

**REPORT ON DROUGHT CONDITION
OF
PENINSULAR MALAYSIA
(BASED ON HYDROLOGIC ANALYSIS)**

July 19, 2005

**Hydrology and Water Resources Division
Department of Irrigation and Drainage
Malaysia**

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Report of Drought Condition in Peninsular Malaysia
(Based on Hydrologic Analysis)
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Summary

Based on rainfall records collected from all 41 stations located on various locations in Peninsular Malaysia, indicate that most stations received substantial amount of rainfall during the second and third week of June. As a result, the drought condition has improved significantly for most part of Peninsular Malaysia. Between middle of April 2005 until second week of June 2005, only one out ten rivers being monitored on-line still experiencing low flow condition. The river is Sg. Kerian at Selama has a low flow of 6.9 cumecs with 5 to 10 years Average Recurrence Interval (ARI).

From six dams being monitored on-line, as on July 18 2005, Timah Tasoh dam has remaining storage of 19.91 million cubic meter (MCM) or 60.42% of its full storage level (FSL) capacity which has significantly improved compared to its lowest ever recorded this year of 28.33% on 22nd Mac 2005. For two other dams i.e. Macap dan Sembrong both in Johor, as recorded on July 18 2005, their water level is still below the alert level at 0.53 m and 0.69 m respectively.

1. Rainfall Analysis

Overall, the drought condition in Peninsular Malaysia has significantly improved towards end of May 2005. Based on Table 1, most of the rainfall stations recorded less amount of rainfall in the month of June 2005. One of the stations records 0.0 mm (station 5003028 in Perak) while another station (station 3411017 in Selangor) records a mere 17.5 mm of rainfall during the month of June. The rainfall data is then used as input to demarcate the isohyetal map as shown in Figure 1 and 2.

From Table 1, we can clearly observe that 2 out of 7 rainfall stations in Johor still recording less rainfall with its deficiency ranging from 16% to 55% of its normal monthly

rainfall. For the state of Perlis, Kedah, Penang, Perak, Selangor, Negeri Sembilan and Pahang the deficiency ranging from 8% to 44%. It shows that, the rainfall deficiency occurs to almost all of the West Coast states and west of Pahang. For East Coast states, especially Kelantan, Terengganu and east of Pahang, the rainfall deficiency range from 9% to 23% which is less severe as compared to the west coast states.

Table 1 : Rainfall Analysis for April – June 2005

(APRIL - JUN 2005)

NO	NO STESEN	April-05	May-05	Jun-05	Total Rainfall	(3Mth Cum Rf)	Diff(mm)	% Dev
1	6501005 (R1)	106.00	190.50	98.00	394.50	525.8	-131.3	-25
2	6206035 (K1)	59.30	143.00	84.00	286.30	464.2	-177.9	-38
3	6103047 (K3)	218.30	223.00	117.90	559.20	520.3	38.9	7
4	061 (K4)	192.20	199.00	99.10	490.30	671.1	-180.8	-27
5	566 (K5)	217.00	209.00	123.50	549.50	666.5	-117.0	-18
6	5505033 (P1)	147.50	257.50	99.00	504.00	550.7	-46.7	-8
7	5304045 (P2)	277.00	315.00	64.00	656.00	465.3	190.7	41
8	5302003 (P3)	196.00	381.00	38.50	615.50	536.5	79.0	15
9	4109095 (A4)	191.00	103.00	70.00	364.00	473.6	-109.6	-23
10	4011139 (A6)	302.50	103.00	140.00	545.50	671.8	-126.3	-19
11	4011144 (A8)	193.50	119.50	144.00	457.00	780.9	-323.9	-41
12	4511111 (A12)	169.50	251.00	59.00	479.50	630.2	-150.7	-24
13	5006021 (A14)	492.50	151.00	56.00	699.50	675.0	24.5	4
14	5003028 (A15)	99.50	175.50	0.00	275.00	469.6	-194.6	-41
15	5210069 (A16)	135.00	85.00	85.00	305.00	432.4	-127.4	-29
16	3411017 (B3)	90.00	88.00	17.50	195.50	335.5	-140.0	-42
17	2917001 (B4)	162.50	88.50	47.50	298.50	531.3	-232.8	-44
18	2818110 (B5)	205.00	209.00	90.00	504.00	488.1	15.9	3
19	3516022 (B6)	184.00	232.50	85.00	501.50	675.6	-174.1	-26
20	3117070 (B7)	202.10	242.00	41.00	485.10	706.3	-221.2	-31
21	3115079 (B8)	170.50	152.00	66.00	388.50	581.4	-192.9	-33
22	2719001 (N1)	286.00	200.50	130.50	617.00	456.8	160.2	35
23	3023098 (N3)	193.00	153.00	89.00	435.00	490.8	-55.8	-11
24	2321006 (M1)	225.00	157.00	46.50	428.50	435.9	-7.4	-2
25	2526001 (J1)	20.00	145.00	40.00	205.00	398.4	-193.4	-49
26	2033001 (J2)	189.50	109.00	131.91	430.41	510.1	-79.7	-16
27	1437116 (J5)	235.00	587.00	77.00	899.00	575.0	324.0	56
28	1829001 (J7)	144.00	30.00	138.50	312.50	526.8	-214.3	-41
29	2528002 (J8)	41.00	90.00	29.00	160.00	352.7	-192.7	-55
30	2536168 (J9)	155.50	168.00	209.00	532.50	511.1	21.4	4
31	2527004 (J10)	25.00	132.00	66.50	223.50	445.9	-222.4	-50
32	3424081 (C3)	137.50	89.00	60.00	286.50	386.6	-100.1	-26
33	3533102 (C4)	248.50	140.00	59.50	448.00	370.1	77.9	21
34	4414036 (C8)	152.00	123.00	88.00	363.00	554.6	-191.6	-35
35	3930012 (C9)	162.00	237.00	221.50	620.50	662.0	-41.5	-6
36	4726001 (D1)	128.00	277.00	200.00	605.00	783.4	-178.4	-23
37	4819027 (D2)	33.00	335.00	159.00	527.00	578.6	-51.6	-9
38	5921009 (D6)	21.50	130.50	291.50	443.50	436.7	6.8	2
39	4234109 (T1)	151.50	248.00	137.00	536.50	431.0	105.5	24
40	4734079 (T2)	157.00	71.00	55.50	283.50	340.3	-56.8	-17
41	5331048 (T5)	75.00	205.00	281.00	561.00	303.9	257.1	85
	MEAN	165.6	184.0	100.88	450.5	522.0	-71.5	-13.7

FOR THE MOVING 3 MONTHLY RAINFALL OF APR – JUNE 2005

MONTH : APR 2005
PERIOD : FEB - APR 2005

MONTH : MAY 2005
PERIOD : MAR - MAY 2005

MONTH : JUNE 2005
PERIOD : APR - JUNE 2005

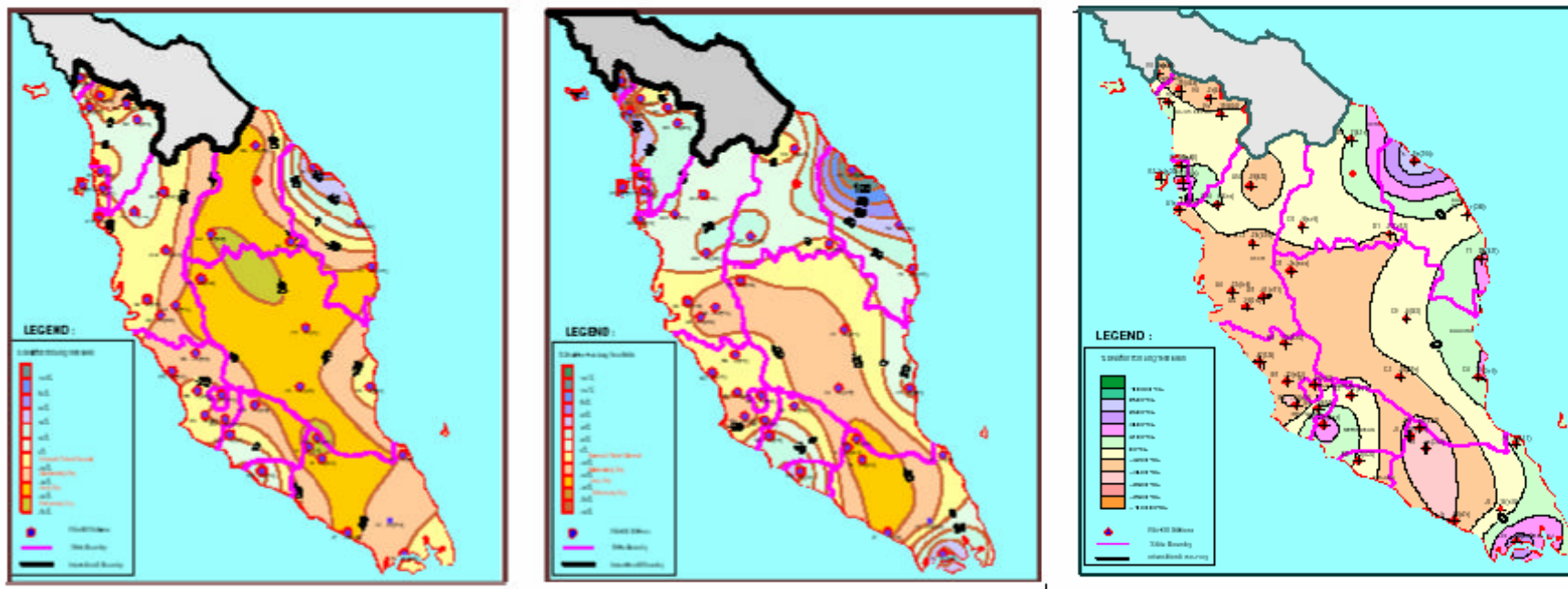


Figure 1 : Isohytal Map Showing Rainfall Deviation from Long Term Mean (Apr – June) 2005)

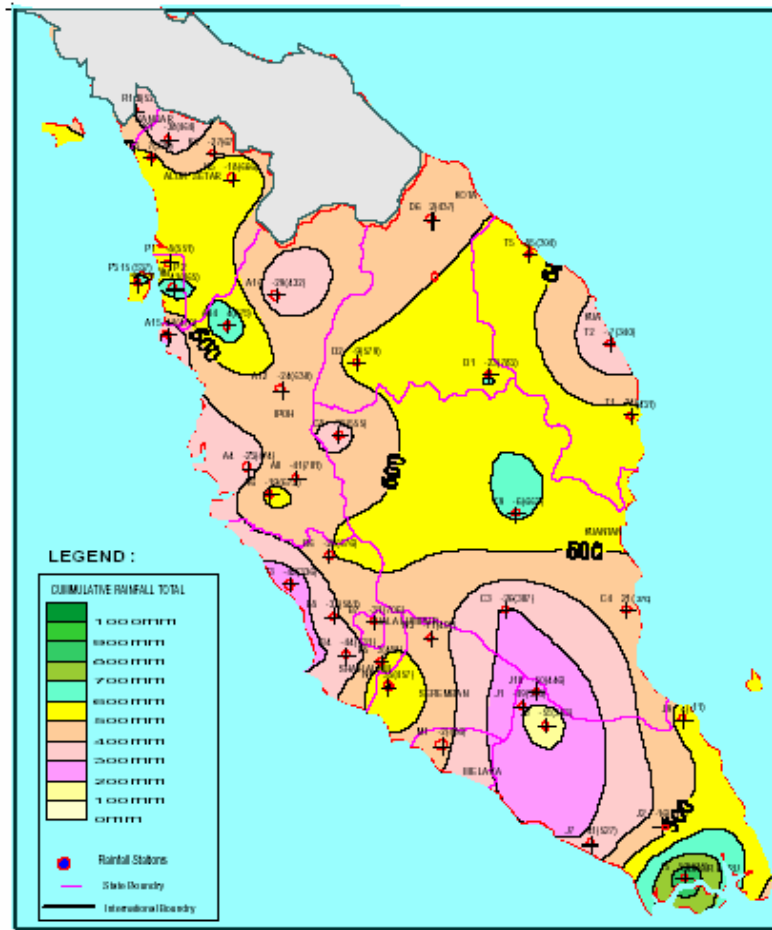


Figure 2 : Isohyet for Three Monthly Rainfall Distribution (June 2005)

2. Low Flow Analysis

From Table 2, as on July 18 2005, the flow of Sg. Kerian at Selama, northern of Perak, is 6.9 cumecs slightly increase from its June 6 reading of 6.3 cumecs. This indicates that the drought condition still persist with an ARI of 5 to 10 years. Three other rivers, namely Sg. Muda at Jambatan Syed Omar, Sg. Bernam at Jambatan SKC and Sg. Kelantan at Jambatan Guillerdmard is experiencing drought condition of 2 to 5 years ARI. Other areas of Peninsular Malaysia have normal or near normal flow conditions.

From Table 3 as on July 18, 2005, the ARI of low flow recorded for Sg. Kelantan at Guillerdmard Bridge, Sg. Muda @ Syed Omar Bridge and Sg. Bernam at SKC Bridge are 128, 11 and 13 cumecs respectively with ARI ranging from 2 to 5 years.

Table 2 : Drought Monitoring by River Flow
 (Data comparable with April 30, 2005, June 6, 2005 and July 18, 2005)

Station Id	Name	State	River Flow (m ³ /s)			
			April 30	May 30	June 6	July 18
5721480	Sg.Kelantan @ Guillerdmard Bridge	Kelantan	83	254	245	128
5606480	Sg.Muda @ Syed Omar Bridge	Kedah	19	21	21	11
2816490	Sg.Langat @ Dengkil	Selangor	10	7	7	25
3813480	Sg.Bernam @ SKC Bridge	Selangor	19	16	16	13
4809490	Sg.Perak @ Kuala Kangsar	Perak	191	184	184	183
5007490	Sg.Kurau @ Pondok Tanjong	Perak	3.4	4.1	4.1	3.8
5206490	Sg.Kerian @ Selama	Perak	5.3	6.3	6.3	6.9
3424490	Sg.Pahang @ Temerloh	Pahang	258	277	277	330
2527490	Sg.Muar @ Buluh Kasap	Johor	6	1	1	offline
1737490	Sg.Johor @ Rantau Panjang	Johor	5.3	3	3	18

Table 3 : Drought Monitoring by River Flow
(on-line Infokemarau)

Drought Monitoring By River Flows									
Station Id	Name	State	Last Update	Water Level (m)	River Flow (m ³ /s)	Drought Flow For Various Return Periods(m ³ /s)			
						2-year	5-year	10-year	20-year
5721480	Sg.Kelantan @ Guillardmard Bridge	Kelantan	19/07/2005-06:01	8.55	128	154	114	88	69
5606480	Sg.Muda @ Syed Omar Bridge	Kedah	17/07/2005-10:02	6.41	11	13	8	5	3
2816490	Sg.Langat @ Dengkil	Selangor	19/07/2005-07:17	3.31	25	5	3	2	1
3813480	Sg.Bernam @ SKC Bridge	Selangor	19/07/2005-07:20	15.90	13	15	12	10	9
4809490	Sg.Perak @ Kuala Kangsar	Perak	19/07/2005-07:01	32.05	183	66	36	22	14
5007490	Sg.Kurau @ Pondok Tanjung	Perak	19/07/2005-07:01	10.83	3.8	3.4	2.4	1.9	1.5
5206490	Sg.Kerian @ Selama	Perak	19/07/2005-07:01	8.76	6.9	10.9	7.7	6.2	4.9
3424490	Sg.Pahang @ Temerloh	Pahang	19/07/2005-07:05	24.20	330	180	125	100	80
2527490	Sg.Muar @ Buluh Kasap	Johor	Off-line	1.58	-12	7.2	4.2	2.9	2.0
1737490	Sg.Johor @ Rantau Panjang	Johor	18/07/2005-09:04	3.53	18	8.5	5.5	4.2	3.2

3. Dam Storage Analysis

From the six dams monitored by Water Resources Unit, Hydrology and Water Resources Division, DID Malaysia as shown in Table 4, 2 dams Machap and Sembrong are still 0.53m and 0.69m below the alert level with reading of 14.59m and 6.50m respectively. Their remaining storages are 43.42% and 30.42%, respectively. The Timah Tasoh dam on the other hand, shows a slight increase from 27.84m as on June 6, 2005 to 28.00m as on July 18, 2005. Table 5 shows the dam monitoring in infokemarau.

Table 4 : Monitoring of Dam Storage Condition
(Comparison of Data for June 6, 2005 and July 18, 2005)

Station Id	Name	State	Alert Level (m)	Water Level (m)		Remaining Dam Storage (MCM)		Remaining Dam Storage (%)	
				June 6	July 18	June 6	July 18	June 6	July 18
3216490	Batu Dam	KL	93.00	101.3	101.66	28.29	29.74	87.87	90.39
3217480	Klang Gates Dam	KL	90.00	90.88	90.62	19.76	18.16	69.23	63.64
6602481	Timah Tasoh Dam	Perlis	27.68	27.84	28.00	15.57	19.91	47.25	60.42
...	Bukit Merah Dam	Perak	7.66	8.19	8.35	n/a	n/a	n/a	n/a
1832480	Macap Dam	Johor	15.12	14.87	14.59	5.50	4.54	52.53	43.42
1931480	Sembrong Dam	Johor	7.19	7.23	6.50	9.99	5.35	56.74	30.42
2030481	Bekok Dam	Johor	12.50	13.26	13.26	30.97	30.97	97.34	97.34

Table 5 : Drought Monitoring by Dam Level
(on-line Infokemarau)

Station Id	Name	State	Last Update	Water Level (m)	Alert Level (m)	Remaining Dam Storage (MCM)	Remaining Dam Storage (%)
3216490	Batu Dam	KL	18/07/2005-22:31	101.66	93.00	29.74	92.39
3217480	Klang Gates Dam	KL	18/07/2005-22:31	90.62	90.00	18.16	63.64
6602481	Timah Tasoh Dam	Perlis	15/07/2005-16:00	28.00	27.68	19.91	60.42
...	Bukit Merah Dam	Perak	21/06/2005-10:01	8.35	7.66	n/a	n/a
1832480	Macap Dam	Johor	18/07/2005-09:05	14.59	15.12	4.54	43.42
1931480	Sembrong Dam	Johor	18/07/2005-09:03	6.50	7.19	5.35	30.42
2030481	Bekok Dam	Johor	22/06/2005-11:00	13.26	12.50	30.97	97.34