

BAB 4 Chapter 4

Kualiti Air Marin dan Pulau-Pulau

Marine and Island Marine Water Quality

BAB 4 | CHAPTER 4

PENGAWASAN KUALITI AIR MARIN

MARINE WATER QUALITY MONITORING

- 81** **Jadual 4.1 : Klasifikasi Indeks Kualiti Air Marin**
Table 4.1 : Marine Water Quality Index Classification
- 82** **Jadual 4.2 : Standard dan Kriteria Kualiti Air Marin Malaysia**
Table 4.2 : Malaysia Marine Water Quality Criteria and Standards
- 84** **Jadual 4.3 Malaysia : Status Kualiti Air Marin Kawasan Pantai**
Table 4.3 Malaysia : Marine Water Quality Status for Coastal
- 88** **Rajah 4.1 Malaysia : Tren Status Kualiti Air Marin Kawasan Pantai Di Malaysia, 2014-2016**
Figure 4.1 Malaysia : The trend of Marine Water Status for Coastal Area in Malaysia, 2014-2016
- 89** **Jadual 4.4 Malaysia : Status Kualiti Air Marin Di Kawasan Kuala**
Table 4.4 Malaysia : Marine Water Quality Status for Estuary
- 91** **Rajah 4.2 Malaysia : Tren Status Kualiti Air Marin Bagi Kawasan Kuala, 2014 - 2016**
Figure 4.2 Malaysia : The Trend Of Marine Water Quality Status for Estuary, 2014 - 2016
- 92** **Jadual 4.5 Malaysia : Stesen-Stesen Pulau, 2016**
Table 4.5 Malaysia : Island Stations, 2016
- 95** **Rajah 4.3 Malaysia : Tren Status Kualiti Air Marin Bagi Pulau, 2014 - 2016**
Figure 4.3: Malaysia : The Trend of Marine Water Quality Status for Island, 2014 - 2016
- 96** **Jadual 4.6 Malaysia : Status Kualiti Air Marin Bagi Pulau**
Table 4.6 Malaysia : Marine Water Quality Status for Island
- 99** **Jadual 4.7 Malaysia : Senarai Pantai Terbaik, 2016**
Table 4.7 Malaysia : List of Excellent Coastal, 2016
- 99** **Jadual 4.8 Malaysia : Senarai Kuala Kategori Terbaik, 2016**
Table 4.8 Malaysia : List of Excellent Estuaries, 2016
- 99** **Jadual 4.9 Malaysia : Senarai Pulau Terbaik, 2016**
Table 4.9 Malaysia : List of Excellent Islands, 2016
- 100** **Peta : Semenanjung Malaysia : Lokasi Stesen Pengawasan Kualiti Air Marin**
Map : Peninsular Malaysia : Location of Marine Water Quality Stations
- 100** **Peta : Sabah & Sarawak : Lokasi Stesen Pengawasan Kualiti Air Marin**
Map : Sabah & Sarawak : Location of Marine Water Quality Stations

PENGAWASAN KUALITI AIR MARIN

Jabatan Alam Sekitar (JAS) menjalankan pengawasan kualiti air marin bermula pada tahun 1978 di Semenanjung Malaysia dan 1985 bagi Sabah dan Sarawak dengan tujuan untuk mengenalpasti status kualiti air marin dan menentukan tahap pencemaran daripada punca-punca di daratan dan juga di laut. Punca-punca pencemaran ini boleh menimbulkan ancaman kepada sumber kehidupan marin dan mengganggu kestabilan dan kepelbagaian ekosistem marin.

Dalam tahun 2016, sebanyak 152 stesen pantai, 76 stesen kuala dan 90 stesen pulau telah dipantau. Sebanyak 608 sampel di kawasan pantai, 304 di kuala dan 360 di pulau telah diambil untuk dianalisis dan hasilnya dilaporkan berdasarkan Indeks Kualiti Air Marin (IKAM).

IKAM digunakan sebagai satu kaedah untuk menentukan kategori dan status kualiti air marin. Indeks ini dibangunkan berdasarkan 7 parameter utama iaitu Oksigen Terlarut (DO), Nitrat (NO_3), Fosfat (PO_4), Ammonia Tidak Terion (NH_3), Faecal Coliform, Minyak dan Gris (O&G) dan Jumlah Pepejal Terampai (TSS).

IKAM yang berskala 0 hingga 100 akan menentukan kategori kualiti air marin daripada "Terbaik" hingga "Tercemar" (**Jadual 4.1**).

MARINE WATER QUALITY MONITORING

The Department of Environment (DOE) has been monitoring the marine water quality since 1978 in Peninsular Malaysia and 1985 in Sabah and Sarawak with the main aims to establish the marine water quality status and to determine the degree of pollution from land-based sources as well as the sea based sources. These sources of pollution can pose threats to the marine life and disturb the stability and diversity of the marine ecosystems.

In 2016, a total of 152 coastal, 76 estuary and 90 island stations were monitored. 608 samples from coastal, 304 samples from estuary and 360 samples from island monitoring stations were collected for analysis and reported based on the Marine Water Quality Index (MWQI).

The MWQI is used as a method to determine the category and status of marine water quality. The index was developed based on the 7 main parameters which are Dissolved Oxygen (DO), Nitrate (NO_3), Phosphate (PO_4), Unionized Ammonia (NH_3), Faecal Coliform, Oil and Grease (O&G) and Total Suspended Solids (TSS).

The resulting MWQI with a scale between 0 to 100 will determine the category of the marine water quality, ranging from "Excellent" to "Poor" (**Table 4.1**).

Jadual 4.1: Klasifikasi Indeks Kualiti Air Marin
Table 4.1: Marine Water Quality Index Classification

KATEGORI / CATEGORY	NILAI INDEKS / INDEX VALUE
Terbaik / Excellent	90 - 100
Baik / Good	80 - <90
Sederhana / Moderate	50 - <80
Tercemar / Poor	0 - <50

Jadual 4.2: Standard dan Kriteria Kualiti Air Marin Malaysia
Table 4.2: Malaysia Marine Water Quality Criteria and Standards

PARAMETER / PARAMETER	KELAS 1 / CLASS 1	KELAS 2 / CLASS 2	KELAS 3 / CLASS 3	KELAS E / CLASS E
Kegunaan/ Uses	Pemeliharaan, Kawasan Dilindungi, Taman Laut/ Preservation, Marine Protected Areas, Marine Parks	Kehidupan Laut, Perikanan, Terumbu Karang, Rekreasi Dan Marikultur/ Marine Life, Fisheries, Coral Reefs, Recreational And Mariculture	Pelabuhan, Lapangan Minyak Dan Gas/ Ports, Oil & Gas Fields	Paya Bakau & Muara Sungai/ Mangroves Estuarine & River-Mouth Water
Suhu (°C)/ Temperature (°C)	≤ 2°C peningkatan terhadap ambien maksimum ≤ 2°C increase over maximum ambient	≤ 2°C peningkatan terhadap ambien maksimum ≤ 2°C increase over maximum ambient	≤ 2°C peningkatan terhadap ambien maksimum ≤ 2°C increase over maximum ambient	≤ 2°C peningkatan terhadap ambien maksimum ≤ 2°C increase over maximum ambient
Oksigen Terlarut (mg/L)/ Dissolved Oxygen (mg/L)	>80% tepu >80% saturation	5	3	4
Jumlah Pepejal Terampai* (mg/L)/ Total suspended solid (mg/L)	25 mg/L atau ≤ 10% peningkatan dalam purata bermusim, yang mana lebih rendah/ 25 mg/L or ≤ 10% increase in seasonal average, whichever is lower	50mg/L (25 mg/L) atau ≤ 10% peningkatan dalam purata bermusim, yang mana lebih rendah/ 50mg/L (25 mg/L) or ≤ 10% increase in seasonal average, whichever is lower	100 mg/L atau ≤ 10% peningkatan dalam purata bermusim, yang mana lebih rendah/ 100 mg/L or ≤ 10% increase in seasonal average, whichever is lower	100 mg/L atau ≤ 30 % peningkatan dalam purata bermusim, yang mana lebih rendah/ 100 mg/L or ≤ 30 % increase in seasonal average, whichever is lower
Minyak dan Geris (mg/L)/ Oil and grease (mg/L)	0.01	0.14	5	0.14
Raksa* (µg/L)/ Mercury* (µg/L)	0.04	0.16 (0.04)	50	0.5
Kadmium* (µg/L)/ Cadmium* (µg/L)	0.5	2 (3)	10	2
Kromium (VI) (µg/L)/ Chromium (VI) (µg/L)	5	10	48	10
Kuprum (µg/L)/ Copper (µg/L)	1.3	2.9	10	2.9
Arsenik (III)* (µg/L)/ Arsenic (III)* (µg/L)	3	20(3)	50	20 (3)
Plumbum (µg/L)/ Lead (µg/L)	4.4	8.5	50	8.5

Jadual 4.2: Standard dan Kriteria Kualiti Air Marin Malaysia
Table 4.2: Malaysia Marine Water Quality Criteria and Standards

PARAMETER / PARAMETER	KELAS 1 / CLASS 1	KELAS 2 / CLASS 2	KELAS 3 / CLASS 3	KELAS E / CLASS E
Kegunaan/ Uses	Pemeliharaan, Kawasan Dilindungi,Taman Laut/ Preservation, Marine Protected Areas, Marine Parks	Kehidupan Laut, Perikanan, Terumbu Karang, Rekreasi Dan Marikultur/ Marine Life, Fisheries, Coral Reefs, Recreational And Mariculture	Pelabuhan, Lapangan Minyak Dan Gas/ Ports, Oil & Gas Fields	Paya Bakau & Muara Sungai/ Mangroves Estuarine & River-Mouth Water
Zink (µg/L)/ Zinc (µg/L)	15	50	100	50
Sianida (µg/L)/ Cyanide (µg/L)	2	7	20	7
Ammonia (tidak terion) (µg/L)/ Ammonia (unionized) (µg/L)	35	70	320	70
Zink (µg/L)/ Zinc (µg/L)	15	50	100	50
Sianida (µg/L)/ Cyanide (µg/L)	2	7	20	7
Ammonia (tidak terion) (µg/L)/ Ammonia (unionized) (µg/L)	35	70	320	70
Nitrit (NO ₂) (µg/L)/ Nitrite (NO ₂) (µg/L)	10	55	1,000	55
Nitrat (NO ₃) (µg/L)/ Nitrate (NO ₃) (µg/L)	10	60	1,000	60
Fosfat (µg/L)/ Phosphate (µg/L)	5	75	670	75
Fenol (µg/L)/ Phenol (µg/L)	1	10	100	10
Tributyltin (TBT) (µg/L)	0.001	0.01	0.05	0.01
Faecal coliform	70 faecal coliform count/100mL	100 faecal coliform count/100mL & (70 faecal coliform count/100mL)	200 faecal coliform count/100mL	100 faecal coliform count/100mL & (70 faecal coliform count/100mL)
Polycyclic Aromatic Hydrocarbon (PAHs) µg/L	100	200	1000	1000

Nota: * Nilai SKKAM dalam kurungan digunakan untuk kawasan air marin yang menjadi sumber makanan laut
Note: * MWQCS in parentheses are for coastal and marine water areas where seafood for human consumption is applicable

STATUS KUALITI AIR MARIN PANTAI

Dalam tahun 2016, sebanyak 152 stesen pantai telah dipantau dan dianalisis serta dilaporkan dalam Indeks Kualiti Air Marin. Hasil pengawasan menunjukkan 16 stesen (11%) dikategorikan sebagai Terbaik, 31 stesen (20%) sebagai Baik, 103 stesen (68%) sebagai Sederhana dan 2 stesen (1%) sebagai Tercemar. (Jadual 4.3).

COASTAL WATER QUALITY STATUS

In 2016, a total of 152 coastal stations was monitored, analysed and reported in term of the Marine Water Quality Index. The monitoring results indicated that 16 stations (11%) as Excellent, 31 stations (20%) as Good, 103 stations (68%) as Moderate and 2 stations (1%) as Poor (Table 4.3).

Jadual 4.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
Table 4.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Kedah	Pantai / Coastal	Pantai Merdeka	5603905	65.63	68.57	76.30	Sederhana / Moderate
		Langkawi Island Resort	6399914	80.51	71.44	66.09	Sederhana / Moderate
		Pantai Kok	6397922	82.15	72.23	66.59	Sederhana / Moderate
		Pantai Kuh	6398925	80.37	71.05	71.01	Sederhana / Moderate
		Pantai Pasir Tengkorak	6499701	82.05	85.47	68.89	Sederhana / Moderate
		Pantai Teluk Burau	6396923	88.36	70.95	64.55	Sederhana / Moderate
		Pantai Teluk Nibong	6497915	79.68	74.75	63.19	Sederhana / Moderate
		Pantai Tengah	6297903	70.21	68.06	60.04	Sederhana / Moderate
Pulau Pinang	Pantai / Coastal	Gertak Sanggul	5201919	55.64	53.11	53.91	Sederhana / Moderate
		Kawasan Perindustrian Bayan Lepas I	5303932	55.34	-	-	-
		Kawasan Perindustrian Bayan Lepas II	5303933	54.71	-	-	-
		Kawasan Perindustrian Bayan Lepas III	5302939	54.46	53.88	50.05	Sederhana / Moderate
		Pantai Bersih	5403906	61.22	52.63	76.02	Sederhana / Moderate
		Pantai Miami	5502901	65.47	69.18	61.60	Sederhana / Moderate
		Pantai Pasir Panjang	5201938	66.81	70.46	63.77	Sederhana / Moderate
		Batu Feringgi (Casuarina)	5402904	69.22	66.07	79.68	Sederhana / Moderate
		Luar Pantai Teluk Bahang	5402930	66.54	65.36	88.10	Baik / Good
		Persiaran Gurney	5403902	66.86	48.03	83.66	Baik / Good
		Rumah Pam Baru Perai	5304927	55.45	52.80	66.44	Sederhana / Moderate
		Rumah Pam Lama Perai	5303926	59.73	55.26	61.75	Sederhana / Moderate
		Selat PP Selatan (Jelutong)	5303911	51.73	49.68	60.39	Sederhana / Moderate
		Tanjung Bungah	5402937	67.36	61.82	83.73	Baik / Good
		Teluk Tempoyak	5202923	61.87	52.55	51.15	Sederhana / Moderate
Batu Maung	5202901	57.26	52.83	46.69	Tercemar / Poor		
Perak	Pantai / Coastal	Pantai Pasir Bogak	4205908	80.41	55.97	58.61	Sederhana / Moderate
		Pantai Teluk Dalam	4205928	70.01	54.45	75.24	Sederhana / Moderate
		Pantai Teluk Batik	4205932	71.11	73.00	51.24	Sederhana / Moderate
		Pantai Tanjung Batu	4406927	84.07	69.34	53.16	Sederhana / Moderate
		Pantai Pasir Panjang	4205924	85.58	51.97	52.02	Sederhana / Moderate

Jadual 4.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
Table 4.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Selangor	Pantai / Coastal	Pantai Bagan Lalang	2616927	85.49	89.27	90.62	Terbaik / Excellent
		Pantai Morib	2712902	87.97	70.10	62.47	Sederhana / Moderate
		Selat Pulau Babi	3012929	93.51	87.15	75.42	Sederhana / Moderate
		Selat Klang Utara	3013908	94.96	68.11	78.09	Sederhana / Moderate
Negeri Sembilan	Pantai / Coastal	Bagan Pinang	2518915	92.75	87.97	97.65	Terbaik / Excellent
		Telok Sinting	2419908	88.84	90.65	97.53	Terbaik / Excellent
		Port Dickson Bandar	2517907	70.39	84.10	97.95	Terbaik / Excellent
		Port Dickson Batu 4	2518937	93.92	91.61	97.91	Terbaik / Excellent
		Port Dickson Batu 5	2418906	67.31	88.16	97.82	Terbaik / Excellent
		Port Dickson Batu 6	2418916	81.68	88.80	97.93	Terbaik / Excellent
		Port Dickson Batu 7	2418905	90.13	86.85	97.94	Terbaik / Excellent
		Port Dickson Batu 8	2418912	93.86	77.94	97.95	Terbaik / Excellent
		Port Dickson Batu 10	2418914	90.10	93.11	97.91	Terbaik / Excellent
		Port Dickson Janakuasa TNB	2517909	91.99	79.48	97.91	Terbaik / Excellent
		Telok Pelanduk	2419917	91.50	93.60	97.86	Terbaik / Excellent
		Pantai Cermin	2416918	88.47	89.62	97.79	Terbaik / Excellent
		Melaka	Pantai / Coastal	Pantai Rombang	2221916	55.15	58.84
Pantai Kundur	2221908			55.51	55.38	57.84	Sederhana / Moderate
Pantai Tanjung Bidara	2320909			52.04	53.50	57.91	Sederhana / Moderate
Teluk Gong	2320902			51.58	55.56	57.93	Sederhana / Moderate
Pulau Melaka Point A(i)	2121915			-	78.57	72.98	Sederhana / Moderate
Pulau Melaka Point A(ii)	2121915			-	-	-	-
Pulau Melaka Point B(i)	2121916			-	84.38	63.91	Sederhana / Moderate
Pulau Melaka Point B(ii)	2121916	-	-	-	-		
Johor	Pantai / Coastal	Tanjung Bin	1336975	90.21	90.25	84.91	Baik / Good
		Pelabuhan Tanjung Pelepas	1438943	85.79	89.61	85.92	Baik / Good
		Hadapan Jabatan Laut	1438918	87.11	62.51	84.09	Baik / Good
		Pantai Stulang Laut	1437951	61.00	58.56	76.01	Sederhana / Moderate
		Jeti Teluk Jawa	1438918	84.28	64.59	53.12	Sederhana / Moderate
		Pelabuhan Pasir Gudang	1428939	64.62	75.37	75.61	Sederhana / Moderate
		Hadapan HSAJB	1437920	55.74	64.08	44.36	Tercemar / Poor
		Pantai Lido	1437921	63.25	59.16	66.36	Sederhana / Moderate
		Pantai Teluk Mahkota	1841911	85.51	85.58	89.13	Baik / Good
		Pantai Tanjung Leman	2140694	87.85	88.85	88.87	Baik / Good
		Pantai Sri Pantai	2339960	87.81	87.93	88.88	Baik / Good
		Tanjung Merak	1441968	61.98	73.30	89.54	Baik / Good
		Tanjung Pengelih	1441967	85.38	88.54	88.20	Baik / Good
		Pantai Tanjong Stapa	1341961	57.22	88.08	89.76	Baik / Good
		Pantai Teluk Gorek	2538958	79.89	89.11	88.61	Baik / Good
		Pantai Air Papan	2538959	86.86	89.75	89.22	Baik / Good
		Jeti Kukup	1334925	64.52	62.22	87.52	Baik / Good
		Jeti Tanjong Belungkor	1440963	87.92	84.34	89.48	Baik / Good
Pasir Gogok	1441966	79.73	89.48	90.36	Terbaik / Excellent		
Pahang	Pantai / Coastal	Pantai Cherating (Club Med)	4133903 (A)	91.11	85.03	60.09	Sederhana / Moderate
		Pantai Cherating (Club Med)	4133903 (B)	94.11	85.22	61.61	Sederhana / Moderate
		Pantai Cherating (Legend)	4133942 (A)	67.36	87.51	81.62	Baik / Good
		Pantai Cherating (Legend)	4133942 (B)	92.74	87.95	61.87	Sederhana / Moderate
		Pantai Muhibbah Balok	3933901 (A)	87.45	77.60	58.94	Sederhana / Moderate

Jadual 4.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
Table 4.3 Malaysia: Marine Water Quality Status for Coastal

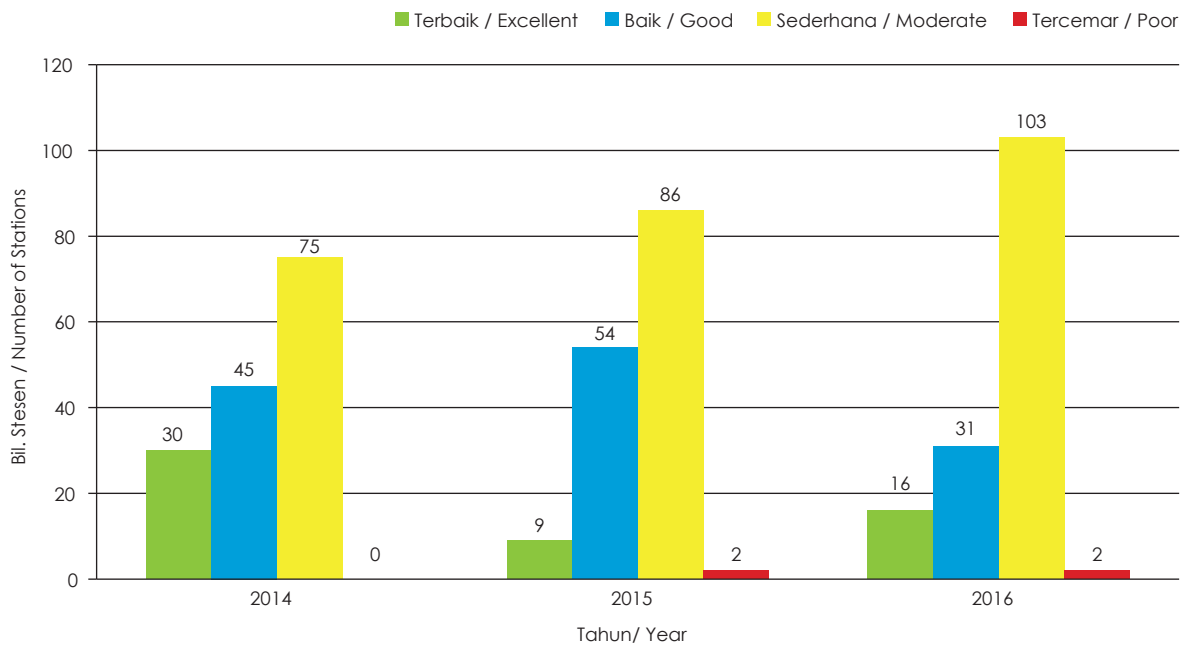
NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Pahang	Pantai / Coastal	Pantai Batu Hitam	3833915 (A)	93.94	85.10	62.06	Sederhana / Moderate
		Pantai Batu Hitam	3833915 (B)	91.21	87.43	56.89	Sederhana / Moderate
		Pantai Berserah	3933941 (A)	93.92	90.27	65.05	Sederhana / Moderate
		Pantai Berserah	3933941 (B)	71.49	78.41	63.68	Sederhana / Moderate
		Pantai Teluk Cempedak	3833910 (A)	93.36	78.44	59.21	Sederhana / Moderate
		Pantai Teluk Cempedak	3833910 (B)	94.29	67.43	59.02	Sederhana / Moderate
		Pantai Teluk Gelora	3833909 (A)	71.47	62.30	64.01	Sederhana / Moderate
		Pantai Teluk Gelora	3833909 (B)	78.43	64.60	59.26	Sederhana / Moderate
		Pantai Sepat	3737915	93.66	62.05	88.46	Baik / Good
		Pantai Sepat (B)	3633916	94.29	85.58	80.21	Baik / Good
		Pantai Legenda (A)	3534943 (A)	94.25	82.83	85.48	Baik / Good
		Pantai Legenda (B)	3534943 (B)	94.20	64.31	79.76	Sederhana/Moderate
		Pantai Kuala Api-Api	3235917	93.21	66.17	79.71	Sederhana / Moderate
		Pantai Tanjung Batu	3334915	93.03	83.32	79.29	Sederhana / Moderate
Terengganu	Pantai / Coastal	Pantai Batu Buruk	5331935	66.63	58.57	78.18	Sederhana/Moderate
		Pantai Bukit Keluang	5825903	69.87	52.50	64.21	Sederhana/Moderate
		Pantai Chendering	5231934	69.84	53.93	61.90	Sederhana/Moderate
		Pantai Rantau Abang	4833917	70.35	60.72	61.70	Sederhana/Moderate
		KIPC Utara	4634954	62.22	62.63	74.41	Sederhana/Moderate
		KIPC Tengah	4534955	63.60	73.57	77.28	Sederhana/Moderate
		KIPC Selatan	4534956	66.53	75.99	74.86	Sederhana/Moderate
		Pantai Kijal	4193530	-	-	62.73	Sederhana/Moderate
Kelantan	Pantai/Coastal	Pantai Seri Tujuh	6221910	71.10	63.01	66.23	Sederhana/Moderate
		Pantai Cahaya Bulan	6122903	74.47	61.56	78.02	Sederhana/Moderate
		Pantai Sabak	6123909	72.13	61.66	66.66	Sederhana/Moderate
		Pantai Irama Bachok	6024908	69.29	62.24	66.25	Sederhana/Moderate
		Pantai Bisikan Bayu	5825905	67.44	64.01	66.69	Sederhana/Moderate
Sarawak	Pantai/Coastal	Pantai Sematan	1898902	91.47	76.37	74.39	Sederhana/Moderate
		Pantai Pandan	1824918	94.47	87.00	75.63	Sederhana/Moderate
		Pantai Pasir Putih	1604910	67.36	67.73	88.80	Baik/Good
		Pantai Bako	1704906	94.29	88.54	74.23	Sederhana/Moderate
		Pantai Damai	1702904	91.29	76.13	89.00	Baik/Good
		Pantai Tanjung Kembang	1810923	73.99	87.39	85.32	Baik/Good
		Pantai Harmoni Mukah	2920921	53.87	54.68	85.54	Baik/Good
		Pantai Tanjung Batu	3132602	70.29	67.28	82.07	Baik/Good
		Pantai Likau	3230915	63.19	89.02	79.00	Sederhana/Moderate
		Pantai Emas	3331903	63.77	88.93	90.88	Terbaik/Excellent
		Pantai Piasau	4539918	88.55	82.17	68.65	Sederhana/Moderate
		Pantai Brighton	4449917	91.43	94.00	68.01	Sederhana/Moderate
		Pantai Esplaned	4339920	89.63	97.11	68.31	Sederhana/Moderate
		Pantai Beraya	4238921	89.42	97.32	68.08	Sederhana/Moderate
		Pantai Bungai	4137922	91.11	82.96	94.62	Terbaik/Excellent
Pantai Belawai	2212913	65.92	83.80	73.02	Sederhana/Moderate		

Jadual 4.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
Table 4.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Sabah	Pantai/Coastal	Pantai Teluk Brunei 1	5053901	80.05	82.27	66.57	Sederhana/Moderate
		Pantai Teluk Brunei 2	5053902	79.10	83.66	59.43	Sederhana/Moderate
		Pantai Teluk Brunei 3	5053903	73.19	85.93	67.49	Sederhana/Moderate
		Pantai Teluk Brunei 4	5053904	75.80	86.68	66.44	Sederhana/Moderate
		Pantai Teluk Brunei 5	5053905	71.05	85.90	65.83	Sederhana/Moderate
		Pantai Teluk Brunei 6	5053906	80.37	83.74	67.28	Sederhana/Moderate
		Borneo Golf Seawater	5355901	80.38	79.00	68.17	Sederhana/Moderate
		Pantai Manis Papar	5555901	81.01	83.86	66.82	Sederhana/Moderate
		Pantai Melinsung	5565902	77.45	83.08	67.71	Sederhana/Moderate
		Pantai Tanjung Aru (Rest Lido)	5656901	82.39	68.15	68.12	Sederhana/Moderate
		Pantai Tanjung Aru (Roll Skating)	5656902	70.13	67.09	63.82	Sederhana/Moderate
		Pantai Tanjung Aru (No. 3)	5656903	67.59	66.39	67.11	Sederhana/Moderate
		Pantai Lok Kawi	5656904	59.14	69.30	62.71	Sederhana/Moderate
		Pantai Dalit Tuaran	6161901	85.15	70.73	64.08	Sederhana/Moderate
		Mangrove Paradise	6161902	86.21	67.12	68.23	Sederhana/Moderate
		Pantai Sabandar	6161903	83.07	68.84	67.87	Sederhana/Moderate
		Pantai Bak-Bak Kudat	6665901	85.11	65.47	63.48	Sederhana/Moderate
		Pasir Putih Sandakan	5580901	83.49	84.12	67.92	Sederhana/Moderate
		Pantai TLDM	5580902	81.66	87.84	69.45	Sederhana/Moderate
		Pantai Batu Sapi	5580903	83.05	84.66	67.58	Sederhana/Moderate
		Pantai Ulu Tungku	5085901	83.94	84.70	68.32	Sederhana/Moderate
		Pantai Sarina Kunak	4481901	83.69	82.82	69.83	Sederhana/Moderate
Pantai Kg. Lamak	4581902	-	82.64	67.95	Sederhana/Moderate		
Pantai Tinagat	4473901	83.50	82.05	69.28	Sederhana/Moderate		
Labuan	Pantai/Coastal	Pulau Papan	5151905	51.08	76.37	75.30	Sederhana/Moderate
		Kiamsam	5151906	67.74	77.30	76.16	Sederhana/Moderate
		Sungai Pagar	5151907	79.75	77.91	78.88	Sederhana/Moderate
		Layang-Layangan	5251902	79.49	76.44	77.98	Sederhana/Moderate
		Tanjung Aru	5251903	75.93	78.49	72.34	Sederhana/Moderate

Tren Indeks Kualiti Air Marin (IKAM) mulai tahun 2014 hingga 2016 adalah seperti yang ditunjukkan dalam **Rajah 4.1**. Bilangan stesen Terbaik dan Sederhana menunjukkan peningkatan, manakala bagi stesen Baik menunjukkan penurunan.

Marine Water Quality Index (MWQI) trends from 2014 to 2016 are shown in **Figure 4.1**. The numbers of 'Excellent' and 'Moderate' stations showed an increase while the numbers of 'Good' stations showed a decrease.



Rajah 4.1 Malaysia: Tren Status Kualiti Air Marin Kawasan Pantai Di Malaysia, 2014-2016
 Figure 4.1 Malaysia: The trend of Marine Water Status for Coastal Area in Malaysia, 2014-2016



STATUS KUALITI AIR KUALA

Dalam tahun 2016, sebanyak 76 stesen kuala telah dipantau dan sampel air dari stesen pengawasan telah dianalisa serta keputusan dilaporkan sebagai Indeks Kualiti Air Marin. Hasil program pengawasan yang telah dijalankan menunjukkan 6 stesen (8%) dikategorikan sebagai Terbaik, 12 stesen (16%) sebagai Baik, 54 stesen (71%) sebagai Sederhana dan 4 stesen (5%) sebagai Tercemar. **(Jadual 4.4)**

ESTUARY WATER QUALITY STATUS

In 2016, 76 estuary stations were monitored, sample from estuary monitoring stations was analysed and reported as Marine Water Quality Index. The results from the monitoring programme indicated that 6 stations (8%) as Excellent, 12 stations (16%) as Good, 54 stations (71%) as Moderate and 4 stations (5%) as Poor. **(Table 4.4)**

Jadual 4.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
Table 4.4 Malaysia: Marine Water Quality Status for Estuary

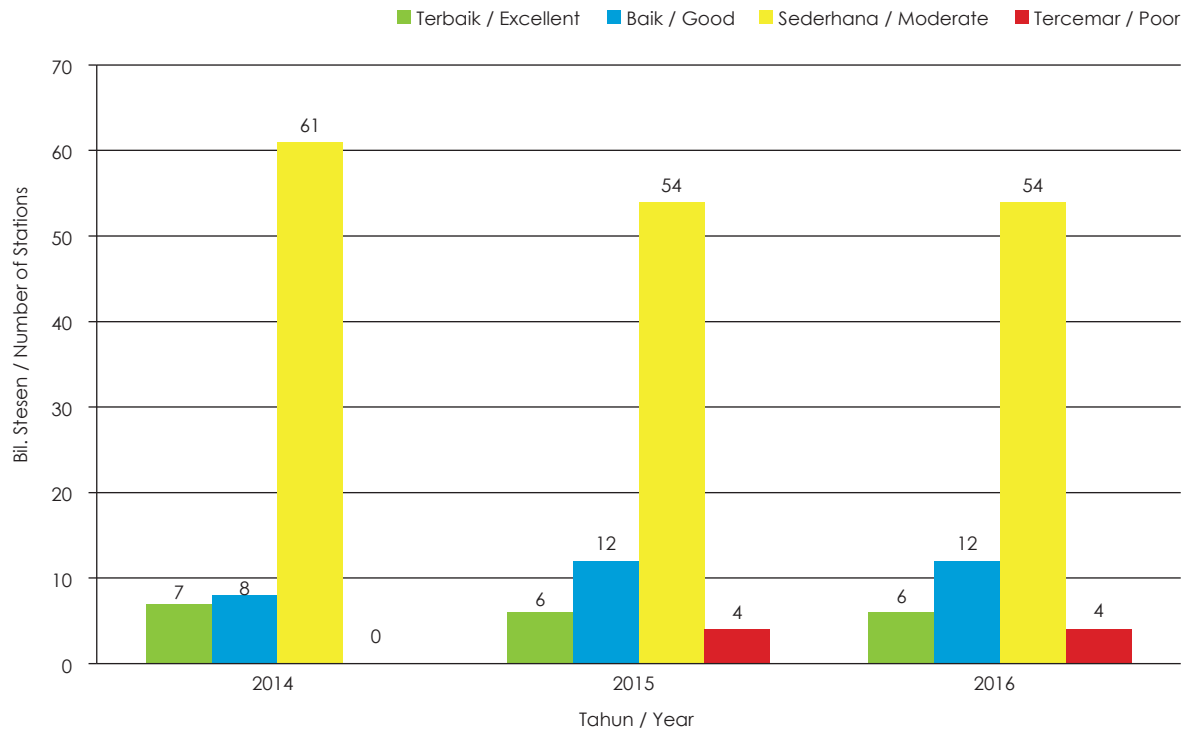
NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
PERLIS	KUALA/ESTUARY	KUALA SUNGAI BARU	6201902	76.48	56.12	60.52	SEDERHANA/MODERATE
		KUALA SUNGAI PERLIS	6401901	59.25	53.96	61.90	SEDERHANA/MODERATE
KEDAH	KUALA/ESTUARY	KUALA KEDAH	6102908	53.46	50.46	77.55	SEDERHANA/MODERATE
		KUALA JERLUN	6302925	65.21	59.02	75.28	SEDERHANA/MODERATE
PULAU PINANG	KUALA/ESTUARY	KUALA SUNGAI JAWI	5204901	58.35	49.63	45.56	TERCEMAR/POOR
		KUALA SUNGAI JURU	5303904	63.62	59.40	70.61	SEDERHANA/MODERATE
		KUALA SUNGAI KERIAN	5104901	61.57	60.38	34.21	TERCEMAR/POOR
		KUALA SUNGAI PINANG	5403934	50.66	47.28	58.39	SEDERHANA/MODERATE
		KUALA SUNGAI PERAI	5303908	53.06	56.22	64.89	SEDERHANA/MODERATE
		KUALA SUNGAI TENGAH	5204935	60.95	67.81	65.19	SEDERHANA/MODERATE
PERAK	KUALA/ESTUARY	KUALA SUNGAI PINANG (BALIK PULAU)	5202929	67.78	46.17	60.11	SEDERHANA/MODERATE
		KUALA SUNGAI MANJUNG	4205930	70.13	67.56	78.96	SEDERHANA/MODERATE
		KUALA SUNGAI GULA	4906926	68.90	60.95	67.43	SEDERHANA/MODERATE
		KUALA SUNGAI KURAU	4994919	56.98	73.47	59.70	SEDERHANA/MODERATE
		KUALA SUNGAI TANJUNG PIANDANG	5003921	75.74	73.57	57.25	SEDERHANA/MODERATE
		KUALA SUNGAI SEPETANG	4806925	53.51	66.87	56.64	SEDERHANA/MODERATE
		KUALA SUNGAI PERAK	4007901	62.01	70.96	64.94	SEDERHANA/MODERATE
SELANGOR	KUALA/ESTUARY	KUALA SUNGAI SEPANG	2517922	71.62	78.04	85.61	BAIK/GOOD
		KUALA SUNGAI SEPANG (KECIL)	2612928	68.14	92.31	86.56	BAIK/GOOD
		KUALA SUNGAI SEPANG (KAWALAN)	2616926	81.15	86.88	92.35	TERBAIK/EXCELLENT
		KUALA SUNGAI LANGAT (JUGRA)	2814925	69.84	55.07	72.13	SEDERHANA/MODERATE
		KUALA SUNGAI KLANG	3013909	95.64	67.65	77.34	SEDERHANA/MODERATE
		KUALA SUNGAI LANGAT (LUMUT)	2913903	93.71	67.50	81.83	BAIK/GOOD
		KUALA SUNGAI BULOH	3212930	64.43	66.90	67.08	SEDERHANA/MODERATE
		KUALA SUNGAI SELANGOR	3312915	90.87	90.85	74.56	SEDERHANA/MODERATE
		KUALA SUNGAI TENGI	3311931	68.06	67.87	72.90	SEDERHANA/MODERATE
NEGERI SEMBILAN	KUALA/ESTUARY	KUALA SUNGAI BERNAM	3808924	67.16	55.15	72.36	SEDERHANA/MODERATE
		KUALA SUNGAI LINGGI	2319901	93.77	81.80	97.51	TERBAIK/EXCELLENT
		KUALA SUNGAI LUKUT	2517910	91.78	68.28	97.91	TERBAIK/EXCELLENT

Jadual 4.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
Table 4.4 Malaysia: Marine Water Quality Status for Estuary

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
MELAKA	KUALA/ESTUARY	KUALA SUNGAI MELAKA	2123903	59.64	55.61	56.59	SEDERHANA/MODERATE
		KUALA SUNGAI SRI MELAKA	2121914	59.55	52.71	53.65	SEDERHANA/MODERATE
		KUALA SUNGAI MERLIMAU	2124912	62.57	86.19	71.71	SEDERHANA/MODERATE
		KUALA SUNGAI KESANG	2186905	68.74	77.06	70.53	SEDERHANA/MODERATE
		KUALA SUNGAI SEBATU	2186904	61.48	58.62	69.80	SEDERHANA/MODERATE
		KUALA SUNGAI LEREH	2222922	-	-	69.62	SEDERHANA/MODERATE
JOHOR	KUALA/ESTUARY	KUALA SUNGAI SEGGET	1437919	61.62	62.52	47.53	TERCEMAR/POOR
		KUALA SUNGAI SKUDAI	1437922	58.88	57.37	65.17	SEDERHANA/MODERATE
		KUALA SUNGAI MELAYU	1437946	75.12	66.06	58.46	SEDERHANA/MODERATE
		KUALA SUNGAI TEBRAU	1438943	61.58	59.96	56.08	SEDERHANA/MODERATE
		KUALA SUNGAI KIM-KIM	1439965	64.21	87.73	82.87	BAIK/GOOD
		KUALA SUNGAI JOHOR	1440916	82.71	88.96	85.31	BAIK/GOOD
		KUALA SUNGAI BATU PAHAT	1729930	51.23	84.41	87.17	BAIK/GOOD
		KUALA SUNGAI MUAR	2024932	64.89	81.78	88.97	BAIK/GOOD
TERENGGANU	KUALA/ESTUARY	KUALA SUNGAI MERSING	2438905	64.89	89.60	85.51	BAIK/GOOD
		KUALA SUNGAI BESUT	5825902	70.72	64.29	63.08	SEDERHANA/MODERATE
		KUALA SUNGAI DUNGUN	4734918	54.17	55.45	53.39	SEDERHANA/MODERATE
		KUALA SUNGAI IBAI	5231949	70.65	63.70	61.82	SEDERHANA/MODERATE
		KUALA SUNGAI KERTEH	4534922	58.43	54.87	56.37	SEDERHANA/MODERATE
		KUALA SUNGAI MARANG	5232911	67.68	63.99	72.47	SEDERHANA/MODERATE
		KUALA SUNGAI PAKA	4634920	66.24	69.21	72.10	SEDERHANA/MODERATE
		KUALA SUNGAI SETIU	5627953	70.04	62.71	75.28	SEDERHANA/MODERATE
		KUALA SUNGAI TERENGGANU	5331907	57.95	72.33	55.93	SEDERHANA/MODERATE
		KUALA SUNGAI KEMAMAN/CHUKAI	4234929	59.64	54.65	56.94	SEDERHANA/MODERATE
		TIOXIDE UTARA (KG. BUKIT KUANG, KIJAL)	4234950	66.36	63.49	63.54	SEDERHANA/MODERATE
		TIOXIDE TENGAH (PUPUK SEMANGAT, KIJAL)	4234951	70.08	62.99	61.31	SEDERHANA/MODERATE
		TIOXIDE SELATAN (KSB, T. KALONG)	4234952	69.01	53.15	-	-
		PULAU DUYUNG	5231908	50.09	48.69	57.06	SEDERHANA/MODERATE
KELANTAN	KUALA/ESTUARY	KUALA SUNGAI GOLOK	6220911	52.34	57.71	76.75	SEDERHANA/MODERATE
		KUALA SUNGAI KELANTAN	6222901	51.26	52.64	74.89	SEDERHANA/MODERATE
		KUALA SUNGAI PENGKALAN CHEPA	6223912	54.89	63.96	72.07	SEDERHANA/MODERATE
		KUALA SUNGAI PENGKALAN DATU	6123913	60.40	63.16	61.91	SEDERHANA/MODERATE
		KUALA SUNGAI KEMASIN	5824914	67.15	58.29	57.49	SEDERHANA/MODERATE
SARAWAK	KUALA/ESTUARY	KUALA SUNGAI SEMANTAN	1898901	95.23	80.93	90.32	TERBAIK/EXCELLENT
		KUALA SUNGAI SARAWAK	1604907	80.57	62.94	70.29	SEDERHANA/MODERATE
		KUALA SUNGAI BAKO	1704905	65.94	69.21	66.35	SEDERHANA/MODERATE
		KUALA SUNGAI SANTUBONG	1702903	75.42	87.22	89.35	BAIK/GOOD
		KUALA BATANG KRIAN (KABONG)	1710922	79.26	64.72	73.53	SEDERHANA/MODERATE
		KUALA BATANG REJANG	2111909	82.83	82.31	87.43	BAIK/GOOD
		KUALA MUKAH	2920920	51.26	70.05	89.46	BAIK/GOOD
		KUALA BATANG KEMENA	3130911	64.20	77.23	69.10	SEDERHANA/MODERATE
		KUALA TANJUNG SIMILA JAU	3431903	85.68	90.37	92.25	TERBAIK/EXCELLENT
		KUALA SUNGAI PANIPAH	3332904	89.47	91.49	92.76	TERBAIK/EXCELLENT
		KUALA PANTAI NYALAU	3431903	55.67	93.69	86.88	BAIK/GOOD
		KUALA SUNGAI BARAM	4539919	96.20	97.62	66.66	SEDERHANA/MODERATE
		KUALA SUNGAI MIRI	4349915	84.73	72.23	68.34	SEDERHANA/MODERATE
		SABAH	KUALA/ESTUARY	KUALA PENYU	5453901	82.00	65.10
MUARA SUNGAI INANAM	5050905			60.16	88.78	45.03	TERCEMAR/POOR

Berdasarkan IKAM, kategori di semua stesen kekal sama bagi tahun 2016 dan 2015. Tren ini ditunjukkan dalam **Rajah 4.2**.

Based on the Marine Water Quality Index (MWQI) showed for all categories, the figure remained unchanged in 2016 as compared to 2016. These trends are tabulated in **Figure 4.2**.



Rajah 4.2 Malaysia: Tren Status Kualiti Air Marin Bagi Kawasan Kuala, 2014-2016
 Figure 4.2 Malaysia: The Trend Of Marine Water Quality Status for Estuary, 2014-2016



KUALITI AIR MARIN PULAU

Senarai stesen Pulau berdasarkan kategori stesen seperti yang ditunjukkan dalam **Jadual 4.5**.

ISLAND MARINE WATER QUALITY

The list of island stations by island category is as shown in **Table 4.5**.

Jadual 4.5 Malaysia: Stesen-Stesen Pulau, 2016
Table 4.5 Malaysia: Island Stations, 2016

NEGERI	BIL. PULAU	BIL. STESEN	PULAU	NO. STESEN	KATEGORI
STATE	NO. OF ISLAND	NO. OF STATION	ISLAND	STATION NO	CATEGORY
KEDAH	7	4	LANGKAWI (PANTAI KUAH)	7KD07	PEMBANGUNAN / DEVELOPMENT
			LANGKAWI (TELUK EWA)	7KD08	PEMBANGUNAN / DEVELOPMENT
			LANGKAWI (PANTAI CHENANG)	7KD09	PEMBANGUNAN / DEVELOPMENT
			LANGKAWI (TANJUNG RHU)	7KD10	PEMBANGUNAN / DEVELOPMENT
		1	SINGA BESAR	7KR01	PERANGINAN / RESORT
		1	DAYANG BUNTING	7KR02	PERANGINAN / RESORT
		1	PAYAR	7KM03	TAMAN LAUT / MARINE PARK
		1	KACA	7KM04	TAMAN LAUT / MARINE PARK
		1	LEMBU	7KM05	TAMAN LAUT / MARINE PARK
		1	SIGANTANG	7KM06	TAMAN LAUT / MARINE PARK
PULAU PINANG	6	3	PULAU PINANG (BATU MAUNG)	7PD01	PEMBANGUNAN / DEVELOPMENT
			PULAU PINANG (TELUK BAHANG)	7PD03	PEMBANGUNAN / DEVELOPMENT
			PULAU PINANG (PADANG KOTA)	7PD04	PEMBANGUNAN / DEVELOPMENT
		1	AMAN	7PR05	PERANGINAN / RESORT
		1	JEREJAK	7PR06	PERANGINAN / RESORT
		1	KENDI	7PR07	PERANGINAN / RESORT
		1	RIMAU	7PR08	PERANGINAN / RESORT
			GEDONG	7PR09	PERANGINAN / RESORT
		PERAK	4	2	PANGKOR (TELOK GEDONG)
PANGKOR (PANTAI PUTERI DEWI)	7AR02				PERANGINAN / RESORT
1	PANGKOR LAUT			7AR03	PERANGINAN / RESORT
1	SEMBILAN			7AR04	PERANGINAN / RESORT
1	TUKUN PERAK			7AP05	DILINDUNGI / PROTECTED
SELANGOR	3	1	KETAM	7BR01	PERANGINAN / RESORT
		1	ANGSA	7BR02	PERANGINAN / RESORT
		1	LUMUT	7BR03	PERANGINAN / RESORT
NEGERI SEMBILAN	1	1	ARANG	7NP01	DILINDUNGI / PROTECTED

Jadual 4.5 Malaysia: Stesen-Stesen Pulau, 2016
Table 4.5 Malaysia: Island Stations, 2016

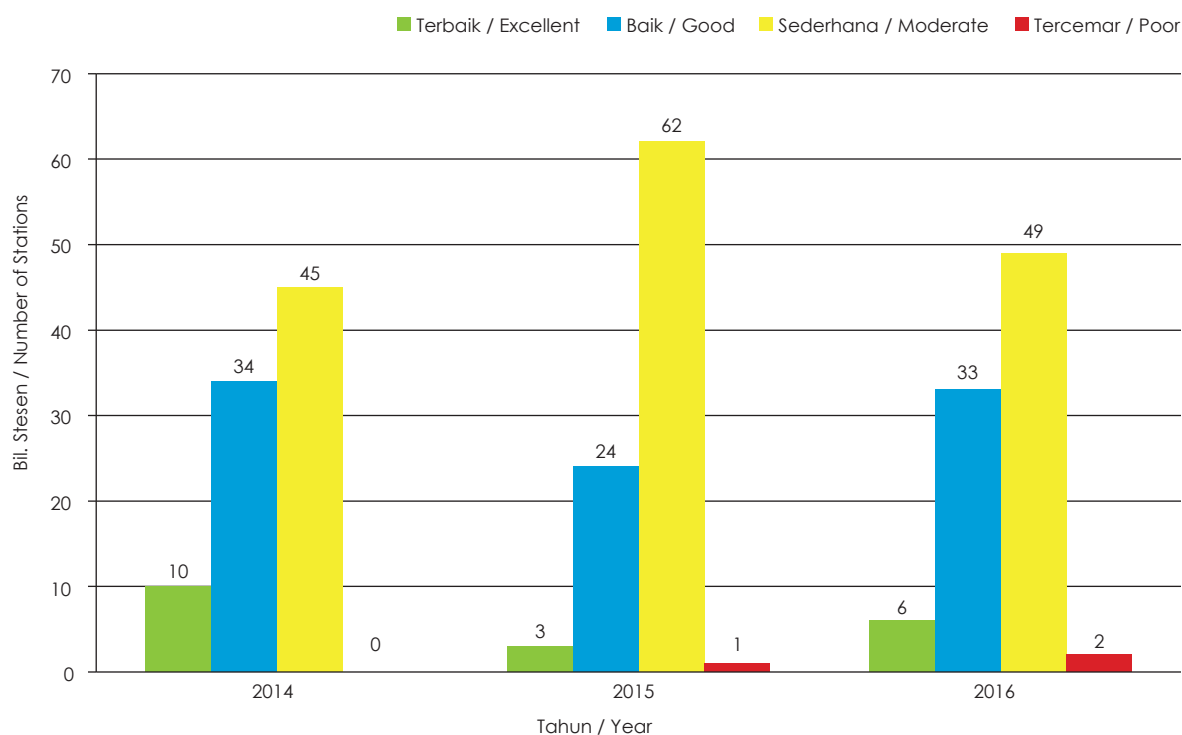
NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
MELAKA	3	2	BESAR (A)	7MR01	PERANGINAN / RESORT
			BESAR (B)	7MR01	PERANGINAN / RESORT
		2	UPEH (A)	7MR02	PERANGINAN / RESORT
			UPEH (B)	7MR02	PERANGINAN / RESORT
		2	UNDAN (A)	7MR03	PERANGINAN / RESORT
			UNDAN (B)	7MR03	PERANGINAN / RESORT
JOHOR	8	1	SETINDAN	7JR01	PERANGINAN / RESORT
		1	BABI TENGAH	7JR02	PERANGINAN / RESORT
		1	DAYANG	7JM03	TAMAN LAUT / MARINE PARK
		1	NANGA BESAR	7JM08	TAMAN LAUT / MARINE PARK
		1	SIBU TENGAH	7JM11	TAMAN LAUT / MARINE PARK
		1	PEMANGGIL	7JM15	TAMAN LAUT / MARINE PARK
		1	KUKUP	7JP17	DILINDUNGI / PROTECTED
		1	PISANG	7JP18	DILINDUNGI / PROTECTED
PAHANG	8	2	TIOMAN (KG. NIPAH)	7CM01	TAMAN LAUT / MARINE PARK
			TIOMAN (TELOK SALANG)	7CM02	TAMAN LAUT / MARINE PARK
		1	SERI BUAT	7CM03	TAMAN LAUT / MARINE PARK
		1	CEBEH	7CM04	TAMAN LAUT / MARINE PARK
		1	TULAI	7CM05	TAMAN LAUT / MARINE PARK
		1	SEPUI	7CM06	TAMAN LAUT / MARINE PARK
		1	LABAS	7CM07	TAMAN LAUT / MARINE PARK
		1	SEMBILANG	7CM08	TAMAN LAUT / MARINE PARK
		1	TOKONG BAHARA	7CM09	TAMAN LAUT / MARINE PARK
TERENGGANU	9	2	PERHENTIAN BESAR (SOUTH)	7TM04	TAMAN LAUT / MARINE PARK
			PERHENTIAN BESAR (WEST)	7TM05	TAMAN LAUT / MARINE PARK
		1	PERHENTIAN KECIL	7TM06	TAMAN LAUT / MARINE PARK
		2	REDANG (NORTH)	7TM07	TAMAN LAUT / MARINE PARK
			REDANG (SOUTH)	7TM08	TAMAN LAUT / MARINE PARK
		1	KAPAS	7TM09	TAMAN LAUT / MARINE PARK
		1	LANG TENGAH	7TM11	TAMAN LAUT / MARINE PARK
		1	PINANG	7TM12	TAMAN LAUT / MARINE PARK
		1	EKOR TEBU	7TM13	TAMAN LAUT / MARINE PARK
		1	LIMA	7TM14	TAMAN LAUT / MARINE PARK
1	GUMIA	7TR01	PERANGINAN / RESORT		

Jadual 4.5 Malaysia: Stesen-Stesen Pulau, 2016
Table 4.5 Malaysia: Island Stations, 2016

NEGERI	BIL. PULAU	BIL. STESEN	PULAU	NO. STESEN	KATEGORI
STATE	NO. OF ISLAND	NO. OF STATION	ISLAND	STATION NO	CATEGORY
KELANTAN	2	1	PANJANG	7DP01	DILINDUNGI / PROTECTED
		1	KUNDUR	7DP02	DILINDUNGI / PROTECTED
SARAWAK	3	1	SATANG	7QP01	DILINDUNGI / PROTECTED
		1	TALANG-TALANG KECIL	7QP02	DILINDUNGI / PROTECTED
		1	TALANG-TALANG BESAR	7QP03	DILINDUNGI / PROTECTED
SABAH	17	1	GAYA	7SR01	PERANGINAN / RESORT
		1	MABUL	7SR03	PERANGINAN / RESORT
		2	SIPADAN (NORTH)	7SR04	PERANGINAN / RESORT
			SIPADAN (WEST)	7SR05	PERANGINAN / RESORT
		1	SAPI	7SM08	TAMAN LAUT / MARINE PARK
		1	MANUKAN	7SR09	PERANGINAN / RESORT
		1	TIGA	7SR10	PERANGINAN / RESORT
		1	KALAMPUNIAN BESAR	7SM11	TAMAN LAUT / MARINE PARK
		1	KAPALAI	7SR12	PERANGINAN / RESORT
		1	LIGITAN	7SR13	PERANGINAN / RESORT
		1	MOLLEANGAN BESAR	7SR14	PERANGINAN / RESORT
		1	BANGGI	7SR15	PERANGINAN / RESORT
		1	BALAMBANGAN	7SR16	PERANGINAN / RESORT
		1	SILINGAN	7SP17	DILINDUNGI / PROTECTED
		1	GULISAN	7SP18	DILINDUNGI / PROTECTED
		1	BAKUNGAN KECIL	7SP19	DILINDUNGI / PROTECTED
		1	BANGGI	7SR20	PERANGINAN / RESORT
1	MANTANANI BESAR	7SR21	PERANGINAN / RESORT		
LABUAN	4	4	LABUAN (POHON BATU)	7LD01	PEMBANGUNAN / DEVELOPMENT
			LABUAN (WATER FRONT)	7LD02	PEMBANGUNAN / DEVELOPMENT
			LABUAN (LUBUK TEMIANG)	7LD03	PEMBANGUNAN / DEVELOPMENT
			LABUAN (RANCHA-RANCHA)	7LD04	PEMBANGUNAN / DEVELOPMENT
		1	KURAMAN	7LM05	TAMAN LAUT / MARINE PARK
		1	RUSUKAN BESAR	7LM06	TAMAN LAUT / MARINE PARK
		1	RUSUKAN KECIL	7LM07	TAMAN LAUT / MARINE PARK

Perairan di sekeliling 75 buah pulau telah dipantau dalam tahun 2016. Pulau-pulau ini termasuk pulau pembangunan (3 buah pulau), pulau pembangunan (3 buah pulau), pulau peranginan (30 buah pulau), pulau taman laut (29 buah pulau) dan pulau dilindungi (13 buah pulau). Sebanyak 90 stesen telah dipantau dan sampel air dari stesen pengawasan telah dianalisis serta keputusan dilaporkan sebagai Indeks Kualiti Air Marin. Hasil analisis menunjukkan 6 stesen (7%) dikategorikan sebagai Terbaik, 33 stesen (37%) dikategorikan sebagai Baik, 49 stesen (54%) dikategorikan sebagai Sederhana dan 2 stesen (2%) dikategorikan sebagai Tercemar. **(Rajah 4.3)**

The waters around 75 islands were monitored in 2016. These islands include development islands (3 islands), resort islands (30 islands), marine park islands (29 islands) and protected islands (13 islands). A total of 90 island stations was monitored, sample from monitoring stations were analysed and reported as Marine Water Quality Index. The result indicated that 6 stations (7%) as Excellent, 33 stations (37%) as Good, 49 stations (54%) as Moderate and 2 stations (2%) categorized as Poor. **(Figure 4.3).**



Rajah 4.3 Malaysia: Tren Status Kualiti Air Marin Bagi Pulau, 2014-2016
Figure 4.3: Malaysia: The Trend of Marine Water Quality Status for Island, 2014-2016

Jadual 4.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
Table 4.6 Malaysia: Marine Water Quality Status for Island

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Kedah	Pulau/Island	Singa Besar	7KR01	83.28	73.83	61.96	Sederhana/Moderate
		Dayang Bunting	7KR02	89.65	71.27	60.13	Sederhana/Moderate
		Payar	7KM03	79.74	73.65	75.06	Sederhana/Moderate
		Kaca	7KM04	82.98	75.03	74.98	Sederhana/Moderate
		Pantai Kuhah	7KD07	75.11	69.31	51.54	Sederhana/Moderate
		Teluk Ewa	7KD08	67.38	74.22	74.48	Sederhana/Moderate
		Pantai Chenang	7KD09	86.55	73.55	63.39	Sederhana/Moderate
		Tanjung Rhu	7KD010	86.38	88.66	67.11	Sederhana/Moderate
		Lembu	7KM05	85.48	75.82	71.77	Sederhana/Moderate
		Segantang	7KM06	84.43	75.09	70.33	Sederhana/Moderate
		Pulau Perak	7KP01	-	72.47	56.51	Sederhana/Moderate
Pulau Pinang	Pulau/Island	Batu Maung	7PD01	70.40	52.83	46.69	Tercemar/Poor
		Padang Kota	7PD04	51.21	47.21	82.05	Baik/Good
		Aman	7PR05	61.84	69.87	72.80	Sederhana/Moderate
		Jerejak	7PR06	54.80	68.19	46.41	Tercemar/Poor
		Kendi	7PR07	67.01	72.24	76.83	Sederhana/Moderate
		Rimau	7PR08	61.24	72.27	51.41	Sederhana/Moderate
		Teluk Bahang	7PD03	-	-	-	-
		Gedong	7PR09	57.46	66.26	71.97	Sederhana/Moderate
Perak	Pulau/Island	Pantai Teluk Gedong	7AR01	70.80	68.72	56.07	Sederhana/Moderate
		Pantai Puteri Dewi	7AR02	50.44	68.35	79.63	Sederhana/Moderate
		Pangkor Laut	7AR03	66.78	63.63	52.16	Sederhana/Moderate
		Sembilan	7AR04	70.30	63.31	58.86	Sederhana/Moderate
		Tukun Perak	7AP05	73.17	62.43	69.53	Sederhana/Moderate
Selangor	Pulau/Island	Ketam	7BR01	93.63	54.29	93.20	Terbaik/Excellent
		Angsa	7BR02	93.08	59.07	88.90	Baik/Good
		Lumut	7BR03	61.03	58.36	87.52	Baik/Good
Negeri Sembilan	Pulau/Island	Arang	7NP01	92.86	94.46	97.94	Terbaik/Excellent
Melaka	Pulau/Island	Upeh (Point A)	7MR02	60.28	56.67	58.11	Sederhana/Moderate
		Upeh (Point B)	7MR02	57.20	54.93	67.26	Sederhana/Moderate
		Besar (Point A)	7MR01	64.11	62.65	70.91	Sederhana/Moderate
		Besar (Point B)	7MR01	58.73	56.93	70.58	Sederhana/Moderate
		Undan (Point A)	7MP03	58.74	54.46	77.89	Sederhana/Moderate
		Undan (Point B)	7MP03	71.01	56.70	61.70	Sederhana/Moderate

Jadual 4.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
Table 4.6 Malaysia: Marine Water Quality Status for Island

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Johor	Pulau/Island	Setindan	7JR01	88.51	89.46	89.86	Baik/Good
		Babi Tengah	7JR02	89.74	89.43	89.09	Baik/Good
		Dayang	7JM03	88.76	90.05	88.62	Baik/Good
		Nanga Besar	7JM08	87.65	89.56	90.58	Terbaik/Excellent
		Sibu Tengah	7JM11	88.92	89.66	88.66	Baik/Good
		Pemanggil	7JM15	88.68	89.35	90.10	Terbaik/Excellent
		Kukup	7JP17	81.08	87.01	83.40	Baik/Good
		Pisang	7JP18	87.52	89.05	86.44	Baik/Good
Pahang	Pulau/Island	Tioman (Teluk Salang)	7CM01	85.77	76.92	78.23	Sederhana/Moderate
		Tioman (Kg. Nipah)	7CM01	85.52	83.01	85.39	Baik/Good
		Tulai	7CM05	84.52	88.79	85.73	Baik/Good
		Labas	7CM07	86.44	85.22	86.18	Baik/Good
		Cebeh	7CM04	85.27	85.38	85.91	Baik/Good
		Sepui	7CM08	85.63	79.94	83.35	Baik/Good
		Sembilang	7CM08	85.76	58.56	75.44	Sederhana/Moderate
		Seri Buat	7CM03	86.56	57.06	84.53	Baik/Good
Tokong Bahara	7CM09	85.71	75.91	86.71	Baik/Good		
Terengganu	Pulau/Island	Gemia	7TR01	66.94	58.69	64.70	Sederhana/Moderate
		Perhentian Besar (South)	7TM04	69.42	59.82	63.15	Sederhana/Moderate
		Perhentian Besar (West)	7TM05	69.18	57.60	62.71	Sederhana/Moderate
		Perhentian Kecil	7TM06	70.52	59.28	61.79	Sederhana/Moderate
		Redang (North)	7TM06	72.94	58.58	78.07	Sederhana/Moderate
		Redang (South)	7TM08	72.14	58.46	64.14	Sederhana/Moderate
		Lang Tengah	7TM11	69.79	71.52	64.74	Sederhana/Moderate
		Pinang	7TM12	71.15	59.11	63.87	Sederhana/Moderate
		Ekor Tebu	7TM13	69.21	60.70	63.19	Sederhana/Moderate
		Lima	7TM14	73.52	59.12	64.40	Sederhana/Moderate
		Kapas	7TP16	67.29	58.42	76.30	Sederhana/Moderate
Kelantan	Pulau/Island	Panjang	7DP01	67.07	65.49	66.03	Sederhana/Moderate
		Kundur	7DP02	70.43	63.22	65.72	Sederhana/Moderate
Sarawak	Pulau/Island	Satang	7QP01	83.36	75.17	90.52	Terbaik/Excellent
		Talang-Talang Kecil	7QP02	84.70	87.37	77.08	Sederhana/Moderate
		Talang-Talang Besar	7QP03	84.50	90.76	91.63	Terbaik/Excellent
Sabah	Pulau/Island	Gaya	7SR01	81.83	85.60	85.50	Baik/Good
		Mabul	7SR03	53.86	71.43	82.47	Baik/Good
		Sipadan (N)	7SR04	58.91	70.70	84.23	Baik/Good
		Sipadan (W)	7SR05	79.41	70.87	80.25	Baik/Good
		Sapi	7SM08	81.27	84.01	84.42	Baik/Good
		Manukan	7SM09	80.44	84.48	82.77	Baik/Good
		Tiga	7SR10	81.80	82.56	84.57	Baik/Good
		Kalamunian Besar	7SM11	84.67	83.80	81.75	Baik/Good
Kapalai	7SR12	81.22	70.17	85.77	Baik/Good		

Jadual 4.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
 Table 4.6 Malaysia: Marine Water Quality Status for Island

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2016) / CATEGORY (2016)
				2014	2015	2016	
Sabah	Pulau/Island	Molleangan Besar	7SR14	79.48	83.20	83.19	Baik/Good
		Banggi (South)	7SR15	76.84	82.57	84.21	Baik/Good
		Banggi (East)	7SR20	79.39	83.43	83.29	Baik/Good
		Balambangan	7SR16	77.52	84.44	83.98	Baik/Good
		Selingan	7SP17	55.98	66.87	84.70	Baik/Good
		Gulisan	7SP18	59.89	87.00	85.63	Baik/Good
		Bakungan Kecil	7SP19	54.40	50.73	83.33	Baik/Good
Mantanani Besar	7SR21	83.08	82.18	83.46	Baik/Good		
Labuan	Pulau/Island	Kuraman	7LM05	97.79	68.67	73.50	Sederhana/Moderate
		Rusukan Besar	7LM07	94.87	66.46	50.99	Sederhana/Moderate
		Rusukan Kecil	7LM06	93.58	66.22	50.93	Sederhana/Moderate
		Pohon Batu	7LD01	97.94	67.65	67.70	Sederhana/Moderate
		Water Front	7LD02	97.65	64.47	76.60	Sederhana/Moderate
		LubukTemiang	7LD03	97.79	65.77	74.67	Sederhana/Moderate
		Ranca-Ranca	7LD04	91.44	66.63	52.02	Sederhana/Moderate



STATUS STESEN-STESEN KUALITI AIR MARIN

Jadual 4.7 dan Jadual 4.8 menunjukkan senarai stesen Pantai dan Kuala yang mencapai kategori Terbaik bagi tahun 2016.

Stesen Pulau yang mencapai Kategori Terbaik bagi tahun 2016 adalah seperti di **Jadual 4.9**.

STATUS OF MARINE WATER QUALITY STATIONS

Table 4.7 and Table 4.8 show the list of coastal and estuaries stations that achieved the Excellent Category in 2016.

The islands that achieved the Excellent Category for Marine Water Quality Index in 2016 are listed in **Table 4.9**.

Jadual 4.7 Malaysia: Senarai Pantai Terbaik, 2016
Table 4.7 Malaysia: List of Excellent Coastal, 2016

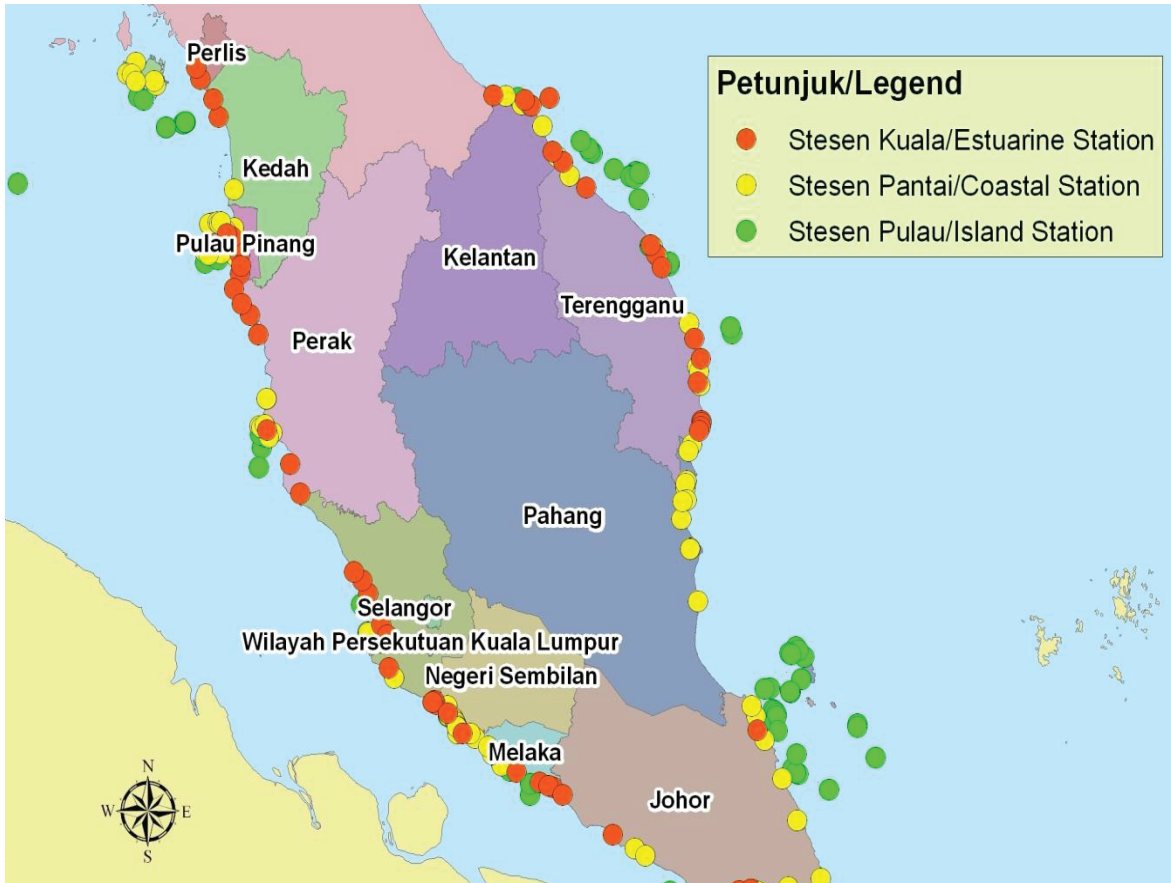
BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Negeri Sembilan	Port Dickson Bandar
2	Negeri Sembilan	Port Dickson Batu 8
3	Negeri Sembilan	Port Dickson Batu 7
4	Negeri Sembilan	Port Dickson Batu 6
5	Negeri Sembilan	Port Dickson Batu 4
6	Negeri Sembilan	Port Dickson Janakuasa TNB
7	Negeri Sembilan	Port Dickson Batu 10
8	Negeri Sembilan	Telok Pelanduk
9	Negeri Sembilan	Port Dickson Batu 5
10	Negeri Sembilan	Pantai Cermin

Jadual 4.8 Malaysia: Senarai Kuala Kategori Terbaik, 2016
Table 4.8 Malaysia: List of Excellent Estuaries, 2016

BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Negeri Sembilan	Kuala Sungai Lukut
2	Negeri Sembilan	Kuala Sungai Linggi
3	Sarawak	Kuala Sungai Panipah
4	Selangor	Kuala Sungai Sepang (Kawalan)
5	Sarawak	Kuala Tanjung Similajau
6	Sarawak	Kuala Sungai Semantan

Jadual 4.9 Malaysia: Senarai Pulau Terbaik, 2016
Table 4.9 Malaysia: List of Excellent Islands, 2016

BIL. / NO.	NEGERI / STATE	PULAU / ISLAND
1	Negeri Sembilan	Arang
2	Selangor	Ketam
3	Sarawak	Talang-Talang Besar
4	Johor	Nanga Besar
5	Sarawak	Satang
6	Johor	Pemanggil



Peta : Semenanjung Malaysia : Lokasi Stesen Pengawasan Kualiti Air Marin
 Map : Peninsular Malaysia : Location of Marine Water Quality Stations



Peta : Sabah & Sarawak : Lokasi Stesen Pengawasan Kualiti Air Marin
 Map : Sabah & Sarawak : Location of Marine Water Quality Stations