

BAB 5
Chapter 5

**Kualiti Air Marin dan
Pulau-Pulau**
***Marine and Island Marine
Water Quality***



BAB 5 / CHAPTER 5

KUALITI AIR MARIN DAN PULAU-PULAU

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PENGAWASAN KUALITI AIR MARIN

MARINE WATER QUALITY MONITORING

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 2015, sebanyak 151 stesen pantai, 76 stesen kuala dan 90 stesen pulau telah dipantau. Sebanyak 590 sampel di kawasan pantai, 401 di kuala dan 353 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 5.1**).

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 both the land-based as well as the sea based sources. These sources may pose threats to the marine resources and can upset the stability and diversity of the marine ecosystem.

In 2015, a total of 151 coastal, 76 estuary and 90 island stations were monitored. As many as 590 samples from coastal, 401 samples from estuary and 353 samples from island monitoring stations were collected for analysis and reported based on the Marine Water Quality Index (MWQI).

The MWQI was used as a method to reflect the marine water quality status and its category. The index was developed based on 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 5.1**).*

Jadual 5.1 Malaysia : Klasifikasi Indeks Kualiti Air Marin
Table 5.1 Malaysia : Marine Water Quality Index Classification

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

Jadual 5.2: Standard dan Kriteria Kualiti Air Marin Malaysia
 Table 5.2: 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 <i>Preservation, Marine Protected areas, Marine Parks</i>	Kehidupan Laut, Perikanan, Terumbu Karang, Rekreasi dan Marikultur <i>Marine Life, Fisheries, Coral Reefs, Recreational and Mariculture</i>	Pelabuhan, Lapangan Minyak dan Gas <i>Ports, Oil & Gas Fields</i>	Paya Bakau & Muara Sungai <i>Mangroves Estuarine & River-mouth Water</i>
Suhu (°C) <i>Temperature (°C)</i>	≤ 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) <i>Dissolved Oxygen (mg/L)</i>	>80% tepu >80% saturation	5	3	4
Jumlah Pepejal Terampai* (mg/L) <i>Total suspended solid (mg/L)</i>	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) <i>Oil and grease (mg/L)</i>	0.01	0.14	5	0.14
Raksa* (µg/L) <i>Mercury* (µg/L)</i>	0.04	0.16 (0.04)	50	0.5
Kadmium* (µg/L) <i>Cadmium* (µg/L)</i>	0.5	2 (3)	10	2
Kromium (VI) (µg/L) <i>Chromium (VI) (µg/L)</i>	5	10	48	10
Kuprum (µg/L) <i>Copper (µg/L)</i>	1.3	2.9	10	2.9
Arsenik (III)* (µg/L) <i>Arsenic (III)* (µg/L)</i>	3	20(3)	50	20 (3)

Jadual 5.2: Standard dan Kriteria Kualiti Air Marin Malaysia
 Table 5.2: 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 <i>Preservation, Marine Protected areas, Marine Parks</i>	Kehidupan Laut, Perikanan, Terumbu Karang, Rekreasi dan Marikultur <i>Marine Life, Fisheries, Coral Reefs, Recreational and Mariculture</i>	Pelabuhan, Lapangan Minyak dan Gas <i>Ports, Oil & Gas Fields</i>	Paya Bakau & Muara Sungai <i>Mangroves Estuarine & River-mouth Water</i>
Plumbum (µg/L) Lead (µg/L)	4.4	8.5	50	8.5
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

COASTAL WATER QUALITY STATUS

Dalam tahun 2015, sebanyak 151 stesen pantai telah dipantau dan dianalisis serta dilaporkan dalam Indeks Kualiti Air Marin. Hasil pengawasan menunjukkan 9 stesen (6%) dikategorikan sebagai Terbaik, 54 stesen (36%) sebagai Baik, 86 stesen (57%) sebagai Sederhana dan 2 stesen (1%) sebagai Tercemar. (Jadual 5.3).

In 2015, a total of 151 coastal stations were monitored, analysed and reported in term of the Marine Water Quality Index. The monitoring results indicated 9 stations (6%) as Excellent, 54 stations (36%) as Good, 86 stations (57%) as Moderate and 2 stations (1%) as Poor. (Table 5.3)

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
Table 5.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Kedah	Pantai / Coastal	Pantai Merdeka	5603905	59.92	65.63	68.57	Sederhana Moderate
		Langkawi Island Resort	6399914	60.61	80.51	71.44	Sederhana Moderate
		Pantai Kok	6397922	69.04	82.15	72.23	Sederhana Moderate
		Pantai Kuah	6398925	62.02	80.37	71.05	Sederhana Moderate
		Pantai Pasir Tengkorak	6499701	84.28	82.05	85.47	Baik / Good
		Pantai Teluk Burau	6396923	81.59	88.36	70.95	Sederhana Moderate
		Pantai Teluk Nibong	6497915	74.92	79.68	74.75	Sederhana Moderate
		Pantai Tengah	6297903	69.04	70.21	68.06	Sederhana Moderate
Pulau Pinang	Pantai / Coastal	Gertak Sanggul	5201919	56.60	55.64	53.11	Sederhana Moderate
		Kawasan Perindustrian Bayan Lepas I	5303932	50.26	55.34	-	-
		Kawasan Perindustrian Bayan Lepas II	5303933	51.17	54.71	-	-
		Kawasan Perindustrian Bayan Lepas III	5302939	49.12	54.46	53.88	Sederhana Moderate
		Pantai Bersih	5403906	61.81	61.22	52.63	Sederhana Moderate
		Pantai Miami	5502901	50.22	65.47	69.18	Sederhana Moderate
		Pantai Pasir Panjang	5201938	58.66	66.81	70.46	Sederhana Moderate
		Batu Feringgi (Casuarina)	5402904	53.81	69.22	66.07	Sederhana Moderate
		Luar Pantai Teluk Bahang	5402930	74.79	66.54	65.36	Sederhana Moderate
		Persiaran Gurney	5403902	51.75	66.86	48.03	Tercemar / Poor

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
 Table 5.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Pulau Pinang	Pantai / Coastal	Rumah Pam Baru Perai	5304927	50.53	55.45	52.80	Sederhana Moderate
		Rumah Pam Lama Perai	5303926	51.02	59.73	55.26	Sederhana Moderate
		Selat PP Selatan (Jelutong)	5303911	60.52	51.73	49.68	Tercemar / Poor
		Tanjung Bungah	5402937	51.91	67.36	61.82	Sederhana Moderate
		Teluk Tempoyak	5202923	57.00	61.87	52.55	Sederhana Moderate
		Batu Maung	5202901	72.34	57.26	52.83	Sederhana Moderate
Perak	Pantai / Coastal	Pantai Pasir Bogak	4205908	51.75	80.41	55.97	Sederhana Moderate
		Pantai Teluk Dalam	4205928	65.64	70.01	54.45	Sederhana Moderate
		Pantai Teluk Batik	4205932	63.86	71.11	73.00	Sederhana Moderate
		Pantai Tanjung Batu	4406927	56.32	84.07	69.34	Sederhana Moderate
		Pantai Pasir Panjang	4205924	64.09	85.58	51.97	Sederhana Moderate
Selangor	Pantai / Coastal	Pantai Bagan Lalang	2616927	86.08	85.49	89.27	Baik / Good
		Pantai Morib	2712902	53.76	87.97	70.10	Sederhana Moderate
		Selat Pulau Babi	3012929	65.21	93.51	87.15	Baik / Good
		Selat Klang Utara	3013908	64.28	94.96	68.11	Sederhana Moderate
Negeri Sembilan	Pantai / Coastal	Bagan Pinang	2518915	67.90	92.75	87.97	Baik / Good
		Telok Sinting	2419908	72.29	88.84	90.65	Terbaik / Excellent
		Port Dickson Bandar	2517907	75.97	70.39	84.10	Baik / Good
		Port Dickson Batu 4	2518937	68.60	93.92	91.61	Terbaik / Excellent
		Port Dickson Batu 5	2418906	68.41	67.31	88.16	Baik / Good
		Port Dickson Batu 6	2418916	73.31	81.68	88.80	Baik / Good
		Port Dickson Batu 7	2418905	71.36	90.13	86.85	Baik / Good
		Port Dickson Batu 8	2418912	94.06	93.86	77.94	Sederhana Moderate
		Port Dickson Batu 10	2418914	94.40	90.10	93.11	Terbaik / Excellent
		Port Dickson Janakuasa TNB	2517909	74.92	91.99	79.48	Sederhana Moderate
		Telok Pelanduk	2419917	91.62	91.50	93.60	Terbaik / Excellent
		Pantai Cermin	2416918	92.36	88.47	89.62	Baik / Good

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
 Table 5.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Melaka	Pantai / Coastal	Pantai Rombang	2221916	45.21	55.15	58.84	Sederhana Moderate
		Pantai Kundur	2221908	46.15	55.51	55.38	Sederhana Moderate
		Pantai Tanjung Bidara	2320909	44.08	52.04	53.50	Sederhana Moderate
		Teluk Gong	2320902	45.18	51.58	55.56	Sederhana Moderate
		Pulau Melaka Point A(i)	2121915	42.39	-	78.57	Sederhana Moderate
		Pulau Melaka Point A(ii)	2121915	40.67	-	-	-
		Pulau Melaka Point B(i)	2121916	41.95	-	84.38	Baik / Good
		Pulau Melaka Point B(ii)	2121916	42.32	-	-	-
Johor	Pantai / Coastal	Tanjung Bin	1336975	88.26	90.21	90.25	Terbaik / Excellent
		Pelabuhan Tanjung Pelepas	1438943	85.67	85.79	89.61	Baik / Good
		Hadapan Jabatan Laut	1438918	78.90	87.11	62.51	Sederhana Moderate
		Pantai Stulang Laut	1437951	61.19	61.00	58.56	Sederhana Moderate
		Jeti Teluk Jawa	1438918	65.03	84.28	64.59	Sederhana Moderate
		Pelabuhan Pasir Gudang	1428939	63.94	64.62	75.37	Sederhana Moderate
		Hadapan HSAJB	1437920	63.48	55.74	64.08	Sederhana Moderate
		Pantai Lido	1437921	64.32	63.25	59.16	Sederhana Moderate
		Pantai Teluk Mahkota	1841911	82.96	85.51	85.58	Baik / Good
		Pantai Tanjung Leman	2140694	83.06	87.85	88.85	Baik / Good
		Pantai Sri Pantai	2339960	59.57	87.81	87.93	Baik / Good
		Tanjung Merak	1441968	49.56	61.98	73.30	Sederhana Moderate
		Tanjung Pengelih	1441967	76.20	85.38	88.54	Baik / Good
		Pantai Tanjong Stapa	1341961	57.47	57.22	88.08	Baik / Good
		Pantai Teluk Gorek	2538958	60.72	79.89	89.11	Baik / Good
		Pantai Air Papan	2538959	79.08	86.86	89.75	Baik / Good
		Jeti Kukup	1334925	58.52	64.52	62.22	Sederhana Moderate
		Jeti Tanjong Belungkor	1440963	80.31	87.92	84.34	Baik / Good
		Pasir Gogok	1441966	71.97	79.73	89.48	Baik / Good

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
 Table 5.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Johor	Pantai / Coastal	Tanjung Buai	1340973	60.45	89.89	88.39	Baik / Good
		Pantai Desaru	1542914	82.91	71.54	65.60	Sederhana Moderate
		Tanjung Sepang	1443969	81.78	83.51	64.57	Sederhana Moderate
		Tanjung Penyusup	1444920	82.02	77.08	62.72	Sederhana Moderate
		Pantai Sungai Lurus	1730962	64.81	86.68	64.68	Sederhana Moderate
		Punggur	1531974	49.47	52.74	87.55	Baik / Good
Pahang	Pantai / Coastal	Pantai Cherating (Club Med)	4133903 (A)	73.92	91.11	85.03	Baik / Good
		Pantai Cherating (Club Med)	4133903 (B)	73.83	94.11	85.22	Baik / Good
		Pantai Cherating (Legend)	4133942 (A)	73.76	67.36	87.51	Baik / Good
		Pantai Cherating (Legend)	4133942 (B)	73.96	92.74	87.95	Baik / Good
		Pantai Muhibbah Balok	3933901 (A)	72.82	87.45	77.60	Sederhana Moderate
		Pantai Muhibbah Balok	3933901 (B)	71.03	86.44	75.96	Sederhana Moderate
		Pantai Batu Hitam	3833915 (A)	73.09	93.94	85.10	Baik / Good
		Pantai Batu Hitam	3833915 (B)	73.87	91.21	87.43	Baik / Good
		Pantai Berserah	3933941 (A)	73.62	93.92	90.27	Terbaik / Excellent
		Pantai Berserah	3933941 (B)	73.84	71.49	78.41	Sederhana Moderate
		Pantai Teluk Cempedak	3833910 (A)	73.96	93.36	78.44	Sederhana Moderate
		Pantai Teluk Cempedak	3833910 (B)	73.89	94.29	67.43	Sederhana Moderate
		Pantai Teluk Gelora	3833909 (A)	55.80	71.47	62.30	Sederhana Moderate
		Pantai Teluk Gelora	3833909 (B)	61.48	78.43	64.60	Sederhana Moderate
		Pantai Sepat	3737915	73.52	93.66	62.05	Sederhana Moderate
		Pantai Sepat (B)	3633916	73.89	94.29	85.58	Baik / Good
		Pantai Legenda (A)	3534943 (A)	73.62	94.25	82.83	Baik / Good
		Pantai Legenda (B)	3534943 (B)	73.62	94.20	64.31	Sederhana Moderate
		Pantai Kuala Api-Api	3235917	72.90	93.21	66.17	Sederhana Moderate
		Pantai Tanjung Batu	3334915	72.65	93.03	83.32	Baik / Good

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
 Table 5.3 Malaysia: Marine Water Quality Status for Coastal

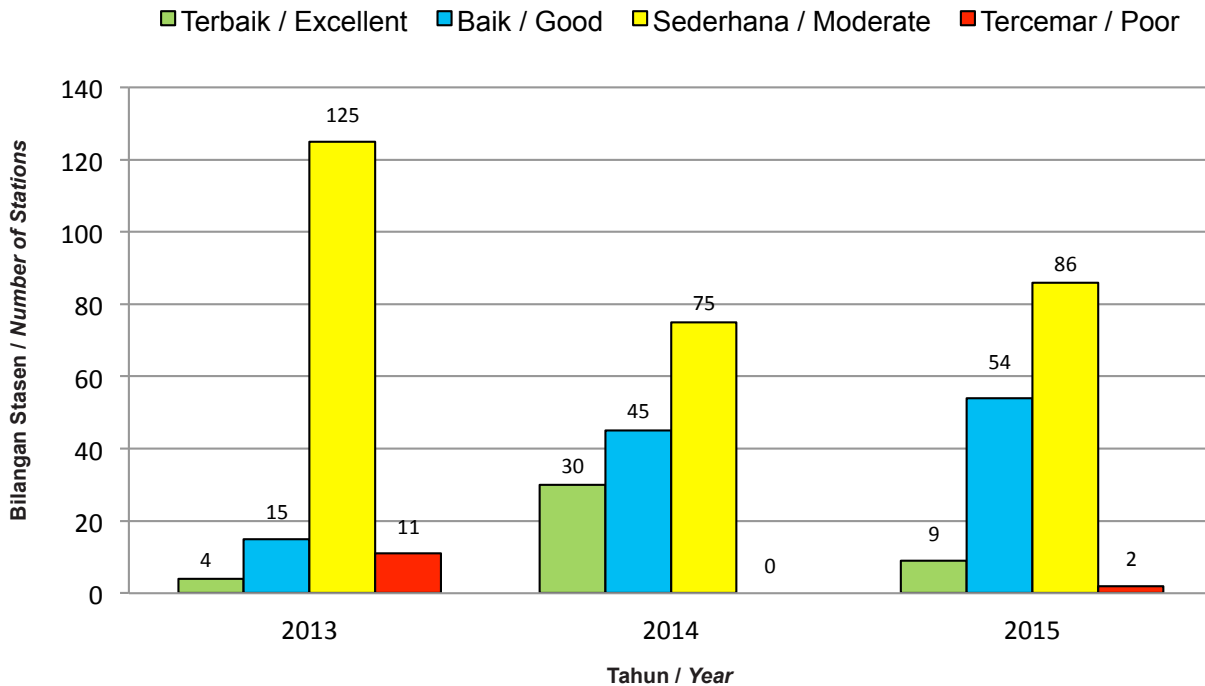
NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Terengganu	Pantai / Coastal	Pantai Batu Buruk	5331935	66.87	66.63	58.57	Sederhana Moderate
		Pantai Bukit Keluang	5825903	63.44	69.87	52.50	Sederhana Moderate
		Pantai Chendering	5231934	66.03	69.84	53.93	Sederhana Moderate
		Pantai Rantau Abang	4833917	68.06	70.35	60.72	Sederhana Moderate
		KIPC Utara	4634954	65.02	62.22	62.63	Sederhana Moderate
		KIPC Tengah	4534955	64.23	63.60	73.57	Sederhana Moderate
		KIPC Selatan	4534956	69.81	66.53	75.99	Sederhana Moderate
Kelantan	Pantai / Coastal	Pantai Seri Tujuh	6221910	66.22	71.10	63.01	Sederhana Moderate
		Pantai Cahaya Bulan	6122903	66.00	74.47	61.56	Sederhana Moderate
		Pantai Sabak	6123909	58.87	72.13	61.66	Sederhana Moderate
		Pantai Irama Bachok	6024908	56.77	69.29	62.24	Sederhana Moderate
		Pantai Bisikan Bayu	5825905	50.28	67.44	64.01	Sederhana Moderate
Sarawak	Pantai / Coastal	Pantai Sematan	1898902	59.58	91.47	76.37	Sederhana Moderate
		Pantai Pandan	1824918	57.94	94.47	87.00	Baik / Good
		Pantai Pasir Putih	1604910	44.04	67.36	67.73	Sederhana Moderate
		Pantai Bako	1704906	69.65	94.29	88.54	Baik / Good
		Pantai Damai	1702904	58.34	91.29	76.13	Sederhana Moderate
		Pantai Tanjung Kembang	1810923	69.32	73.99	87.39	Baik / Good
		Pantai Harmoni Mukah	2920921	53.42	53.87	54.68	Sederhana Moderate
		Pantai Tanjung Batu	3132602	62.49	70.29	67.28	Sederhana Moderate
		Pantai Likau	3230915	51.99	63.19	89.02	Baik / Good
		Pantai Emas	3331903	63.45	63.77	88.93	Baik / Good
		Pantai Piasau	4539918	54.53	88.55	82.17	Baik / Good
		Pantai Brighton	4449917	54.84	91.43	94.00	Terbaik / Excellent
		Pantai Esplaned	4339920	54.97	89.63	97.11	Terbaik / Excellent
		Pantai Beraya	4238921	70.12	89.42	97.32	Terbaik / Excellent
		Pantai Bungai	4137922	53.41	91.11	82.96	Baik / Good
		Pantai Belawai	2212913	76.91	65.92	83.80	Baik / Good

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai
 Table 5.3 Malaysia: Marine Water Quality Status for Coastal

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Sabah	Pantai / Coastal	Pantai Teluk Brunei 1	5053901	71.27	80.05	82.27	Baik / Good
		Pantai Teluk Brunei 2	5053902	70.87	79.10	83.66	Baik / Good
		Pantai Teluk Brunei 3	5053903	69.26	73.19	85.93	Baik / Good
		Pantai Teluk Brunei 4	5053904	73.17	75.80	86.68	Baik / Good
		Pantai Teluk Brunei 5	5053905	73.94	71.05	85.90	Baik / Good
		Pantai Teluk Brunei 6	5053906	74.56	80.37	83.74	Baik / Good
		Borneo Golf Seawater	5355901	79.01	80.38	79.00	Sederhana Moderate
		Pantai Manis Papar	5555901	81.64	81.01	83.86	Baik / Good
		Pantai Melinsung	5565902	78.52	77.45	83.08	Baik / Good
		Pantai Tanjung Aru (Rest Lido)	5656901	77.54	82.39	68.15	Sederhana Moderate
		Pantai Tanjung Aru (Roll Skating)	5656902	76.46	70.13	67.09	Sederhana Moderate
		Pantai Tanjung Aru (No. 3)	5656903	65.33	67.59	66.39	Sederhana Moderate
		Pantai Lok Kawi	5656904	67.48	59.14	69.30	Sederhana Moderate
		Pantai Dalit Tuaran	6161901	70.89	85.15	70.73	Sederhana Moderate
		Mangrove Paradise	6161902	77.51	86.21	67.12	Sederhana Moderate
		Pantai Sabandar	6161903	72.57	83.07	68.84	Sederhana Moderate
		Pantai Bak-Bak Kudat	6665901	81.06	85.11	65.47	Sederhana Moderate
		Pasir Putih Sandakan	5580901	73.89	83.49	84.12	Baik / Good
		Pantai TLDM	5580902	75.20	81.66	87.84	Baik / Good
		Pantai Batu Sapi	5580903	74.90	83.05	84.66	Baik / Good
		Pantai Ulu Tungku	5085901	72.82	83.94	84.70	Baik / Good
		Pantai Sarina Kunak	4481901	72.77	83.69	82.82	Baik / Good
Labuan	Pantai / Coastal	Pantai Kg. Lamak	4581902	71.67	-	82.64	Baik / Good
		Pantai Tinagat	4473901	74.51	83.50	82.05	Baik / Good
		Pulau Papan	5151905	65.92	51.08	76.37	Sederhana Moderate
		Kiamsam	5151906	61.69	67.74	77.30	Sederhana Moderate
		Sungai Pagar	5151907	63.05	79.75	77.91	Sederhana Moderate
		Layang-Layangan	5251902	62.22	79.49	76.44	Sederhana Moderate
		Tanjung Aru	5251903	66.59	75.93	78.49	Sederhana Moderate

Tren Indeks Kualiti Air Marin (IKAM) mulai tahun 2013 hingga 2015 adalah seperti yang ditunjukkan dalam **Rajah 5.1**. Bilangan stesen Baik, Sederhana dan Tercemar menunjukkan peningkatan, manakala bagi stesen Terbaik menunjukkan penurunan.

The trend in terms of Marine Water Quality Index (MWQI) for 2013 to 2015 is as shown in **Figure 5.1**. The numbers of Good, Moderate and Poor water quality stations showed an increase while for Excellent stations showed a decrease.



Rajah 5.1 Malaysia: Tren Status Kualiti Air Marin Kawasan Pantai Di Malaysia, 2013-2015
 Figure 5.1 Malaysia: The trend of Marine Water Status for Coastal Area in Malaysia, 2013-2015



STATUS KUALITI AIR KUALA ESTUARY WATER QUALITY STATUS

Dalam tahun 2015, sebanyak 76 stesen Kuala telah dipantau dan dianalisa serta 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 5.4)

In 2015, 76 estuary stations were monitored, analysed and reported as Marine Water Quality Index. The results from the monitoring programme indicated 6 stations (8%) as Excellent, 12 stations (16%) as Good, 54 stations (71%) as Moderate and 4 stations (5%) as Poor. (Table 5.4)

Jadual 5.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
Table 5.4 Malaysia: Marine Water Quality Status for Estuary

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Perlis	Kuala / Estuary	Kuala Sungai Baru	6201902	55.87	76.48	56.12	Sederhana Moderate
		Kuala Sungai Perlis	6401901	48.76	59.25	53.96	Sederhana Moderate
Kedah	Kuala / Estuary	Kuala Kedah	6102908	84.21	53.46	50.46	Sederhana Moderate
		Kuala Jerlun	6302925	74.29	65.21	59.02	Sederhana Moderate
Pulau Pinang	Kuala / Estuary	Kuala Sungai Jawi	5204901	50.49	58.35	49.63	Tercemar / Poor
		Kuala Sungai Juru	5303904	49.72	63.62	59.40	Sederhana Moderate
		Kuala Sungai Kerian	5104901	80.43	61.57	60.38	Sederhana Moderate
		Kuala Sungai Pinang	5403934	50.97	50.66	47.28	Tercemar / Poor
		Kuala Sungai Perai	5303908	61.88	53.06	56.22	Sederhana Moderate
		Kuala Sungai Tengah	5204935	63.34	60.95	67.81	Sederhana Moderate
		Kuala Sungai Pinang (Balik Pulau)	5202929	37.63	67.78	46.17	Tercemar / Poor
Perak	Kuala / Estuary	Kuala Sungai Manjung	4205930	60.32	70.13	67.56	Sederhana Moderate
		Kuala Sungai Gula	4906926	50.92	68.90	60.95	Sederhana Moderate
		Kuala Sungai Kurau	4994919	67.63	56.98	73.47	Sederhana Moderate
		Kuala Sungai Tanjung Piandang	5003921	52.25	75.74	73.57	Sederhana Moderate
		Kuala Sungai Sepetang	4806925	32.33	53.51	66.87	Sederhana Moderate
		Kuala Sungai Perak	4007901	66.08	62.01	70.96	Sederhana Moderate

Jadual 5.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
 Table 5.4 Malaysia: Marine Water Quality Status for Estuary

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Selangor	Kuala / Estuary	Kuala Sungai Sepang	2517922	88.35	71.62	78.04	Sederhana Moderate
		Kuala Sungai Sepang (Kecil)	2612928	89.61	68.14	92.31	Terbaik / Excellent
		Kuala Sungai Sepang (Kawalan)	2616926	72.81	81.15	86.88	Baik / Good
		Kuala Sungai Langat (Jugra)	2814925	53.62	69.84	55.07	Sederhana Moderate
		Kuala Sungai Klang	3013909	50.83	95.64	67.65	Sederhana Moderate
		Kuala Sungai Langat (Lumut)	2913903	61.85	93.71	67.50	Sederhana Moderate
		Kuala Sungai Buloh	3212930	53.82	64.43	66.90	Sederhana Moderate
		Kuala Sungai Selangor	3312915	51.01	90.87	90.85	Terbaik / Excellent
		Kuala Sungai Tenggi	3311931	47.95	68.06	67.87	Sederhana Moderate
		Kuala Sungai Bernam	3808924	70.11	67.16	55.15	Sederhana Moderate
Negeri Sembilan	Kuala / Estuary	Kuala Sungai Linggi	2319901	75.46	93.77	81.80	Baik / Good
		Kuala Sungai Lukut	2517910	66.78	91.78	68.28	Sederhana Moderate
Melaka	Kuala / Estuary	Kuala Sungai Melaka	2123903	35.12	59.64	55.61	Sederhana Moderate
		Kuala Sungai Sri Melaka	2121914	34.00	59.55	52.71	Sederhana Moderate
		Kuala Sungai Merlimau	2124912	35.41	62.57	86.19	Baik / Good
		Kuala Sungai Kesang	2186905	45.29	68.74	77.06	Sederhana Moderate
		Kuala Sungai Sebatu	2186904	45.37	61.48	58.62	Sederhana Moderate
Johor	Kuala / Estuary	Kuala Sungai Segget	1437919	59.46	61.58	59.96	Sederhana Moderate
		Kuala Sungai Skudai	1437922	66.47	64.21	87.73	Baik / Good
		Kuala Sungai Melayu	1437946	83.38	82.71	88.96	Baik / Good
		Kuala Sungai Tebrau	1438943	59.89	51.23	84.41	Baik / Good
		Kuala Sungai Kim-Kim	1439965	49.41	64.89	81.78	Baik / Good
		Kuala Sungai Johor	1440916	75.62	64.89	89.60	Baik / Good
		Kuala Sungai Batu Pahat	1729930	59.46	61.58	59.96	Sederhana Moderate
		Kuala Sungai Muar	2024932	66.47	64.21	87.73	Baik / Good
		Kuala Sungai Mersing	2438905	83.38	82.71	88.96	Baik / Good

Jadual 5.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
 Table 5.4 Malaysia: Marine Water Quality Status for Estuary

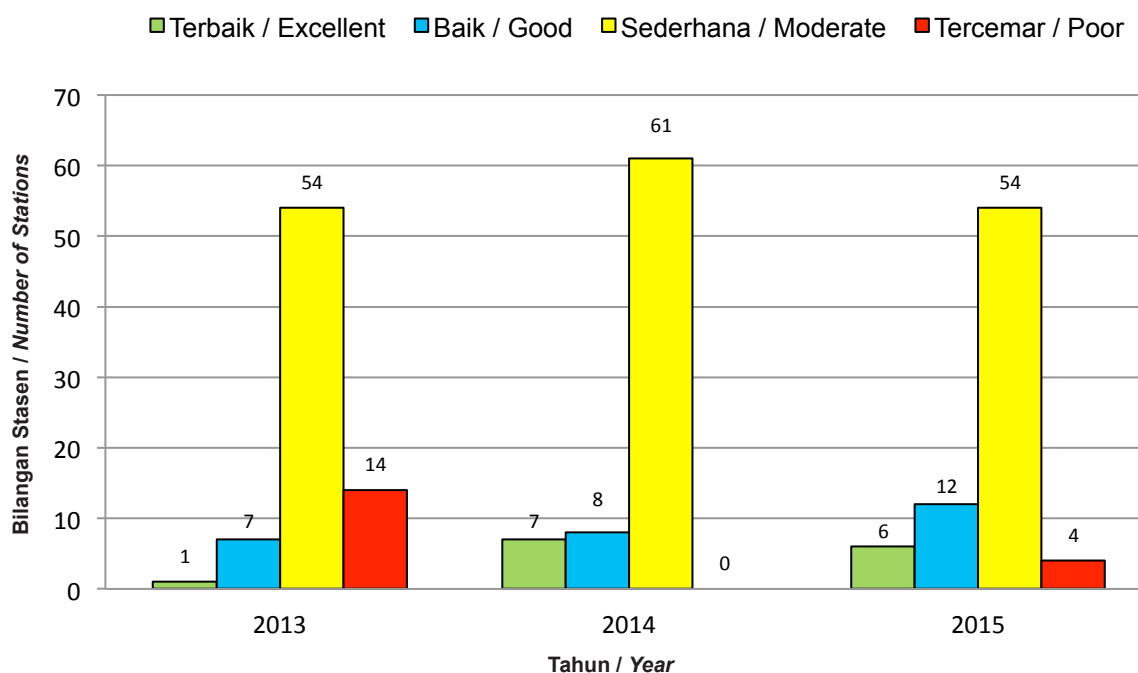
NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Terengganu	Kuala / Estuary	Kuala Sungai Besut	5825902	61.30	70.72	64.29	Sederhana Moderate
		Kuala Sungai Dungun	4734918	49.72	54.17	55.45	Sederhana Moderate
		Kuala Sungai Ibai	5231949	51.26	70.65	63.70	Sederhana Moderate
		Kuala Sungai Kerteh	4534922	52.34	58.43	54.87	Sederhana Moderate
		Kuala Sungai Marang	5232911	70.04	67.68	63.99	Sederhana Moderate
		Kuala Sungai Paka	4634920	59.15	66.24	69.21	Sederhana Moderate
		Kuala Sungai Setiu	5627953	61.10	70.04	62.71	Sederhana Moderate
		Kuala Sungai Terengganu	5331907	63.64	57.95	72.33	Sederhana Moderate
		Kuala Sungai Kemaman/ Chukai	4234929	49.06	59.64	54.65	Sederhana Moderate
		Tioxide Utara (Kg. Bukit Kuang, Kijal)	4234950	64.84	66.36	63.49	Sederhana Moderate
		Tioxide Tengah (Pupuk Semangat, Kijal)	4234951	66.61	70.08	62.99	Sederhana Moderate
		Tioxide Selatan (KSB, T. Kalong)	4234952	66.52	69.01	53.15	Sederhana Moderate
		Pulau Duyung	5231908	64.80	50.09	48.69	Tercemar / Poor
Kelantan	Kuala / Estuary	Kuala Sungai Golok	6220911	64.02	52.34	57.71	Sederhana Moderate
		Kuala Sungai Kelantan	6222901	53.90	51.26	52.64	Sederhana Moderate
		Kuala Sungai Pengkalan Chepa	6223912	54.67	54.89	63.96	Sederhana Moderate
		Kuala Sungai Pengkalan Datu	6123913	51.07	60.40	63.16	Sederhana Moderate
		Kuala Sungai Kemasin	5824914	50.90	67.15	58.29	Sederhana Moderate
Sarawak	Kuala / Estuary	Kuala Sungai Semantan	1898901	55.06	95.23	80.93	Baik / Good
		Kuala Sungai Sarawak	1604907	51.47	80.57	62.94	Sederhana Moderate
		Kuala Sungai Bako	1704905	53.91	65.94	69.21	Sederhana Moderate
		Kuala Sungai Santubong	1702903	66.57	75.42	87.22	Baik / Good
		Kuala Batang Krian (Kabong)	1710922	53.09	79.26	64.72	Sederhana Moderate
		Kuala Batang Rejang	2111909	86.75	82.83	82.31	Baik / Good
		Kuala Mukah	2920920	34.57	51.26	70.05	Sederhana Moderate

Jadual 5.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala
 Table 5.4 Malaysia: Marine Water Quality Status for Estuary

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Sarawak	Kuala / Estuary	Kuala Batang Kemena	3130911	63.94	64.20	77.23	Sederhana Moderate
		Kuala Tanjung Similajau	3431903	63.98	85.68	90.37	Terbaik / Excellent
		Kuala Sungai Panipah	3332904	88.78	89.47	91.49	Terbaik / Excellent
		Kuala Pantai Nyalau	3431903	90.10	55.67	93.69	Terbaik / Excellent
		Kuala Sungai Baram	4539919	64.13	96.20	97.62	Terbaik / Excellent
		Kuala Sungai Miri	4349915	64.63	84.73	72.23	Sederhana Moderate
Sabah	Kuala / Estuary	Kuala Penyu	5453901	77.68	82.00	65.10	Sederhana Moderate
		Muara Sungai Inanam	5050905	59.15	60.16	88.78	Baik / Good

Berdasarkan Indeks Kualiti Air Marin (IKAM), kualiti air di kawasan kuala menunjukkan penurunan bagi kategori Terbaik iaitu daripada 7 stesen (2014) kepada 6 stesen bagi tahun 2015. Bilangan stesen kategori Tercemar dicatatkan sebanyak 4 stesen pada tahun 2015. Bagi kategori stesen Baik, bilangan stesen meningkat daripada 8 stesen (2014) kepada 12 stesen pada tahun 2015. Bagi kategori stesen Sederhana pula, bilangan stesen menurun daripada 61 stesen (2014) kepada 54 stesen dalam tahun 2015. Tren ini ditunjukkan dalam **Rajah 5.2**.

The estuarine water quality in terms of Marine Water Quality Index (MWQI), showed a decrease in the Excellent category from 7 stations in 2014 to 6 stations in 2015. Meanwhile, 4 stations recorded as a Poor category in 2015. For the Good category, the number of stations significantly increased from 8 stations (2014) to 12 stations in 2015. Furthermore, for the Moderate category, the number of stations decreased from 61 stations (2014) to 54 stations in 2015. These trends are shown in **Figure 5.2**.



Rajah 5.2 Malaysia: Tren Status Kualiti Air Marin Bagi Kawasan Kuala, 2013-2015
 Figure 5.2 Malaysia: The Trend Of Marine Water Quality Status for Estuary, 2013-2015

KUALITI AIR MARIN PULAU

ISLAND MARINE WATER QUALITY

Senarai stesen Pulau berdasarkan kategori stesen seperti yang ditunjukkan dalam **Jadual 5.5**.

*The list of island stations by island category is as shown in **Table 5.5**.*

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2015
Table 5.5 Malaysia: Island Stations, 2015

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI 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
		1	PERAK	7KP01	DILINDUNGI PROTECTED
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
		1	GEDONG	7PR09	PERANGINAN RESORT

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2015
 Table 5.5 Malaysia: Island Stations, 2015

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
PERAK	4	2	PANGKOR (TELOK GEDONG)	7AR01	PERANGINAN RESORT
			PANGKOR (PANTAI PUTERI DEWI)	7AR02	PERANGINAN RESORT
		1	PANGKOR LAUT	7AR03	PERANGINAN RESORT
		1	SEMBILAN	7AR04	PERANGINAN RESORT
			TUKUN PERAK	7AP05	DILINDUNGI PROTECTED
SELANGOR	3	1	KETAM	7BR01	PERANGINAN RESORT
		1	ANGSA	7BR02	PERANGINAN RESORT
			LUMUT	7BR03	PERANGINAN RESORT
NEGERI SEMBILAN	1	1	ARANG	7NP01	DILINDUNGI PROTECTED
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

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2015
 Table 5.5 Malaysia: Island Stations, 2015

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
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
			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
				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
KELANTAN	2	1	PANJANG	7DP01	DILINDUNGI PROTECTED
			KUNDUR	7DP02	DILINDUNGI PROTECTED

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2015
 Table 5.5 Malaysia: Island Stations, 2015

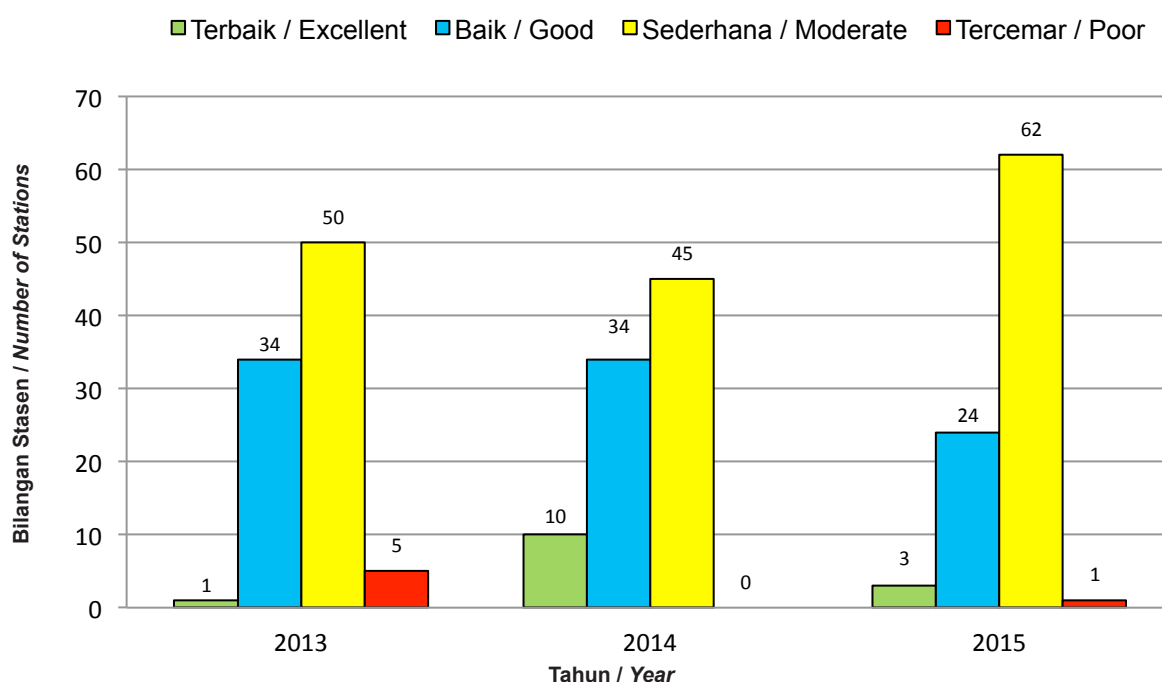
NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
SARAWAK	3	1	SATANG	7QP01	DILINDUNGI PROTECTED
		1	TALANG-TALANG KECIL	7QP02	DILINDUNGI PROTECTED
			TALANG-TALANG BESAR	7QP03	DILINDUNGI PROTECTED
SABAH	17	1	GAYA	7SR01	PERANGINAN RESORT
		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

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2015
Table 5.5 Malaysia: Island Stations, 2015

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
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 2015. Pulau-pulau ini termasuk 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 dianalisis serta dilaporkan sebagai Indeks Kualiti Air Marin. Hasil analisis menunjukkan 3 stesen (3%) dikategorikan sebagai Terbaik, 24 stesen (27%) dikategorikan sebagai Baik, 62 stesen (69%) dikategorikan sebagai Sederhana dan 1 stesen (1%) dikategorikan sebagai Tercemar. (Rajah 5.3)

The waters around 75 islands were monitored in 2015. 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 were monitored, analysed and reported as Marine Water Quality Index. The result indicated 3 stations (3%) as Excellent, 24 stations (27%) as Good, 62 stations (69%) as Moderate and 1 station (1%) is categorized as Poor. (Figure 5.3)



Rajah 5.3 Malaysia: Tren Status Kualiti Air Marin Bagi Pulau, 2013-2015
Figure 5.3: Malaysia: The Trend of Marine Water Quality Status for Island, 2013-2015

Jadual 5.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
Table 5.6 Malaysia: Marine Water Quality Status for Island

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Kedah	Pulau / Island	Singa Besar	7KR01	74.45	83.28	73.83	Sederhana / Moderate
		Dayang Bunting	7KR02	75.91	89.65	71.27	Sederhana / Moderate
		Payar	7KM03	83.73	79.74	73.65	Sederhana / Moderate
		Kaca	7KM04	85.84	82.98	75.03	Sederhana / Moderate
		Pantai Kuah	7KD07	74.45	75.11	69.31	Sederhana / Moderate
		Pantai Chenang	7KD08	83.07	86.55	73.55	Sederhana / Moderate
		Tanjung Rhu	7KD09	69.05	86.38	88.66	Baik / Good
		Teluk Ewa	7KD10	81.15	67.38	74.22	Sederhana / Moderate
		Segantang	7KR01	84.69	84.43	75.09	Sederhana / Moderate
		Perak	7KP01	-	-	72.47	Sederhana / Moderate
Pulau Pinang	Pulau / Island	Batu Maung	7PD01	49.71	70.40	52.83	Sederhana / Moderate
		Padang Kota	7PD04	50.50	51.21	47.21	Tercemar / Poor
		Aman	7PR05	83.95	61.84	69.87	Sederhana / Moderate
		Jerejak	7PR06	75.63	54.80	68.19	Sederhana / Moderate
		Kendi	7PR07	73.86	67.01	72.24	Sederhana / Moderate
		Rimau	7PR08	85.96	61.24	72.27	Sederhana / Moderate
		Teluk Bahang	7PD03	51.06	-	-	-
		Gedong	7PR09	84.97	57.46	66.26	Sederhana / Moderate
Perak	Pulau / Island	Pantai Teluk Gedong	7AR01	54.52	70.80	68.72	Sederhana / Moderate
		Pantai Puteri Dewi	7AR02	74.58	50.44	68.35	Sederhana / Moderate
		Pangkor Laut	7AR03	72.07	66.78	63.63	Sederhana / Moderate
		Sembilan	7AR04	80.45	70.30	63.31	Sederhana / Moderate
		Tukun Perak	7AP05	82.35	73.17	62.43	Sederhana / Moderate
Selangor	Pulau / Island	Ketam	7BR01	87.70	93.63	54.29	Sederhana / Moderate
		Angsa	7BR02	92.07	93.08	59.07	Sederhana / Moderate
		Lumut	7BR03	56.73	61.03	58.36	Sederhana / Moderate
Negeri Sembilan	Pulau / Island	Arang	7NP01	81.24	68.56	92.86	Terbaik / Excellent

Jadual 5.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
 Table 5.6 Malaysia: Marine Water Quality Status for Island

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Melaka	Pulau / Island	Upeh (Point A)	7MR02	43.76	60.28	56.67	Sederhana / Moderate
		Upeh (Point B)	7MR02	41.08	57.20	54.93	Sederhana / Moderate
		Besar (Point A)	7MR01	56.27	64.11	62.65	Sederhana / Moderate
		Besar (Point B)	7MR01	46.81	58.73	56.93	Sederhana / Moderate
		Undan (Point A)	7MP03	47.02	58.74	54.46	Sederhana / Moderate
		Undan (Point B)	7MP03	55.18	71.01	56.70	Sederhana / Moderate
Johor	Pulau / Island	Setindan	7JR01	85.80	88.51	89.46	Baik / Good
		Babi Tengah	7JR02	86.92	89.74	89.43	Baik / Good
		Dayang	7JM03	87.03	88.76	90.05	Terbaik / Excellent
		Nanga Besar	7JM08	86.64	87.65	89.56	Baik / Good
		Sibu Tengah	7JM11	86.35	88.92	89.66	Baik / Good
		Pemanggil	7JM15	85.95	88.68	89.35	Baik / Good
		Kukup	7JP17	82.27	81.08	87.01	Baik / Good
		Pisang	7JP18	84.29	87.52	89.05	Baik / Good
Pahang	Pulau / Island	Tioman (Teluk Salang)	7CM01	71.84	85.77	76.92	Sederhana / Moderate
		Tioman (Kg. Nipah)	7CM01	73.89	85.52	83.01	Baik / Good
		Tulai	7CM05	73.99	84.52	88.79	Baik / Good
		Labas	7CM07	73.88	86.44	85.22	Baik / Good
		Cebah	7CM04	73.90	85.27	85.38	Baik / Good
		Sepui	7CM08	73.90	85.63	79.94	Sederhana / Moderate
		Sembilang	7CM08	73.91	85.76	58.56	Sederhana / Moderate
		Seri Buat	7CM03	73.89	86.56	57.06	Sederhana / Moderate
		Tokong Bahara	7CM09	74.00	85.71	75.91	Sederhana / Moderate

Jadual 5.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
 Table 5.6 Malaysia: Marine Water Quality Status for Island

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Terengganu	Pulau / Island	Gemia	7TR01	61.96	66.94	58.69	Sederhana / Moderate
		Perhentian Besar (South)	7TM04	69.03	69.42	59.82	Sederhana / Moderate
		Perhentian Besar (West)	7TM05	67.88	69.18	57.60	Sederhana / Moderate
		Perhentian Kecil	7TM06	64.88	70.52	59.28	Sederhana / Moderate
		Redang (North)	7TM06	66.65	72.94	58.58	Sederhana / Moderate
		Redang (South)	7TM08	68.87	72.14	58.46	Sederhana / Moderate
		Lang Tengah	7TM11	65.89	69.79	71.52	Sederhana / Moderate
		Pinang	7TM12	68.11	71.15	59.11	Sederhana / Moderate
		Ekor Tebu	7TM13	67.51	69.21	60.70	Sederhana / Moderate
		Lima	7TM14	66.19	73.52	59.12	Sederhana / Moderate
		Kapas	7TP16	67.89	67.29	58.42	Sederhana / Moderate
Kelantan	Pulau / Island	Panjang	7DP01	65.20	67.07	65.49	Sederhana / Moderate
		Kundur	7DP02	69.22	70.43	63.22	Sederhana / Moderate
Sarawak	Pulau / Island	Satang	7QP01	58.98	83.36	75.17	Sederhana / Moderate
		Talang-Talang Kecil	7QP02	70.35	84.70	87.37	Baik / Good
		Talang-Talang Besar	7QP03	70.87	84.50	90.76	Terbaik / Excellent
Sabah	Pulau / Island	Gaya	7SR01	67.05	81.83	85.60	Baik / Good
		Mabul	7SR03	82.35	53.86	71.43	Sederhana / Moderate
		Sipadan (N)	7SR04	81.39	58.91	70.70	Sederhana / Moderate
		Sipadan (W)	7SR05	67.73	79.41	70.87	Sederhana / Moderate
		Sapi	7SM08	69.67	81.27	84.01	Baik / Good
		Manukan	7SM09	69.13	80.44	84.48	Baik / Good
		Tiga	7SR10	77.13	81.80	82.56	Baik / Good
		Kalampunian Besar	7SM11	66.79	84.67	83.80	Baik / Good
		Kapalai	7SR12	81.32	81.22	70.17	Sederhana / Moderate
		Molleangan Besar	7SR14	86.61	79.48	83.20	Baik / Good
		Banggi (South)	7SR15	84.16	76.84	82.57	Baik / Good
		Banggi (East)	7SR20	85.67	79.39	83.43	Baik / Good
		Balambangan	7SR16	84.95	77.52	84.44	Baik / Good
		Selingan	7SP17	68.34	55.98	66.87	Sederhana / Moderate

Jadual 5.6 Malaysia: Status Kualiti Air Marin Bagi Pulau
 Table 5.6 Malaysia: Marine Water Quality Status for Island

NEGERI STATE	KLASIFIKASI STESEN STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN STATION NUMBER	NILAI IKAM MWQI VALUE			KATEGORI (2015) CATEGORY (2015)
				2013	2014	2015	
Sabah	Pulau / Island	Gulisan	7SP18	81.40	59.89	87.00	Baik / Good
		Bakungan Kecil	7SP19	84.07	54.40	50.73	Sederhana / Moderate
		Mantanani Besar	7SR21	83.41	83.08	82.18	Baik / Good
Labuan	Pulau / Island	Kuraman	7LM05	81.63	97.79	68.67	Sederhana / Moderate
		Rusukan Besar	7LM07	84.15	94.87	66.46	Sederhana / Moderate
		Rusukan Kecil	7LM06	81.68	93.58	66.22	Sederhana / Moderate
		Pohon Batu	7LD01	78.08	97.94	67.65	Sederhana / Moderate
		Water Front	7LD02	72.81	97.65	64.47	Sederhana / Moderate
		Lubuk Temiang	7LD03	79.85	97.79	65.77	Sederhana / Moderate
		Ranca-Ranca	7LD04	88.04	91.44	66.63	Sederhana / Moderate

STATUS STESEN-STESEN KUALITI AIR MARIN

STATUS OF MARINE WATER QUALITY STATIONS

Jadual 5.7 dan Jadual 5.8 menunjukkan senarai stesen Pantai dan Kuala yang mencapai kategori Terbaik bagi tahun 2015.

Table 5.7 and Table 5.8 show the list of coastal and estuaries stations that achieved Excellent Category in 2015.

Jadual 5.7 Malaysia: Senarai Pantai Terbaik, 2015
Table 5.7 Malaysia: List of Excellent Coastal, 2015

BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Sarawak	Pantai Beraya
2	Sarawak	Pantai Esplaned
3	Sarawak	Pantai Brighton
4	Negeri Sembilan	Telok Pelanduk
5	Negeri Sembilan	Port Dickson Batu 10
6	Negeri Sembilan	Port Dickson Batu 4
7	Negeri Sembilan	Telok Siting
8	Pahang	Pantai Berserah
9	Johor	Tanjung Bin

Jadual 5.8 Malaysia: Senarai Kuala Kategori Terbaik, 2015
Table 5.8 Malaysia: List of Excellent Estuaries, 2015

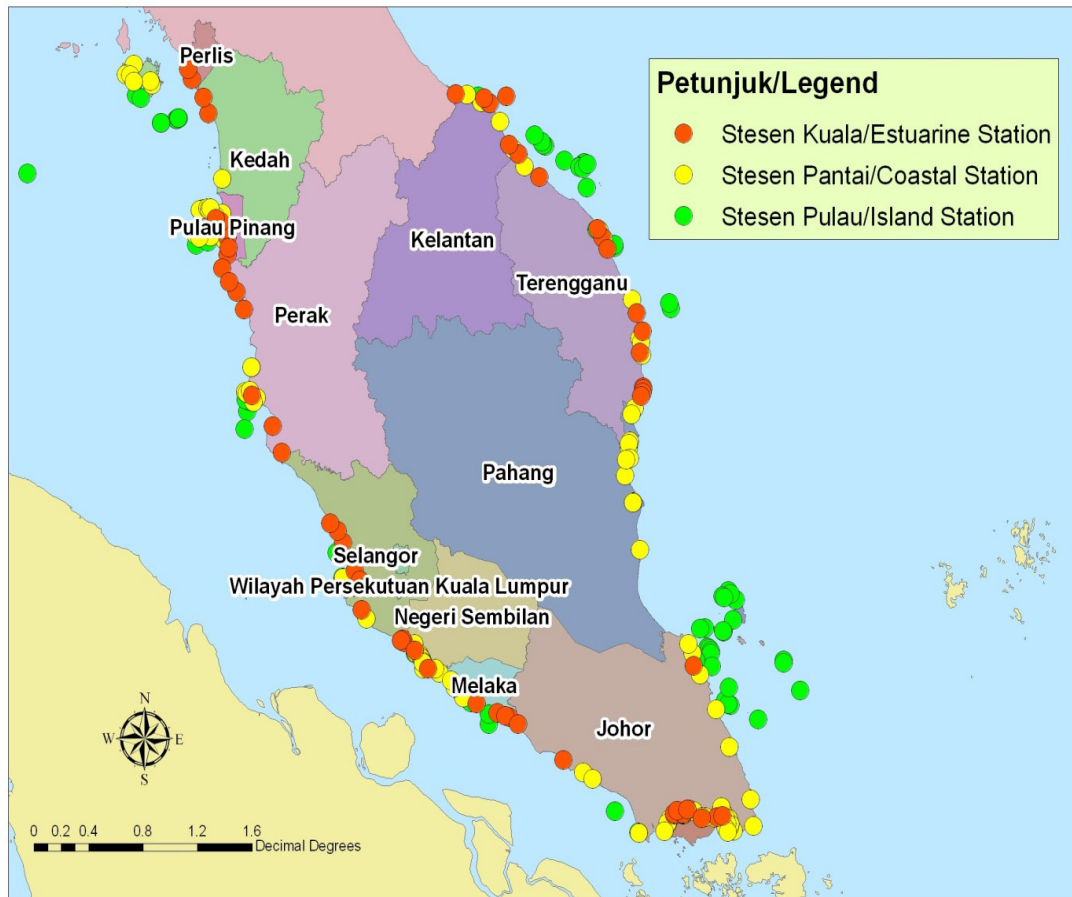
BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Sarawak	Kuala Sungai Baram
2	Sarawak	Kuala Pantai Nyalau
3	Selangor	Kuala Sungai Sepang (Kecil)
4	Sarawak	Kuala Sungai Panipah
5	Sarawak	Kuala Sungai Selangor
6	Sarawak	Kuala Tanjung Similajau

Stesen Pulau yang mencapai Kategori Terbaik bagi tahun 2015 adalah seperti di Jadual 5.9.

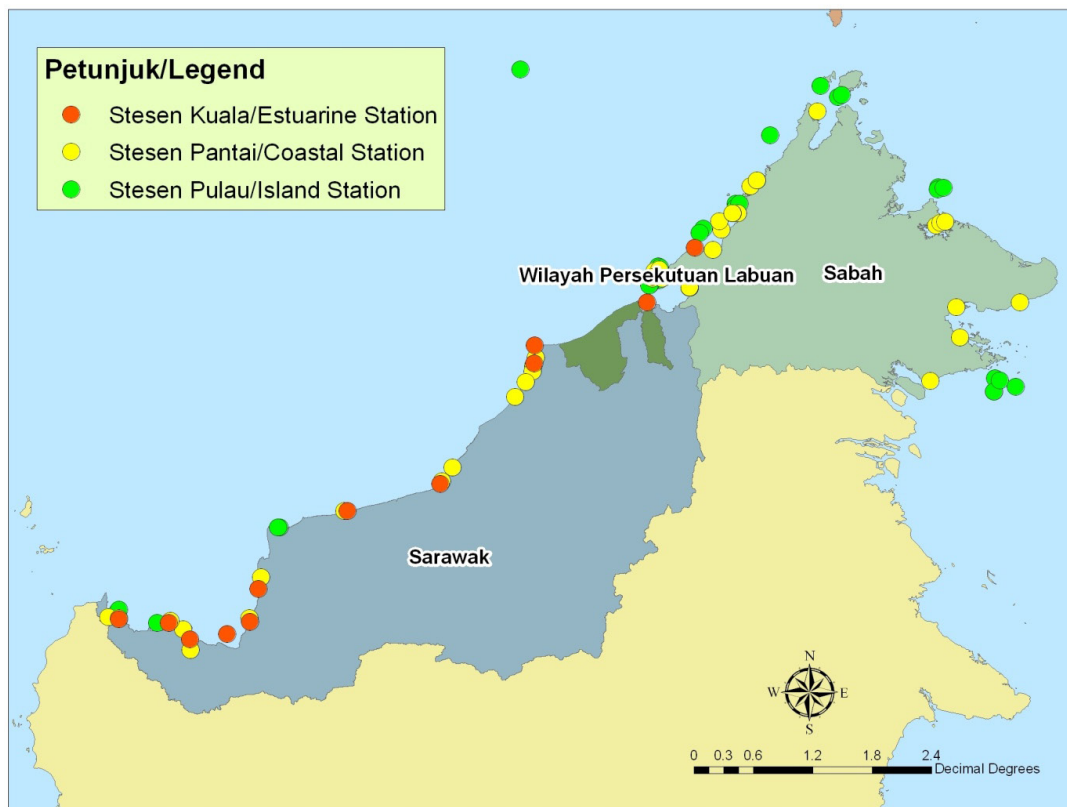
The islands that achieved the Excellent Category for Marine Water Quality Index in 2015 are listed in Table 5.9.

Jadual 5.9 Malaysia: Senarai Pulau Terbaik, 2015
Table 5.9 Malaysia: List of Excellent Islands, 2015

BIL. / NO.	NEGERI / STATE	PULAU / ISLAND	KATEGORI PULAU / ISLAND CATEGORY
1	Selangor	Arang	Dilindungi / Protected
2	Sarawak	Talang-Talang Besar	Dilindungi / Protected
3	Johor	Dayang	Taman Laut / Marine Park



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