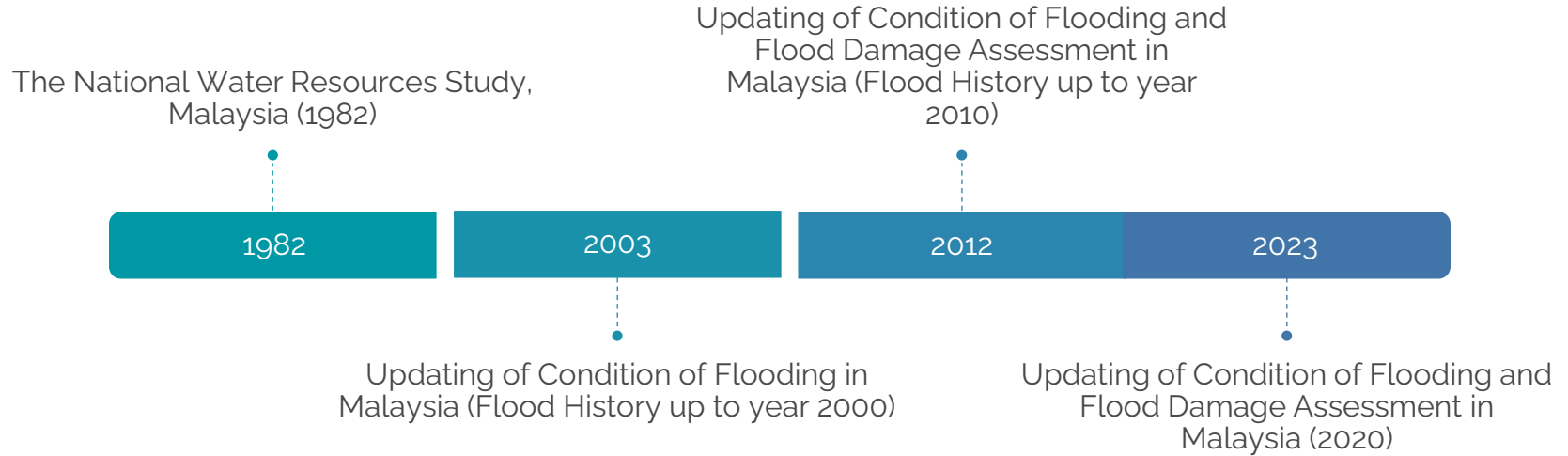


✓ Natural disasters potentially cause great **damage** and loss

✓ **Affects** the **population** living in the flood-affected area and risks to their properties and lives

*Disaster Risk Reduction (DRR), and Disaster Management Cycle.
From: World Risk Report 2016, United Nations University (Universitat Stuttgart)*

HISTORY



MyFloodRAS

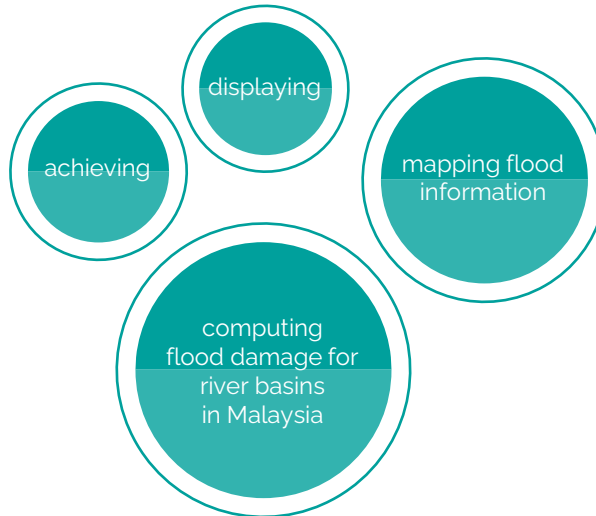
Updating Of Condition Of Flooding And Flood Damage Assessment In Malaysia

✓ GIS-based web application for flood damage assessment

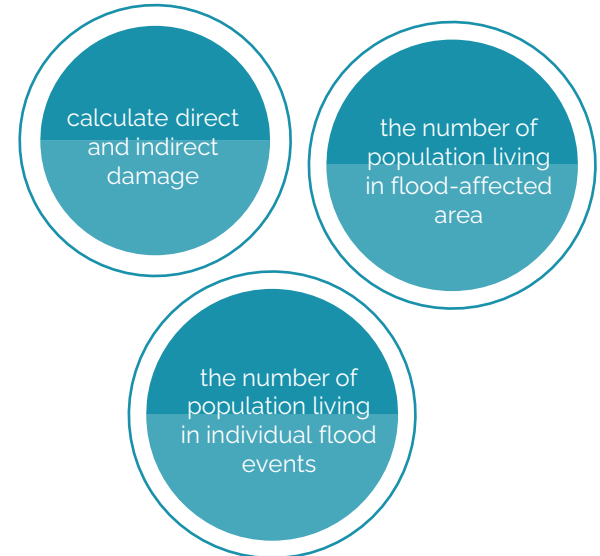
✓ Have been designed with the main decision-making features for decision support

✓ It can directly process the outputs

✓ Combines flood information from Year 2000 to 2020



✓ Spatially varied object attributes and damage functions to assess flood damages

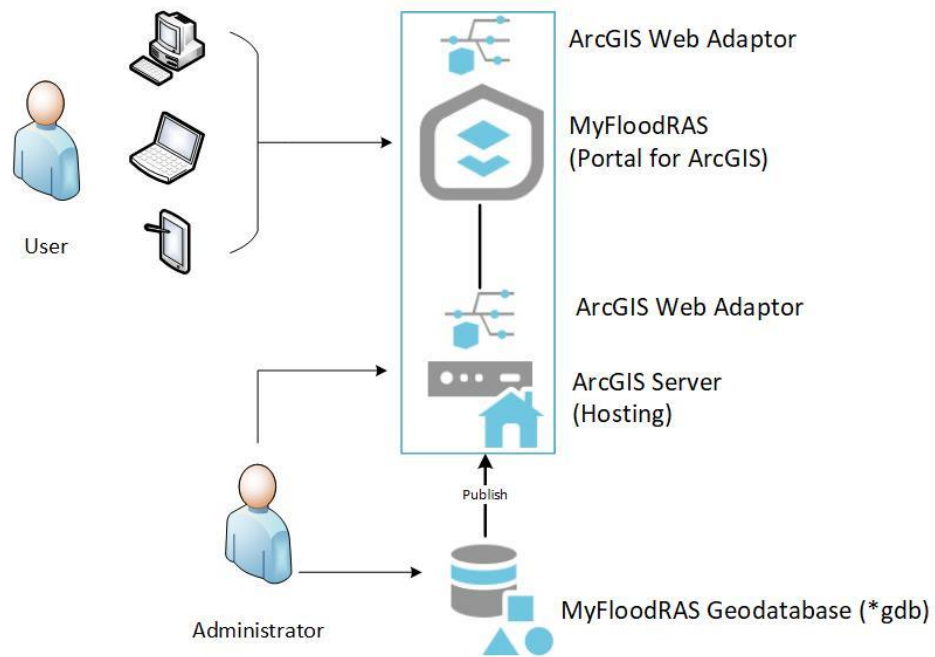


MyFloodRAS



- ✓ To share and provide information regarding flood damage assessment
- ✓ To enable information related to flood condition to be properly stored and easily retrieved
- ✓ To calculate and generate flood damage assessment for the desired flood-affected area
- ✓ To centralise and harmonise flood risk assessment

MyFloodRAS ARCHITECTURE



MyFloodRAS MAIN MODULES

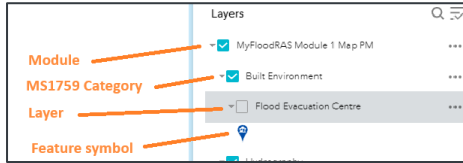
Module 1: Flood Information

- ✓ Module 1 focuses on the historical flood information gathered from the JPS study year 2001, 2012 and 2023
- ✓ It's includes base data such as population, flood damage component, socio-economic information, RBMU, river network and administrative boundaries
- ✓ The output of this module is the calculation of flood damage based on the historical flood information
- ✓ This module enable user to digitize new layer such as Flood Affected Location, Flood Affected Area, and Flood Mitigation Project
- ✓ User also can print a map for desired location or area

Module 2: Flood Risk Assessment Tool

- ✓ Module 2 main functions can be categorized into two which are:
 - 1 Calculation of potential flood damage; and
 - 2 Calculation of mean flood damage
- ✓ Potential flood damage calculation will be based on the flood affected area generated or result from the flood simulation
- ✓ Calculation of mean flood damage will be using default parameter (State and National Mean for Flood Depth and Flood Duration) or based on user define parameter
- ✓ User can generate and print a flood damage calculation report
- ✓ User also can print a map for desired location or area

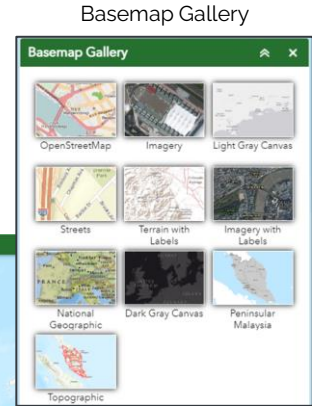
BASIC FUNCTIONALITIES



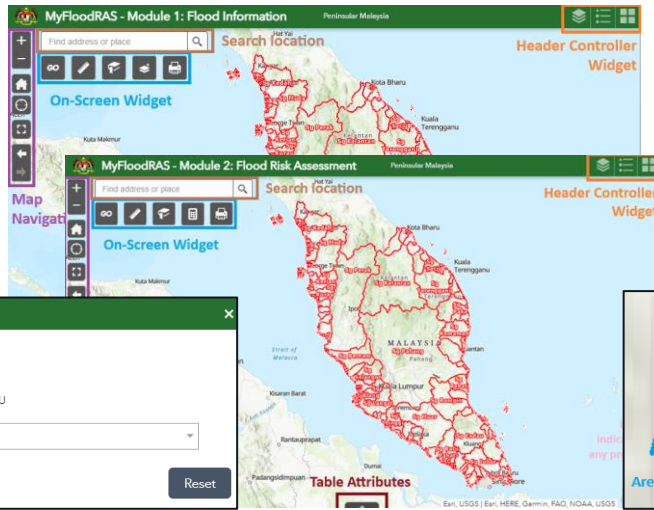
Layer List



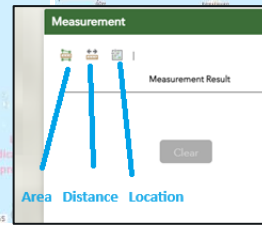
Legend



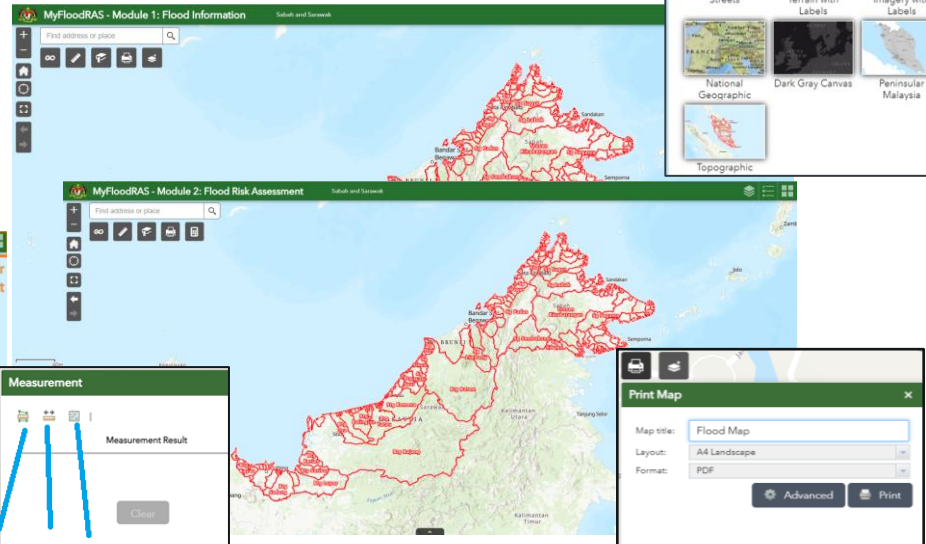
Basemap Gallery



Go To



Measurement



Print Map

BASIC FUNCTIONALITIES

The screenshot displays the MyFloodRAS - Module 1: Flood Information interface. The top header shows the application name and the region 'Peninsular Malaysia'. A search bar is present with the text 'Find address or place'. Below the search bar are several icons for navigation and map interaction. The main area is a map of Peninsular Malaysia with red lines indicating river basins. A table titled 'River Basin Management Unit Area' is overlaid on the map, showing a list of river basins with their names, basin names, areas, categories, and states. The table has columns for 'Field Names' and 'Field Values'. A red box highlights the table, and red arrows point to various UI elements: 'Select Feature buttons' (a red box around the table's top-left corner), 'Layer Name' (a red arrow pointing to the table title), 'Field Names' (a red arrow pointing to the column headers), 'Field Values' (a red arrow pointing to the data cells), and 'Show/Hide columns' (a red arrow pointing to a small icon in the top-right corner of the table).

RBMU No	RBMU Name	Basin Name	Area Measured (ha)	RBMU Category	Shared State
92	Wilayah Persekutuan Labuan	Sg. Kiasam	8,906.733	River basin within the state	Wilayah Persekutuan Labuan
9	Sungai Jeragan Bistari	Sg Jeragan Bistari	14,808.560	River basin within the state	Sabah
7	Sungai Tanjung Labian	Sg Tanjung Labian	11,680.193	River basin within the state	Sabah
6	Sungai Sahebat	Sg Sahebat	22,511.980	River basin within the state	Sabah
5	Sungai Ulu Tungku	Sg Ulu Tungku	25,039.450	River basin within the state	Sabah
7	Sungai Tanjung Labian	Sbh402	3,027.849	River basin within the state	Sabah
4	Sungai Silabukan	Sg Silabukan	52,572.321	River basin within the state	Sabah

Attributes Table

CUSTOM FUNCTIONALITIES

The screenshot displays the MyFloodRAS - Module 1: Flood Information interface. The main map shows Peninsular Malaysia with various flood-affected areas highlighted in red. The interface includes a search bar, navigation tools, and a toolbar with icons for home, refresh, zoom, and layer management. A red box highlights the layer management icon in the toolbar, with a red arrow pointing to the 'Add Layer' dialog box.

The 'Add Layer' dialog box is open, showing the 'Digitize Layer' section. The 'Flood Affected Area' layer is selected, and the 'Draw' mode is set to 'Polygon'. The 'Upload Layer' button is highlighted in green. Below the 'Upload Layer' button, there is a note: 'Note: Upload layer compresses shapfiles and does not accurately represent its features.' and a 'Shapefile' button.

The 'Data Fields' section is also visible, showing the following fields:

ID	FCD	NAM	ARH
-	HH8005	Taman	0

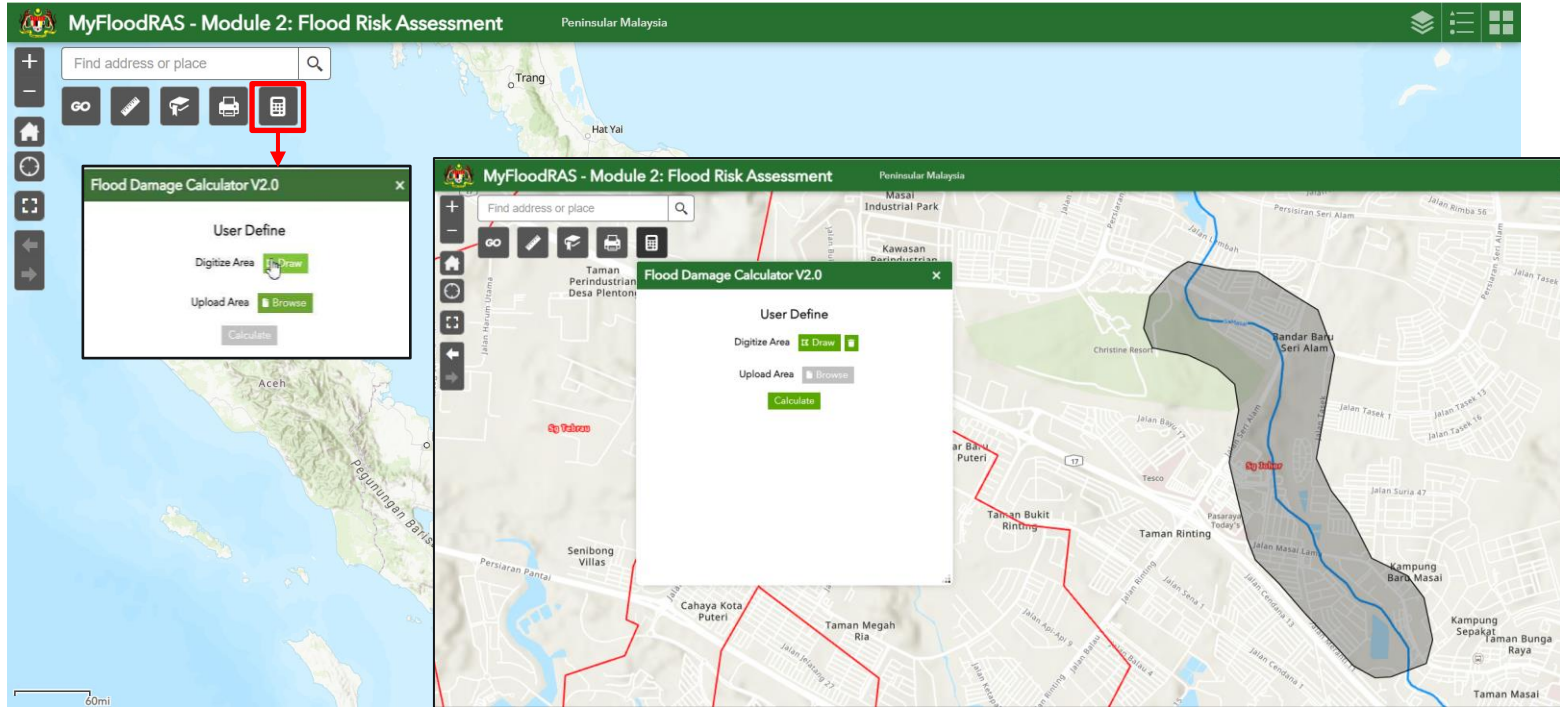
Another 'Add Layer' dialog box is open, showing the 'Digitize Layer' section. The 'Flood Affected Location' layer is selected, and the 'Draw' mode is set to 'Point'. The 'Upload Layer' button is highlighted in green. Below the 'Upload Layer' button, there is a note: 'Note: Upload layer compresses shapfiles and does not accurately represent its features.' and a 'Shapefile' button.

The 'Data Fields' section is also visible, showing the following fields:

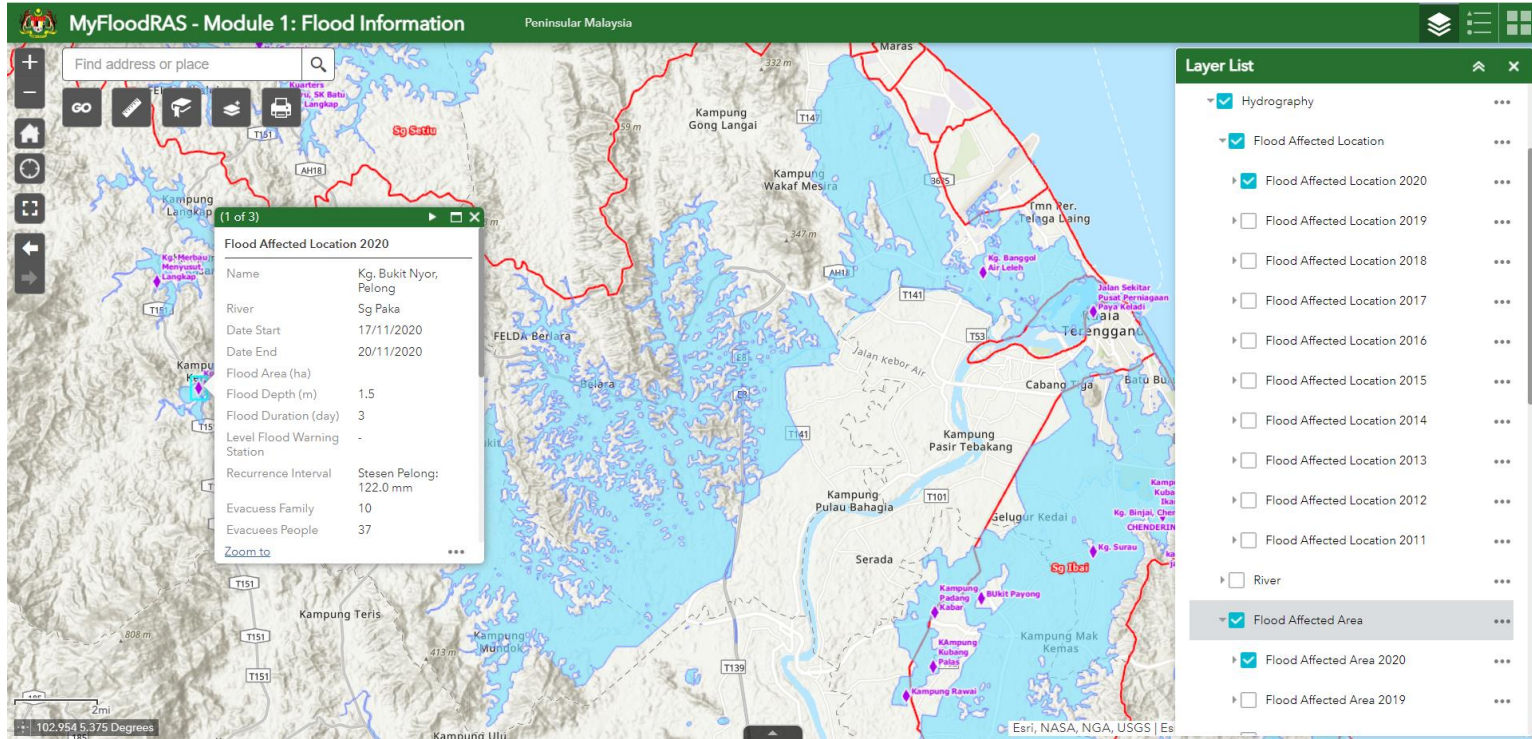
Project Name	Type of Draw Mode
-	-

Add Layer

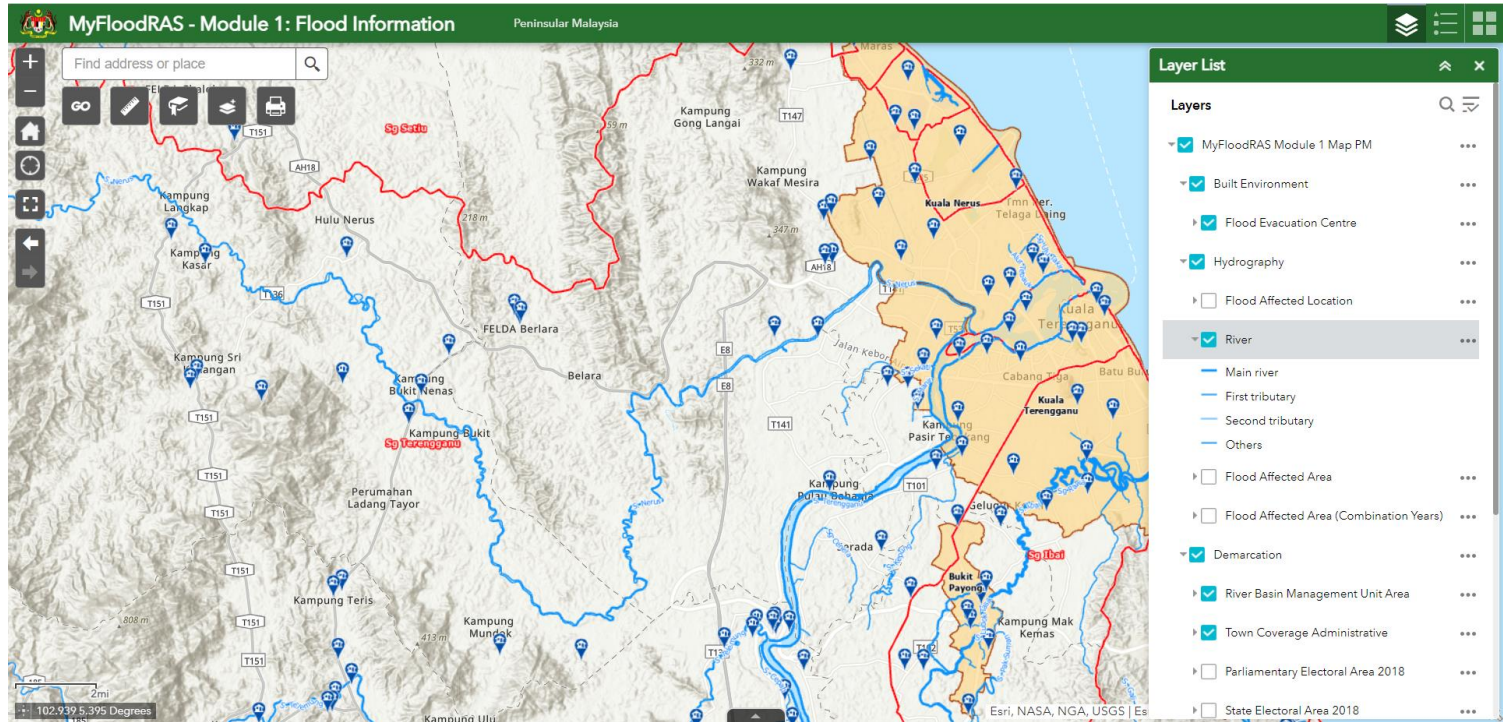
CUSTOM FUNCTIONALITIES



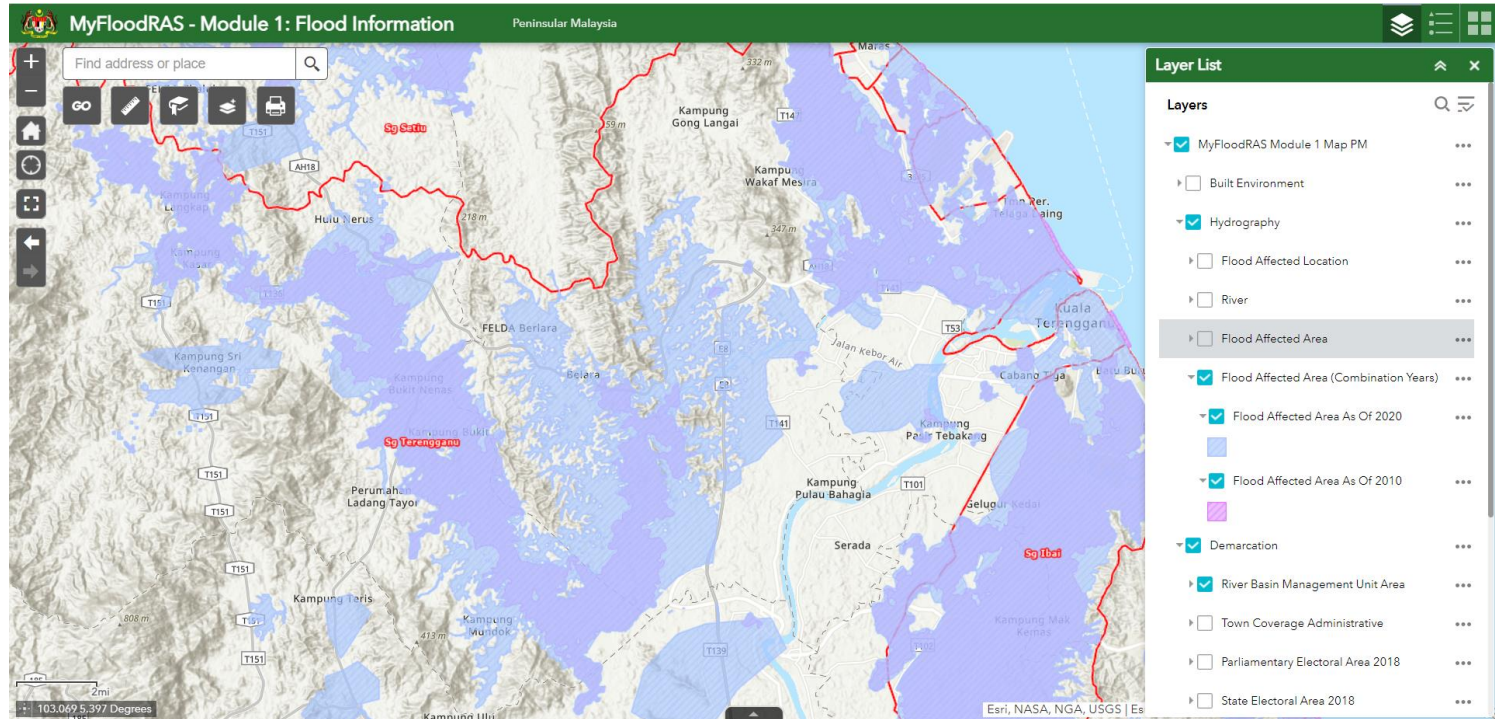
Flood Damage Calculator (Module 2 Only)



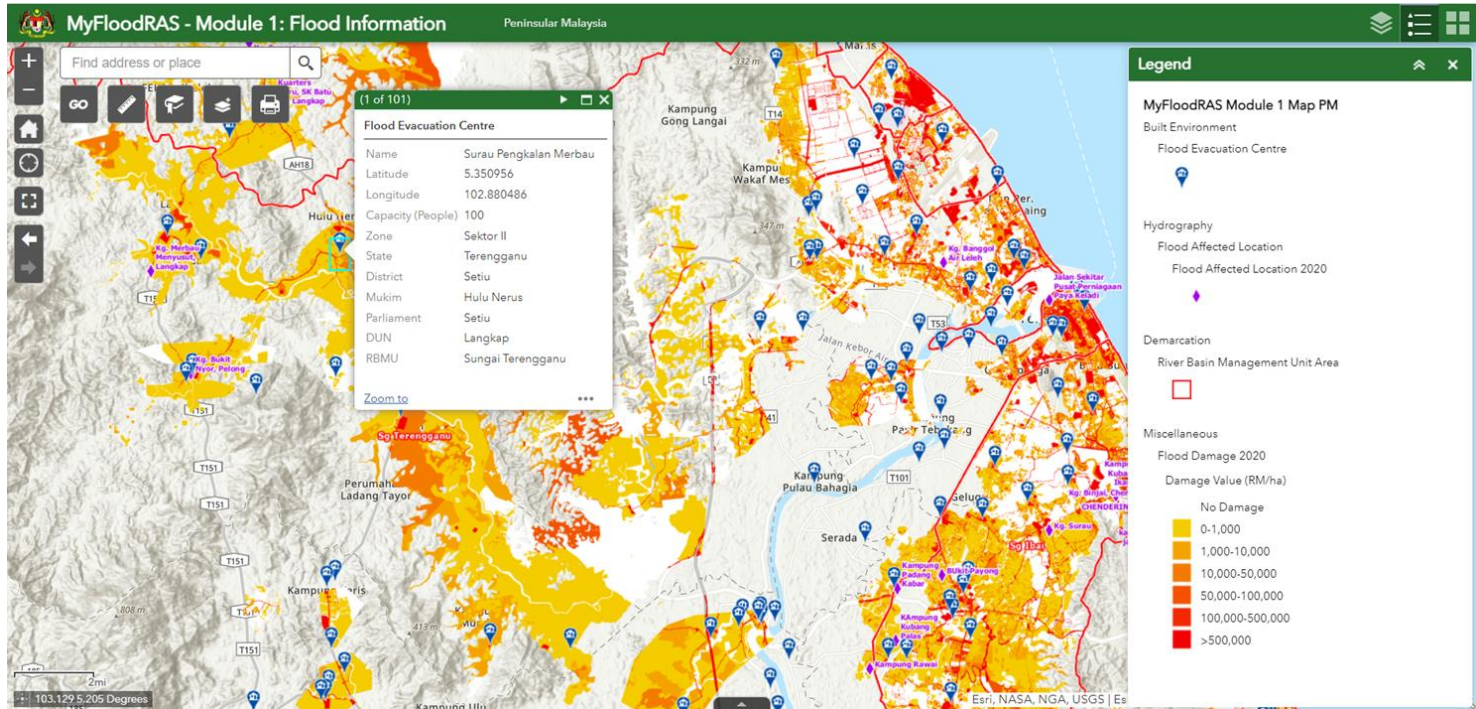
Flood Affected Location & Flood Affected Area



Flood Evacuation Centre, River & Town Coverage Administrative



Flood Affected Area As of 2020 & Flood Affected Area As Of 2010



Flood Damage, Flood Evacuation Centre & Flood Affected Location

MyFloodRAS - Module 1: Flood Information Peninsular Malaysia

Find address or place

Basemap Gallery

- OpenStreetMap
- Imagery
- Light Gray Canvas
- Streets
- Terrain with Labels
- Imagery with Labels
- National Geographic
- Oceans
- Dark Gray Canvas
- Peninsular Malaysia
- Topographic

102.960 5.394 Degrees

OpenStreetMap Basemap

MyFloodRAS - Module 1: Flood Information Peninsular Malaysia

Find address or place

Basemap Gallery

- OpenStreetMap
- Imagery
- Light Gray Canvas
- Streets
- Terrain with Labels
- Imagery with Labels
- National Geographic
- Oceans
- Dark Gray Canvas
- Peninsular Malaysia
- Topographic

Imagery with Labels Basemap

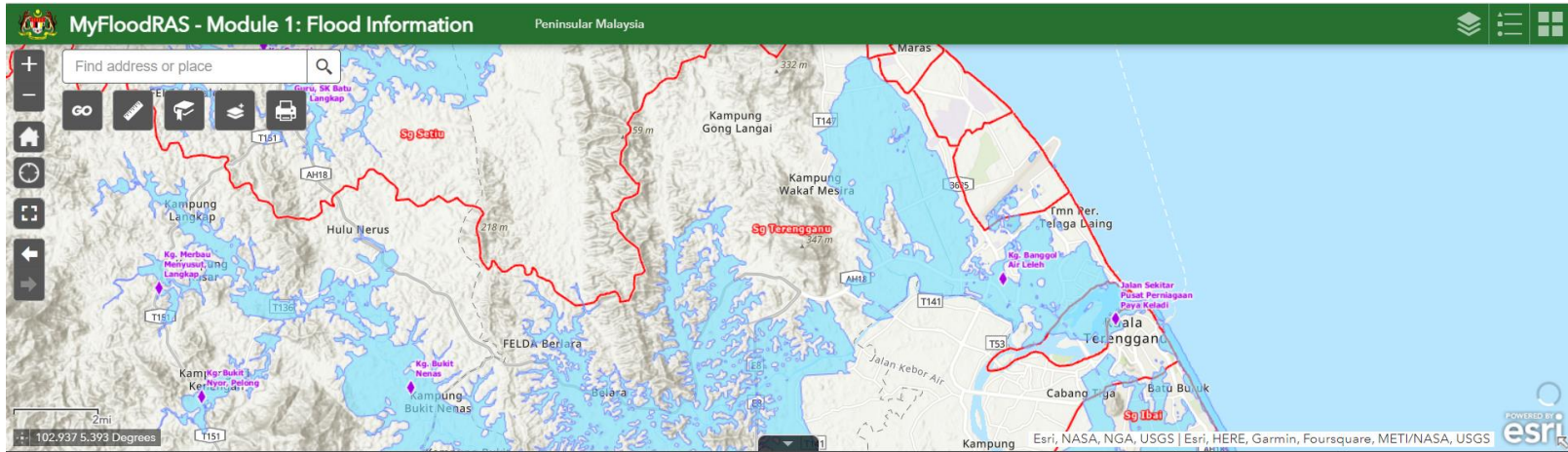
MyFloodRAS - Module 1: Flood Information Peninsular Malaysia

Find address or place

Basemap Gallery

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Peninsular Malaysia Basemap



Flood Affected Location 2020		Flood Affected Area 2020		River Basin Management Unit Area											
Name	River	Date Start	Date End	Flood Area (ha)	Flood Depth (m)	Flood Duration (day)	Level Flood Warning Station	Recurrence Interval	Evacues Family	Evacues People	Death	Damage Reported (RM)	Road/Railway Flooded	Flood Causes	
Jalan Sekitar Pusat Perniagaan Paya Keladi	Sg Terengganu	9/7/2020	12/7/2020		0.5	3	-	Stesen Bukit Tumboh: 79 mm			0		N	1	
Kg. Banggol Air Leleh	Sg Terengganu	23/11/2020	26/11/2020		0.3	3	-	Stesen Bukit Tumboh: 102.0 mm	30		0		N	1	
Kg. Bukit Nenas	Sg Terengganu	19/12/2020	21/12/2020		0.5	2	-	Stesen SK Sg Tong: 136.0 mm	1	2	0		N	1	

7 features 0 selected

Flood Affected Location 2020 Table & Attributes

MyFloodRAS - Module 2: Flood Risk Assessment Peninsular Malaysia

Find address or place

Flood Damage Calculator V2.0

User Define

Digitize Area Draw

Potential Damage Rate (RM/ Ha)

Flood Depth (m) Flood Duration (Day) Mean State

Total Affected Population 6,158 Total Area (ha) 167.806 Direct Damage RM26,626,376.02

Indirect Damage RM7,987,912.81 Total Estimated Flood Damage RM34,614,288.83 Report

State	Flood Damage Component	Component	Quantity (Unit)	Unit Rate (RM)	Potential Flood Damage Factor	Flood Damage (RM)	Flood
Johor							0.2
	Commercial	Commercial	32.178 ha			321,150.47	
	Infrastructure and Utilities	Infrastructure and Utilities	24.979 ha			9,547,367.45	
	Public/ Institutional Buildings	4 Components	13.249 ha			5,274,224.02	
	Transportations	2 Components	47.841 ha			11,285,818.52	
	Industrial	Industrial	1.113 ha			11,105.40	

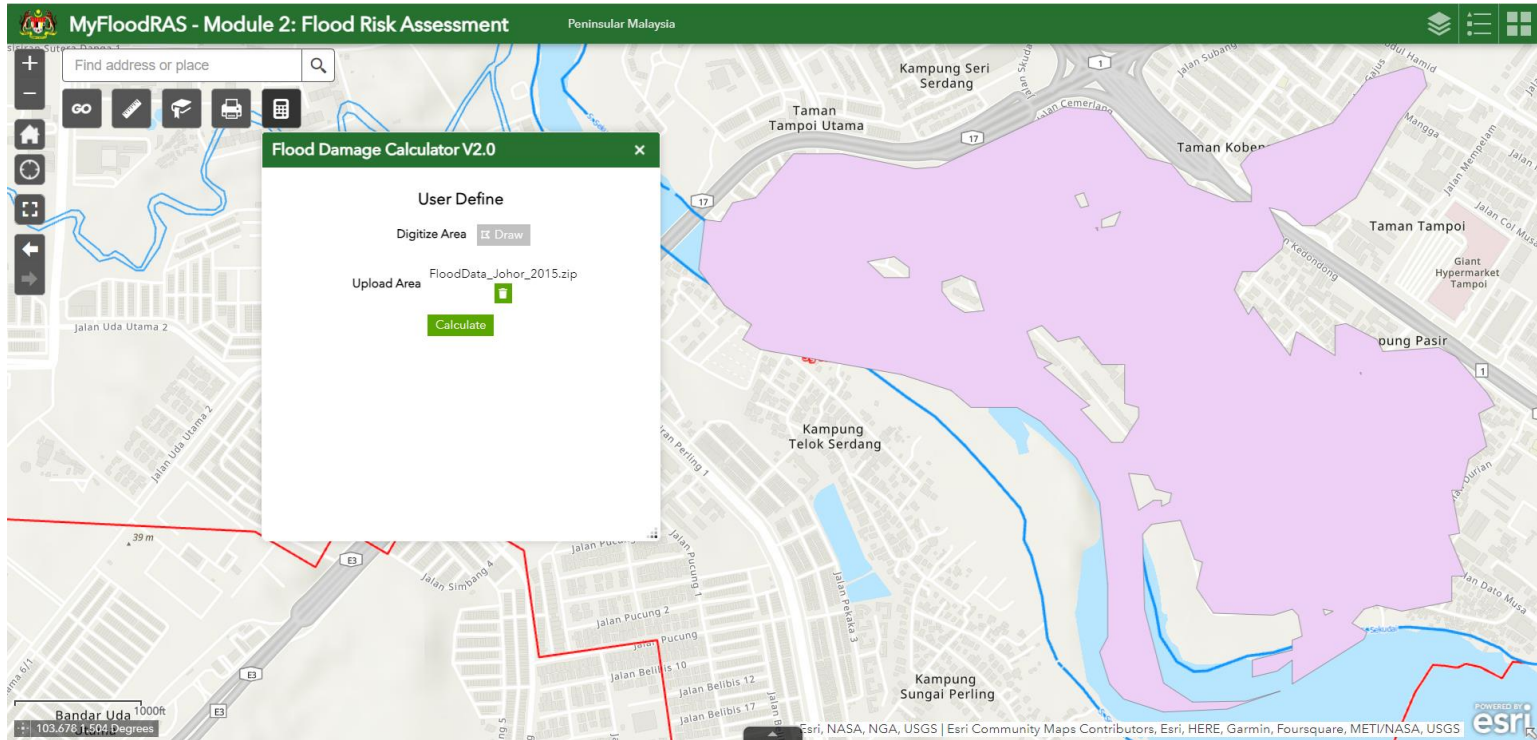
Map labels: Masai Industrial Park, Kawasan Perindustrian, Taman Perindustrian Desa Plentong, Bandar Baru Seri Alam, Kampung Baru Masai, Kampung Sepakat, Taman Bunga Raya, Taman Masai, Persisiran Seri Alam, Jalan Rimba 56, Jalan Tasek 64, Jalan Tasek 13, Jalan Tasek 16, Jalan Suria 47, Jalan Cendana 13, Jalan Cendana 1, Jalan Debaru 24, Senib Villa, Persiaran Pantai, Sg. Tebrau, Christine Resort, Masai, Persiaran, Jalan, Jalan Lintang, Jalan Tasek 7, Jalan Tasek 1, Jalan Tasek 16, Jalan Tasek 13, Jalan Suria 47, Pasaraya Today's, Kampung Baru Masai, Kampung Sepakat, Taman Bunga Raya, Taman Masai.

Scale: 0.3mi

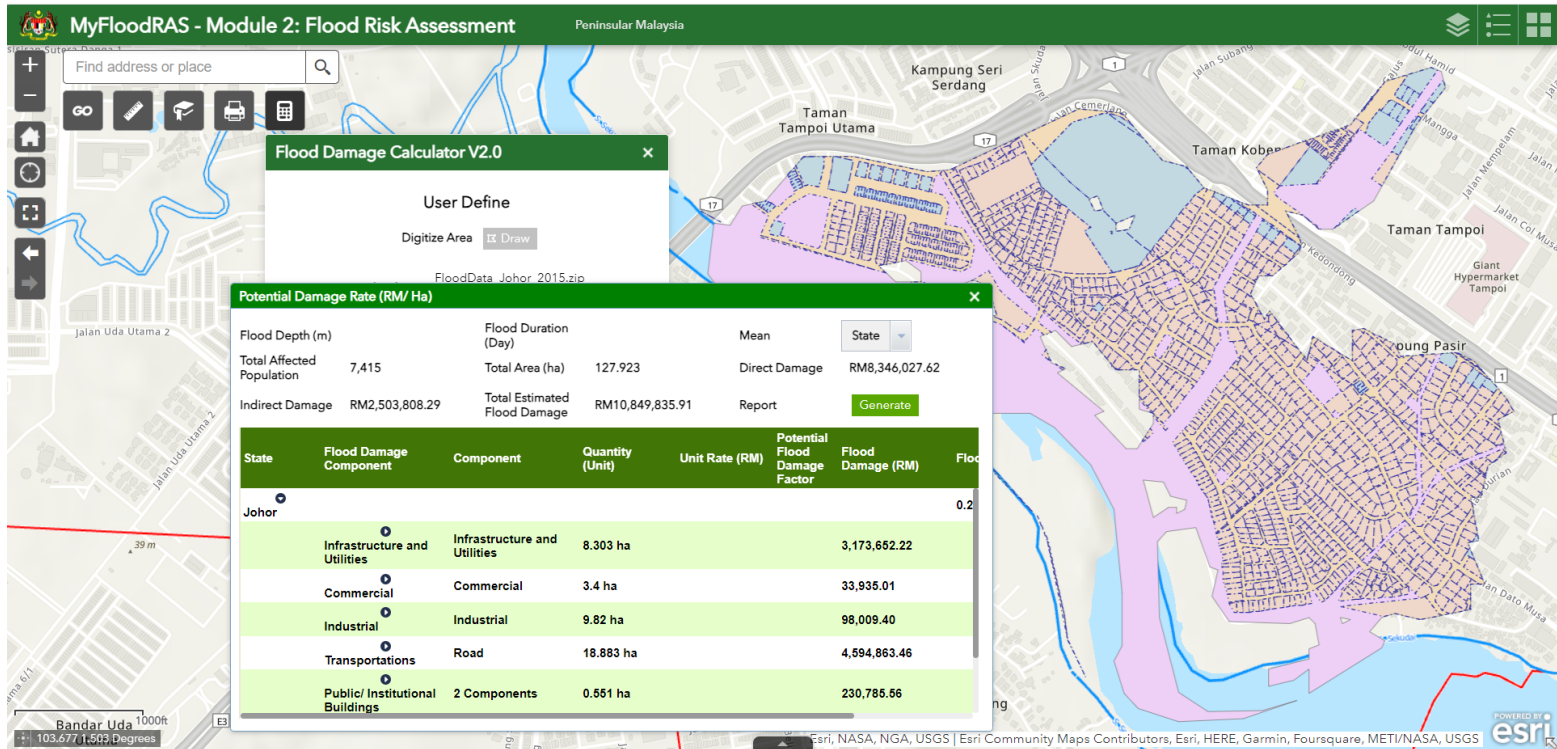
Coordinates: 103.844 1.511 Degrees

Powered by Esri, NASA, NGA, USGS | Esri Community Maps Contributors, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Calculate Flood Damage for Digitized Area



Upload Flood Affected Area



Calculate Flood Damage for Uploaded Area

MyFloodRAS - Module 2: Flood Risk Assessment Peninsular Malaysia

Find address or place

Flood Damage Calculator V2.0

User Define

Digitize Area

FloodData Johor 2015.zip

Potential Damage Rate (RM/ Ha)

Flood Depth (m) Flood Duration (Day) Mean State

Total Affected Population 7,415 Total Area (ha) 127.923 Direct Damage RM8,346,027.62

Indirect Damage RM2,503,808.29 Total Estimated Flood Damage RM10,849,835.91 Report

State	Flood Damage Component	Component	Quantity (Unit)	Unit Rate (RM)	Potential Flood Damage Factor	Flood Damage (RM)	Flood
Johor							0.2
	Infrastructure and Utilities	Infrastructure and Utilities	8.303 ha			3,173,662.22	
	Commercial	Commercial	3.4 ha			33,935.01	
	Industrial	Industrial	9.82 ha			98,009.40	
	Transportations	Road	18.883 ha			4,594,863.46	
	Public/ Institutional Buildings	2 Components	0.551 ha			230,785.56	

Generate Report

Prepared By

River

Flood Event Historical

Flood Event Design

Notes

Generate

Warnings

Bandar Uda 1000ft

103.690 1.496 Degrees

Esri, NASA, NGA, USGS | Esri Community Maps Contributors, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Generate Report

Department of Irrigation and Drainage Malaysia
MyFloodRAS



Flood Report

GENERAL INFO

Date and Time of Issue: Wed, 27/09/2023, 10:48 am
Prepared by: GSE
State: Johor
District: Johor Bahru
RBMU Name: Sungai Skudai
RBMU No: 41
River: Sungai Skudai

FLOOD INFORMATION

Flood Events:

- **Date:** 27/09/2023
- **ARI:** 2 Year

Historical Flood Recorded:

- Kg. Pasir Tebrau [2019]
- Kg. Pasir, Skudai [2017]
- Kg. Pasir [2014, 2020]
- Kg. Serdang [2014]
- Kg. Sri Jaya, Skudai [2018]
- Jalan Sukun, Kg. Pasir, Skudai [2018]
- Kg. Seri Jaya [2020]
- Kg. Seri Serdang [2020]
- Kg. Sri Serdang [2015]
- Kg. Sri Jaya [2015]
- Kg. Pasir, Jalan Sukun [2015]
- Kg. Pasir, Jalan Limau Kasturi [2015]
- Kg. Pasir, Jalan Manggis [2015]
- Kg. Pasir, Jalan Limau [2015]

GENERATED MAP



FLOOD DAMAGE ESTIMATION

State - Mean Depth and Mean Duration:

State	Flood Depth (m)	Flood Duration (days)
Johor	0.22	2.04

State - Average House Size:

State	Average House Size
Johor	3.7

Flood Damage Calculation:

State	Flood Damage Component	Component	Quantity (Unit)	Unit Rate (RM/unit)	Potential Flood Damage Factor	Total Damages (RM)
Johor	Residential	Urban Household	1,934 no	5,913.34	76.38%	8,725,121.98
	Commercial	Commercial	88 no	17,841.60	47.90%	752,687.15
	Industrial	Industrial	128 no	17,841.60	47.90%	1,094,817.67
	Public/ Institutional Buildings	Education	0.1363 ha	712,305.66	47.90%	46,543.63
		Religious	0.4145 ha	761,090.10	47.90%	151,237.20
		Infrastructure and Utilities	Infrastructure and Utilities	8.3034 ha	683,252.00	47.90%
	Transportations	Road	18,8825 ha	435,001.40	47.90%	3,937,750.34

Estimated Results:

Total Direct Damages (RM)	Total Indirect Damages (RM)	Total Estimated Damage Damages (RM)	Flood Damages Rate (RM/ha)
17,437,945.02	5,231,383.51	22,669,328.53	177,211.38
Flood Affected Area (FAA) (ha)	No of Population Living in FAA	No of Affected Population (no)	No of Affected Household (no)
127,9225	7,415	7,156	1,934

BENEFIT OF MyFloodRAS



Early Warning



Risk Assessment



Insurance Pricing



Post-Flood Recovery



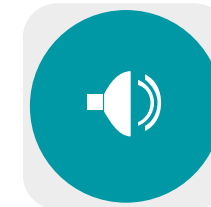
Resource Allocation



Infrastructure
Planning



Climate Change
Adaptation



Public Awareness

Study On Updating Of Condition Of Flooding And Flood Damage Assessment (UCFFDA) In Malaysia

Special thanks to:

- ✓ Bahagian Pengurusan Banjir, Jabatan Pengairan dan Saliran Malaysia
- ✓ Dr Nik And Associates

