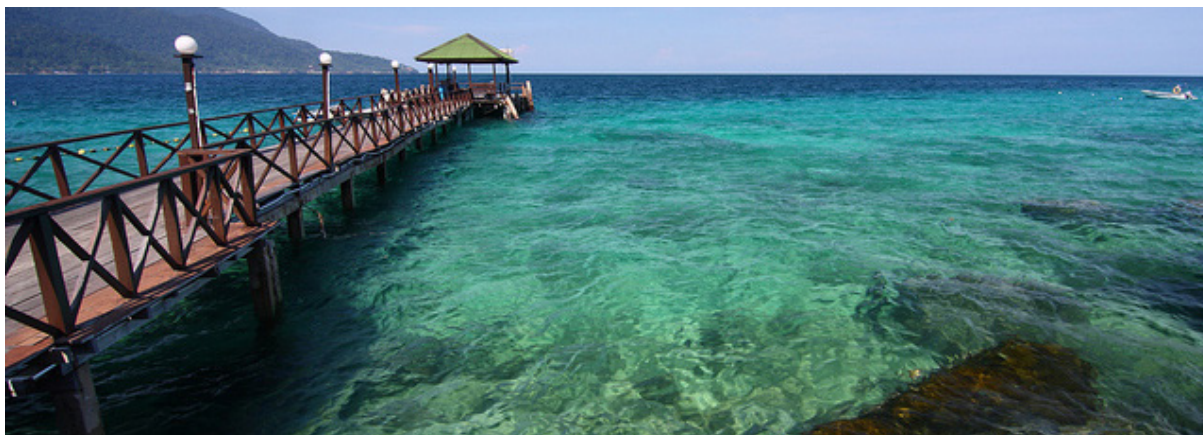




BAB
CHAPTER 5

KUALITI AIR MARIN DAN PULAU-PULAU / ISLANDS AND MARINE WATER QUALITY



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 2013, sebanyak 155 stesen pantai, 76 stesen kuala dan 90 stesen pulau telah dipantau. Sebanyak 648 sampel di kawasan pantai, 334 di kuala dan 327 di pulau telah diambil untuk dianalisa dan hasilnya dilaporkan berdasarkan Indeks Kualiti Air Marin (IKAM)(Annex).

MARINE WATER QUALITY MONITORING

The Department of Environment (DOE) continues to monitor the quality of marine water since 1978 for Peninsular Malaysia and 1985 for Sabah and Sarawak, with the principal aim of identifying the quality of marine water status and to determine the degree of pollution from both land-based sources as well as the seas. These sources may pose threats to marine resources and can upset the stability and diversity of its ecosystem.

In 2013, 155 coastal, 76 estuary and 90 island monitoring stations were monitored, a total of 648 samples from coastal, 334 samples from estuary and 327 samples from island monitoring stations were collected, analyzed and reported based on the Marine Water Quality Index (MWQI)(ANNEX).

IKAM digunakan sebagai satu cara untuk menggambarkan kategori dan status kualiti air marin. Indeks ini dibangunkan berdasarkan tujuh (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 MWQI was used as a benchmark to reflect the quality of marine water status and categories. The index was developed based on seven (7) main parameters consisting of 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).

MWQI with scales between 0 to 100, will be used to designate the assigned categories of water quality, ranging from "Excellent" to "Poor" (**Table 5.1**).

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

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

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

Jadual 5.2: Standard dan Kriteria Kualiti Air Marin

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 / 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
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
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

Jadual 5.2: Standard dan Kriteria Kualiti Air Marin

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 / 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
Fosfat ($\mu\text{g/L}$) / Phosphate ($\mu\text{g/L}$)	5	75	670	75
Fenol ($\mu\text{g/L}$) / Phenol ($\mu\text{g/L}$)	1	10	100	10
Tributyltin (TBT) ($\mu\text{g/L}$)	0.001	0.01	0.05	0.01
Faecal coliform	70 faecal coliform 100mL^{-1}	100 faecal coliform 100mL^{-1} & (70 faecal coliform 100mL^{-1})	200 faecal coliform 100mL^{-1}	100 faecal coliform 100mL^{-1} & (70 faecal coliform 100mL^{-1})
Polycyclic Aromatic Hydrocarbon (PAHs) $\mu\text{g/L}$	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*

Jadual 5.2: Standard dan Kriteria Kualiti Air Marin

Table 5.2: Malaysia Marine Water Quality Criteria and Standards

STATUS KUALITI AIR MARIN PANTAI

Dalam tahun 2013, sebanyak 155 stesen pantai telah dipantau, dianalisa serta dilaporkan dalam Indeks Kualiti Air Marin. Hasil pengawasan menunjukkan empat(4) stesen (2.6%) dikategorikan sebagai Terbaik, 15 stesen (9.7%) sebagai Baik, 125 stesen (80.6%) sebagai Sederhana dan 11 stesen (7.1%) sebagai Tercemar. **(Jadual 5.3).**

COASTAL WATER QUALITY STATUS

In 2013, a total of 155 coastal stations were monitored, analyzed and reported according to the Marine Water Quality Index. The results indicate four(4) stations (2.6%) as Excellent, 15 stations (9.7%) as Good, 125 stations (80.6%) as Moderate and 11 stations (7.1%) as Poor **(Table 5.3).**

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Kedah	Pantai / Coastal	Pantai Merdeka	5603905	71.62	71.62	59.92	Sederhana / Moderate
		Langkawi Island Resort	6399914	73.60	73.60	60.61	Sederhana / Moderate
		Pantai Kok	6397922	60.45	60.45	69.04	Sederhana / Moderate
		Pantai Kuah	6398925	74.13	74.13	62.02	Sederhana / Moderate
		Pantai Pasir Tengkorak	6499701	72.87	72.87	84.28	Baik / Good
		Pantai Teluk Burau	6396923	56.11	56.11	81.59	Baik / Good
		Pantai Teluk Nibong	6497915	54.93	54.93	74.92	Sederhana / Moderate
		Pantai Tengah	6297903	-	-	69.04	Sederhana / Moderate
Pulau Pinang	Pantai / Coastal	Gertak Sanggul	5201919	82.18	58.29	56.60	Sederhana / Moderate
		Kawasan Perindustrian Bayan Lepas I	5303932	62.54	61.00	50.26	Sederhana / Moderate
		Kawasan Perindustrian Bayan Lepas II	5303933	63.09	62.33	51.17	Sederhana / Moderate
		Kawasan Perindustrian Bayan Lepas III	5302939	58.78	55.65	49.12	Tercemar / Poor
		Pantai Bersih	5403906	72.19	52.38	61.81	Sederhana / Moderate
		Pantai Miami	5502901	83.37	65.52	50.22	Sederhana / Moderate
		Pantai Pasir Panjang	5201938	74.15	63.02	58.66	Sederhana / Moderate
		Batu Feringgi	5402904	61.16	81.13	53.81	Sederhana / Moderate

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai

Table 5.3 Malaysia: Coastal Marine Water Quality Status

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Pulau Pinang	Pantai / Coastal	Luar Pantai Teluk Bahang	5402930	84.28	68.52	74.79	Sederhana / Moderate
		Persiaran Gurney	5403902	61.85	68.05	51.75	Sederhana / Moderate
		Rumah Pam Baru Perai	5304927	64.92	50.48	50.53	Sederhana / Moderate
		Rumah Pam Lama Perai	5303926	66.63	61.60	51.02	Sederhana / Moderate
		Selat PP Selatan (Jelutong)	5303911	61.49	58.13	60.52	Sederhana / Moderate
		Tanjung Bungah	5402937	61.61	51.98	51.91	Sederhana / Moderate
		Teluk Tempoyak	5202923	74.03	77.99	57.00	Sederhana / Moderate
		Batu Maung	5202901	-	-	72.34	Sederhana / Moderate
Perak	Pantai / Coastal	Pantai Pasir Bogak	4205908	62.23	55.69	51.75	Sederhana / Moderate
		Pantai Teluk Dalam	4205928	87.90	39.94	65.64	Sederhana / Moderate
		Pantai Teluk Batik	4205932	88.55	60.35	63.86	Sederhana / Moderate
		Pantai Tanjung Batu	4406927	40.32	40.32	56.32	Sederhana / Moderate
		Pantai Pasir Panjang	4205924	63.16	63.16	64.09	Sederhana / Moderate
Selangor	Pantai / Coastal	Pantai Bagan Lalang	2616927	63.51	90.57	86.08	Baik / Good
		Pantai Morib	2712902	52.18	75.03	53.76	Sederhana / Moderate
		Selat Pulau Babi	3012929	63.47	90.98	65.21	Sederhana / Moderate
		Selat Klang Utara	3013908	65.82	89.14	64.28	Sederhana / Moderate
Negeri Sembilan	Pantai / Coastal	Bagan Pinang	2518915	72.47	72.47	67.90	Sederhana / Moderate
		Telok Sinting	2419908	65.90	65.90	72.29	Sederhana / Moderate
		Port Dickson Bandar	2517907	66.45	66.45	75.97	Sederhana / Moderate
		Port Dickson Batu 4	2518937	-	-	68.60	Sederhana / Moderate
		Port Dickson Batu 5	2418906	81.60	81.60	68.41	Sederhana / Moderate
		Port Dickson Batu 6	2418916	89.61	89.61	73.31	Sederhana / Moderate
		Port Dickson Batu 7	2418905	64.49	64.49	71.36	Sederhana / Moderate
		Port Dickson Batu 8	2418912	75.72	75.72	94.06	Terbaik / Excellent
		Port Dickson Batu 10	2418914	66.34	66.34	94.40	Terbaik / Excellent

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai

Table 5.3 Malaysia: Coastal Marine Water Quality Status

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Negeri Sembilan	Pantai / Coastal	Port Dickson Janakuasa TNB	2517909	66.19	66.19	74.92	Sederhana / Moderate
		Telok Pelanduk	2419917	80.93	80.93	91.62	Terbaik/ Excellent
		Pantai Cermin	2416918	89.19	89.19	92.36	Terbaik/ Excellent
Melaka	Pantai / Coastal	Teluk Gong	2320902	55.02	79.24	45.18	Tercemar/ Poor
		Pulau Melaka Point A(i)	2121915	43.76	50.24	42.39	Tercemar/ Poor
		Pulau Melaka Point A(ii)	2121915	49.15	49.15	40.67	Tercemar/ Poor
		Pulau Melaka Point B(i)	2121916	48.08	48.31	41.95	Tercemar/ Poor
		Pulau Melaka Point B(ii)	2121916	49.61	49.61	42.32	Tercemar/ Poor
Johor	Pantai / Coastal	Tanjung Bin	1336975	87.65	88.98	88.26	Baik / Good
		Pelabuhan Tanjung Pelepas	1438943	88.09	86.35	85.67	Baik / Good
		Hadapan Jabatan Laut	1438918	54.77	66.86	78.90	Sederhana / Moderate
		Pantai Stulang Laut	1437951	70.74	61.36	61.19	Sederhana / Moderate
		Jeti Teluk Jawa	1438918	64.70	62.37	65.03	Sederhana / Moderate
		Pelabuhan Pasir Gudang	1428939	66.24	61.48	63.94	Sederhana / Moderate
		Hadapan HSAJB	1437920	66.66	54.37	63.48	Sederhana / Moderate
		Pantai Lido	1437921	67.01	55.94	64.32	Sederhana / Moderate
		Pantai Teluk Mahkota	1841911	80.46	78.57	82.96	Baik / Good
		Pantai Tanjung Leman	2140694	82.79	78.72	83.06	Baik / Good
		Pantai Sri Pantai	2339960	80.26	80.02	59.57	Sederhana / Moderate
		Tanjung Merak	1441968	81.54	82.82	49.56	Baik / Good
		Tanjung Pengelih	1441967	82.93	83.31	76.20	Baik / Good
		Pantai Tanjong Stapa	1341961	78.24	81.10	57.47	Sederhana / Moderate
		Pantai Teluk Gorek	2538958	-	84.07	60.72	Sederhana / Moderate
		Pantai Air Papan	2538959	87.02	82.50	79.08	Sederhana / Moderate
Jeti Kukup	1334925	62.69	86.43	58.52	Sederhana / Moderate		
Jeti Tanjong Belungkor	1440963	80.14	84.21	80.31	Baik / Good		

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai

Table 5.3 Malaysia: Coastal Marine Water Quality Status

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Johor	Pantai / Coastal	Pasir Gogok	1441966	69.26	83.94	71.97	Sederhana / Moderate
		Tanjung Buai	1340973	86.44	84.61	60.45	Sederhana / Moderate
		Pantai Desaru	1542914	92.51	85.33	82.91	Baik / Good
		Tanjung Sepang	1443969	90.82	84.86	81.78	Baik / Good
		Tanjung Penyusup	1444920	89.52	82.21	82.02	Baik / Good
		Pantai Sungai Lurus	1730962	52.07	81.76	64.81	Sederhana / Moderate
		Punggur	1531974	52.45	68.18	49.47	Tercemar / Poor
Pahang	Pantai / Coastal	Pantai Cherating (Club Med)	4133903 (A)	79.44	70.48	73.92	Sederhana / Moderate
		Pantai Cherating (Club Med)	4133903 (B)	70.48	70.48	73.83	Sederhana / Moderate
		Pantai Cherating (Legend)	4133942 (A)	75.73	70.02	73.76	Sederhana / Moderate
		Pantai Cherating (Legend)	4133942 (B)	70.87	70.87	73.96	Sederhana / Moderate
		Pantai Muhibbah Balok	3933901 (A)	52.06	51.16	72.82	Sederhana / Moderate
		Pantai Muhibbah Balok	3933901 (B)	51.04	51.04	71.03	Sederhana / Moderate
		Pantai Batu Hitam	3833915 (A)	71.20	69.36	73.09	Sederhana / Moderate
		Pantai Batu Hitam	3833915 (B)	71.08	71.08	73.87	Sederhana / Moderate
		Pantai Berserah	3933941 (A)	67.48	70.90	73.62	Sederhana / Moderate
		Pantai Berserah	3933941 (B)	55.11	55.11	73.84	Sederhana / Moderate
		Pantai Teluk Cempedak	3833910 (A)	67.99	64.29	73.96	Sederhana / Moderate
		Pantai Teluk Cempedak	3833910 (B)	46.56	46.56	73.89	Sederhana / Moderate
		Pantai Teluk Gelora	3833909 (A)	52.24	50.21	55.80	Sederhana / Moderate
		Pantai Teluk Gelora	3833909 (B)	50.49	50.49	61.48	Sederhana / Moderate
		Pantai Sepat	3737915	75.78	70.11	73.52	Sederhana / Moderate
		Pantai Sepat (B)	3633916	73.78	73.64	73.89	Sederhana / Moderate
		Pantai Legenda (A)	3534943 (A)	64.74	70.92	73.62	Sederhana / Moderate
Pantai Legenda (B)	3534943 (B)	70.44	70.97	73.62	Sederhana / Moderate		

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

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Pahang	Pantai / Coastal	Pantai Kuala Api-Api	3235917	68.19	70.71	72.90	Sederhana / Moderate
		Pantai Tanjung Batu	3334915	58.64	70.50	72.65	Sederhana / Moderate
		Pantai Batu Buruk	5331935	53.47	57.66	66.87	Sederhana / Moderate
		Pantai Bukit Keluang	5825903	76.96	70.00	63.44	Sederhana / Moderate
		Pantai Chendering	5231934	57.99	51.76	66.03	Sederhana / Moderate
		Pantai Rantau Abang	4833917	85.50	70.11	68.06	Sederhana / Moderate
		KIPC Utara	4634954	83.71	50.19	65.02	Sederhana / Moderate
		KIPC Tengah	4534955	86.08	63.65	64.23	Sederhana / Moderate
		KIPC Selatan	4534956	83.63	51.70	69.81	Sederhana / Moderate
Kelantan	Pantai / Coastal	Pantai Seri Tujuh	6221910	65.76	65.76	66.22	Sederhana / Moderate
		Pantai Cahaya Bulan	6122903	61.83	61.83	66.00	Sederhana / Moderate
		Pantai Sabak	6123909	63.46	63.46	58.87	Sederhana / Moderate
		Pantai Irama Bachok	6024908	70.50	70.50	56.77	Sederhana / Moderate
		Pantai Bisikan Bayu	5825905	62.00	62.00	50.28	Sederhana / Moderate
Sarawak	Pantai / Coastal	Pantai Sematan	1898902	82.78	67.79	59.58	Sederhana / Moderate
		Pantai Pandan	1824918	85.21	60.43	57.94	Sederhana / Moderate
		Pantai Pasir Putih	1604910	70.33	69.60	44.04	Tercemar / Poor
		Pantai Bako	1704906	78.38	73.63	69.65	Sederhana / Moderate
		Pantai Damai	1702904	73.06	70.20	58.34	Sederhana / Moderate
		Pantai Tanjung Kembang	1810923	69.44	70.40	69.32	Sederhana / Moderate
		Pantai Harmoni Mukah	2920921	50.30	69.90	53.42	Sederhana / Moderate
		Pantai Tanjung Batu	3132602	34.98	34.98	62.49	Sederhana / Moderate
		Pantai Likau	3230915	48.22	48.22	51.99	Sederhana / Moderate
		Pantai Emas	3331903	34.98	34.98	63.45	Sederhana / Moderate
		Pantai Piasau	4539918	66.78	66.78	54.53	Sederhana / Moderate
		Pantai Brighton	4449917	57.31	52.45	54.84	Sederhana / Moderate
Pantai Esplaned	4339920	53.47	53.47	54.97	Sederhana / Moderate		

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

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Sarawak	Pantai / Coastal	Pantai Beraya	4238921	72.00	72.00	70.12	Sederhana / Moderate
		Pantai Bungai	4137922	72.35	72.35	53.41	Sederhana / Moderate
		Pantai Belawai	2212913	54.17	52.44	76.91	Sederhana / Moderate
Sabah	Pantai / Coastal	Pantai Teluk Brunei 1	5053901	72.36	72.36	71.27	Sederhana / Moderate
		Pantai Teluk Brunei 2	5053902	64.45	64.45	70.87	Sederhana / Moderate
		Pantai Teluk Brunei 3	5053903	72.96	72.95	69.26	Sederhana / Moderate
		Pantai Teluk Brunei 4	5053904	73.71	73.71	73.17	Sederhana / Moderate
		Pantai Teluk Brunei 5	5053905	75.38	75.38	73.94	Sederhana / Moderate
		Pantai Teluk Brunei 6	5053906	66.58	66.58	74.56	Sederhana / Moderate
		Borneo Golf Seawater	5355901	73.39	73.39	79.01	Sederhana / Moderate
		Pantai Manis Papar	5555901	85.29	85.29	81.64	Baik / Good
		Pantai Melinsung	5565902	84.09	84.09	78.52	Sederhana / Moderate
		Pantai Tanjung Aru (Rest Lido)	5656901	78.28	78.28	77.54	Sederhana / Moderate
		Pantai Tanjung Aru (Roll Skating)	5656902	74.49	74.49	76.46	Sederhana / Moderate
		Pantai Tanjung Aru (No. 3)	5656903	69.93	69.93	65.33	Sederhana / Moderate
		Pantai Lok Kawi	5656904	64.61	64.61	67.48	Sederhana / Moderate
		Pantai Dalit Tuaran	6161901	86.22	86.22	70.89	Sederhana / Moderate
		Mangrove Paradise	6161902	68.82	68.82	77.51	Sederhana / Moderate
		Pantai Sabandar	6161903	80.54	80.54	72.57	Sederhana / Moderate
		Pantai Bak-Bak Kudat	6665901	89.28	89.28	81.06	Baik / Good
		Pasir Putih Sandakan	5580901	85.12	85.12	73.89	Sederhana / Moderate
		Pantai TLDM	5580902	56.26	56.26	75.20	Sederhana / Moderate
		Pantai Batu Sapi	5580903	89.99	89.99	74.90	Sederhana / Moderate
Pantai Ulu Tungku	5085901	88.17	88.17	72.82	Sederhana / Moderate		
Pantai Sarina Kunak	4481901	89.32	89.32	72.77	Sederhana / Moderate		

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

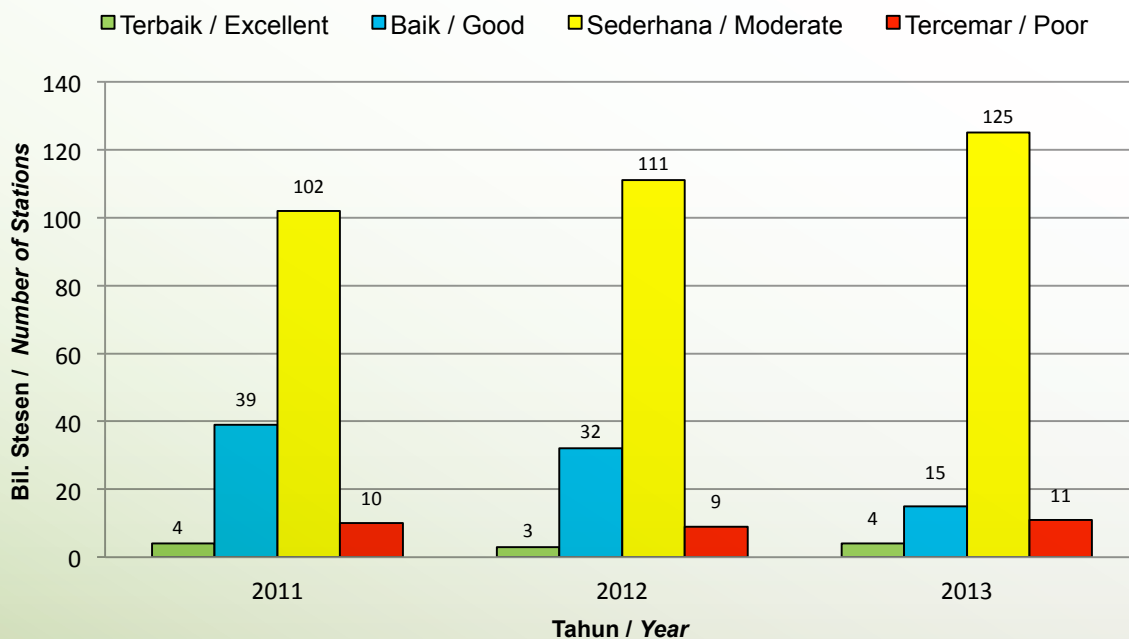
NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Sabah	Pantai / Coastal	Pantai Kg. Lamak	4581902	89.01	89.01	71.67	Sederhana / Moderate
		Pantai Tinagat	4473901	91.28	91.28	74.51	Sederhana / Moderate
Labuan	Pantai / Coastal	Pulau Papan	5151905	49.12	65.11	65.92	Sederhana / Moderate
		Kiamsam	5151906	62.67	66.37	61.69	Sederhana / Moderate
		Sungai Pagar	5151907	48.21	66.10	63.05	Sederhana / Moderate
		Layang-Layangan	5251902	55.39	68.15	62.22	Sederhana / Moderate
		Tanjung Aru	5251903	61.99	65.93	66.59	Sederhana / Moderate

Jadual 5.3 Malaysia: Status Kualiti Air Marin Kawasan Pantai

Table 5.3 Malaysia: Coastal Marine Water Quality Status

Tren Indeks Kualiti Air Marin (IKAM) mulai tahun 2011 hingga 2013 adalah seperti yang ditunjuk dalam **Rajah 5.1**. Bilangan stesen terbaik, sederhana dan tercemar menunjukkan peningkatan, manakala bagi

The trend in terms of Marine Water Quality Index (MWQI) from 2011 to 2013 is as shown in **Figure 5.1**. The number of excellent, moderate and poor water quality stations had increased, while the number of good stations had decreased.



Rajah 5.1 Malaysia: Tren Status Kualiti Air Marin Kawasan Pantai Di Malaysia, 2011-2013

Figure 5.1 Malaysia: The trend of Marine Water Status for Coastal Area in Malaysia, 2011-2013

STATUS KUALITI AIR KUALA

Dalam tahun 2013, sebanyak 76 stesen Kuala telah dipantau dan dianalisa serta dilaporkan sebagai Indeks Kualiti Air Marin. Hasil program pengawasan yang telah dilakukan menunjukkan satu (1) stesen (1.3%) dikategorikan sebagai terbaik, 7 stesen (9.2%) sebagai baik, 54 stesen (71.1%) sebagai sederhana dan 14 stesen (18.4%) sebagai tercemar (**Jadual 5.4**)

ESTUARY WATER QUALITY STATUS

In 2013, 76 estuary stations were monitored, analysed and reported as Marine Water Quality Index. The result from the monitoring programme indicated that one (1) station (1.3%) as excellent, 7 stations (9.2%) as good, 54 stations (71.1%) as moderate and 14 stations (18.4%) as poor. (**Table 5.4**)



NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Perlis	Kuala / Estuary	Kuala Sungai Baru	6201902	52.61	52.61	55.87	Sederhana / Moderate
		Kuala Sungai Perlis	6401901	54.66	54.66	48.76	Tercemar / Poor
Kedah	Kuala / Estuary	Kuala Kedah	6102908	65.38	65.38	84.21	Baik / Good
		Kuala Jerlun	6302925	65.38	65.38	74.29	Sederhana / Moderate
Pulau Pinang	Kuala / Estuary	Kuala Sungai Jawi	5204901	57.37	61.04	50.49	Sederhana / Moderate
		Kuala Sungai Juru	5303904	49.58	60.11	49.72	Tercemar / Poor
		Kuala Sungai Kerian	5104901	64.38	60.42	80.43	Baik / Good
		Kuala Sungai Pinang	5403934	62.90	60.49	50.97	Sederhana / Moderate
		Kuala Sungai Perai	5303908	49.39	55.11	61.88	Sederhana / Moderate
		Kuala Sungai Tengah	5204935	61.08	81.36	63.34	Sederhana / Moderate
		Kuala Sungai Pinang (Balik Pulau)	5202929	50.43	48.51	37.63	Tercemar / Poor
Perak	Kuala / Estuary	Kuala Sungai Manjung	4205930	89.28	33.36	60.32	Sederhana / Moderate
		Kuala Sungai Gula	4906926	22.92	35.12	50.92	Sederhana / Moderate
		Kuala Sungai Kurau	4994919	41.58	41.58	67.63	Sederhana / Moderate
		Kuala Sungai Tanjung Piandang	5003921	38.67	38.67	52.25	Sederhana / Moderate
		Kuala Sungai Sepetang	4806925	23.35	23.55	32.33	Tercemar / Poor
		Kuala Sungai Perak	4007901	66.49	46.34	66.08	Sederhana / Moderate
Selangor	Kuala / Estuary	Kuala Sungai Sepang	2517922	81.79	87.09	88.35	Baik / Good
		Kuala Sungai Sepang (Kecil)	2612928	63.92	90.46	89.61	Baik / Good
		Kuala Sungai Sepang (Kawalan)	2616926	61.62	89.35	72.81	Sederhana / Moderate
		Kuala Sungai Langat (Jugra)	2814925	53.02	73.81	53.62	Sederhana / Moderate
		Kuala Sungai Klang	3013909	55.23	75.12	50.83	Sederhana / Moderate
		Kuala Sungai Langat (Lumut)	2913903	63.87	75.03	61.85	Sederhana / Moderate
		Kuala Sungai Buloh	3212930	66.52	74.69	53.82	Sederhana / Moderate
		Kuala Sungai Selangor	3312915	66.57	87.24	51.01	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 (2013) / CATEGORY (2013)
				2011	2012	2013	
Selangor	Kuala / Estuary	Kuala Sungai Tenggi	3311931	52.21	74.03	47.95	Tercemar / Poor
		Kuala Sungai Bernam	3808924	66.32	88.52	70.11	Sederhana / Moderate
Negeri Sembilan	Kuala / Estuary	Kuala Sungai Linggi	2319901	64.27	64.27	75.46	Sederhana / Moderate
		Kuala Sungai Lukut	2517910	67.94	67.94	66.78	Sederhana / Moderate
Melaka	Kuala / Estuary	Kuala Sungai Melaka	2123903	49.89	56.78	35.12	Tercemar / Poor
		Kuala Sungai Sri Melaka	2121914	48.65	56.51	34.00	Tercemar / Poor
		Kuala Sungai Merlimau	2124912	64.06	47.57	35.41	Tercemar / Poor
		Kuala Sungai Kesang	2186905	67.08	61.71	45.29	Tercemar / Poor
		Kuala Sungai Sebatu	2186904	62.82	54.16	45.37	Tercemar / Poor
Johor	Kuala / Estuary	Kuala Sungai Segget	1437919	67.50	57.21	61.50	Sederhana / Moderate
		Kuala Sungai Skudai	1437922	68.16	61.32	60.73	Sederhana / Moderate
		Kuala Sungai Melayu	1437946	67.84	63.94	63.73	Sederhana / Moderate
		Kuala Sungai Tebrau	1438943	67.64	61.54	59.46	Sederhana / Moderate
		Kuala Sungai Kim-Kim	1439965	83.54	60.34	66.47	Sederhana / Moderate
		Kuala Sungai Johor	1440916	91.60	59.45	83.38	Baik / Good
		Kuala Sungai Batu Pahat	1729930	62.99	82.33	59.89	Sederhana / Moderate
		Kuala Sungai Muar	2024932	62.63	82.37	49.41	Tercemar / Poor
Terengganu	Kuala / Estuary	Kuala Sungai Mersing	2438905	67.41	82.88	75.62	Sederhana / Moderate
		Kuala Sungai Besut	5825902	61.13	61.22	61.30	Sederhana / Moderate
		Kuala Sungai Dungun	4734918	53.15	51.70	49.72	Tercemar / Poor
		Kuala Sungai Ibai	5231949	53.31	52.08	51.26	Sederhana / Moderate
		Kuala Sungai Kerteh	4534922	74.31	57.50	52.34	Sederhana / Moderate
		Kuala Sungai Marang	5232911	71.49	57.59	70.04	Sederhana / Moderate
		Kuala Sungai Paka	4634920	80.99	62.71	59.15	Sederhana / Moderate
Kuala Sungai Setiu	5627953	49.83	56.41	61.10	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 (2013) / CATEGORY (2013)
				2011	2012	2013	
Terengganu	Kuala / Estuary	Kuala Sungai Terengganu	5331907	58.42	51.06	63.64	Sederhana / Moderate
		Kuala Sungai Kemaman / Chukai	4234929	82.32	49.76	49.06	Tercemar / Poor
		Tioxide Utara (Kg. Bukit Kuang, Kijal)	4234950	86.37	70.52	64.84	Sederhana / Moderate
		Tioxide Tengah (Pupuk Semangat, Kijal)	4234951	88.57	70.32	66.61	Sederhana / Moderate
		Tioxide Selatan (KSB, T. Kalong)	4234952	88.02	69.60	66.52	Sederhana / Moderate
		Pulau Duyung	5231908	65.29	50.15	64.80	Sederhana / Moderate
Kelantan	Kuala / Estuary	Kuala Sungai Golok	6220911	56.01	56.01	64.02	Sederhana / Moderate
		Kuala Sungai Kelantan	6222901	45.08	45.08	53.90	Sederhana / Moderate
		Kuala Sungai Pengkalan Chepa	6223912	48.16	48.16	54.67	Sederhana / Moderate
		Kuala Sungai Pengkalan Datu	6123913	59.05	59.05	51.07	Sederhana / Moderate
		Kuala Sungai Kemasin	5824914	59.36	59.36	50.90	Sederhana / Moderate
Sarawak	Kuala / Estuary	Kuala Sungai Semantan	1898901	79.45	72.01	55.06	Sederhana / Moderate
		Kuala Sungai Sarawak	1604907	61.59	67.11	51.47	Sederhana / Moderate
		Kuala Sungai Bako	1704905	59.67	55.69	53.91	Sederhana / Moderate
		Kuala Sungai Santubong	1702903	86.81	70.00	66.57	Sederhana / Moderate
		Kuala Batang Krian (Kabong)	1710922	70.39	70.39	53.09	Sederhana / Moderate
		Kuala Batang Rejang	2111909	70.81	70.81	86.75	Baik / Good
		Kuala Mukah	2920920	59.31	59.31	34.57	Tercemar / Poor
		Kuala Batang Kemena	3130911	56.56	56.56	63.94	Sederhana / Moderate
		Kuala Tanjung Similajau	3431903	41.75	41.75	63.98	Sederhana / Moderate
		Kuala Sungai Panipah	3332904	-	-	88.78	Baik / Good
		Kuala Pantai Nyalau	3431903	-	-	90.10	Terbaik / Excellent
		Kuala Sungai Baram	4539919	-	-	64.13	Sederhana / Moderate
		Kuala Sungai Miri	4349915	-	-	64.63	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 (2013) / CATEGORY (2013)
				2011	2012	2013	
Sabah	Kuala / Estuary	Kuala Penyu	5453901	55.42	55.42	77.68	Sederhana / Moderate
		Muara Sungai Inanam	5050905	58.76	58.76	59.15	Sederhana / Moderate

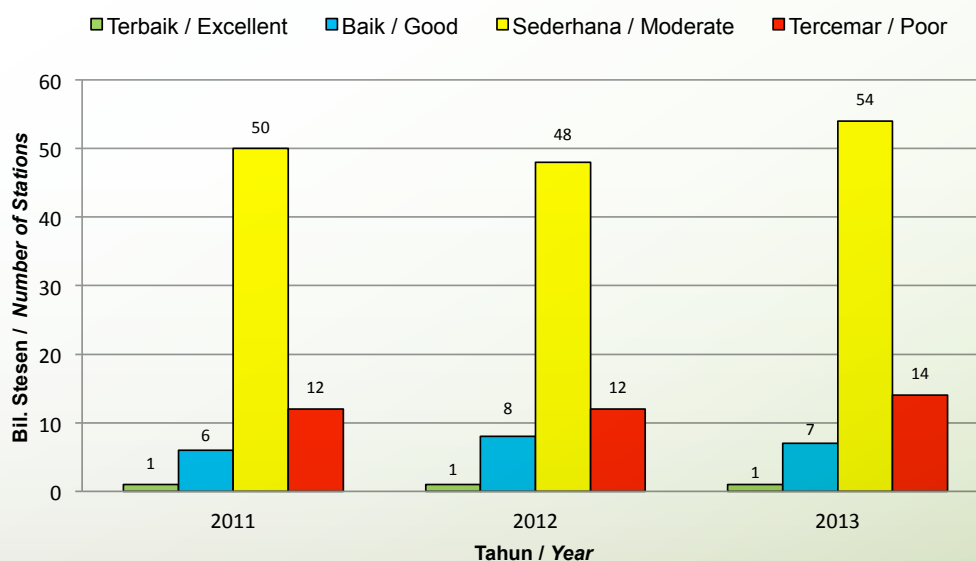
Jadual 5.4 Malaysia: Status Kualiti Air Marin Di Kawasan Kuala

Table 5.4 Malaysia: Marine Water Quality Status for Estuary

stesen baik menunjukkan penurunan.

Dalam tahun 2013, berdasarkan Indeks Kualiti Air Marin (IKAM), kualiti air di kawasan kuala menunjukkan sedikit peningkatan bagi kategori sederhana iaitu daripada 69.6% (2012) kepada 71.1% bagi tahun 2013. Bilangan stesen tercemar juga meningkat daripada 12 stesen dalam tahun 2012 kepada 14 stesen bagi tahun 2013. Bagi kategori stesen baik, terdapat penurunan daripada lapan (8) stesen pada tahun 2012 kepada tujuh (7) stesen pada tahun 2013. Bagi kategori stesen terbaik, bilangan stesen kekal sama iaitu satu (1) stesen bagi tahun 2012 dan 2013. Tren ini ditunjukkan dalam **Rajah 5.2**.

The quality of estuarine water in terms of Marine Water Quality Index (MWQI), showed a slight increase in the moderate category from 69.6% in 2012 to 71.1% in 2013. The stations with poor quality increased from 12 in 2012 to 14 in 2013. There was a decline from eight (8) in 2012 to seven (7) in 2013 for stations in the good category. Meanwhile, for the excellent category, the figures remained unchanged in 2013 as compared to 2012. These trends are tabulated in **Figure 5.2**.



Rajah 5.2 Malaysia: Tren Status Kualiti Air Marin Bagi Kawasan Kuala, 2011-2013

Figure 5.2 Malaysia: The Trend Of Marine Water Quality Status for Estuary, 2011-2013

STATUS KUALITI AIR MARIN PULAU

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

ISLAND MARINE WATER QUALITY STATUS

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

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		
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

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2013

Table 5.5 Malaysia: Island Stations , 2013

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
		1	RIMAU	7PR08	PERANGINAN / RESORT
		1	GEDONG	7PR09	PERANGINAN / RESORT
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
		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
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	3	1	SETINDAN	7JR01	PERANGINAN / RESORT
		1	BABI TENGAH	7JR02	PERANGINAN / RESORT
		1	DAYANG	7JM03	TAMAN LAUT / MARINE PARK

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2013

Table 5.5 Malaysia: Island Stations , 2013

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
JOHOR	5	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	3	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

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2013

Table 5.5 Malaysia: Island Stations , 2013

NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
TERENGGANU	6	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
		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	5	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
		SABAH	12	1	TIGA
		1	KALAMPUNIAN BESAR	7SM11	TAMAN LAUT / MARINE PARK
		1	KAPALAI	7SR12	PERANGINAN / RESORT

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2013

Table 5.5 Malaysia: Island Stations , 2013

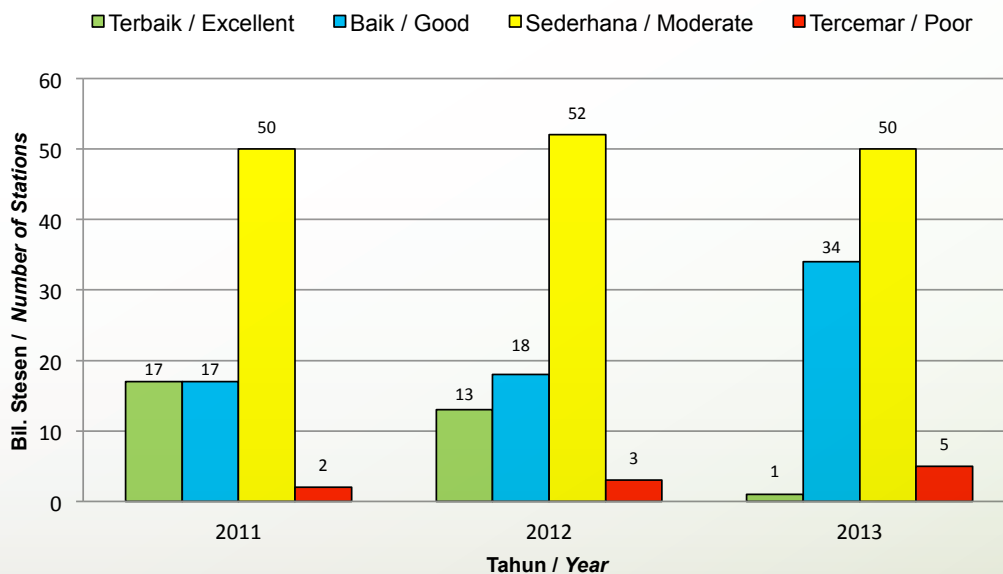
NEGERI STATE	BIL. PULAU NO. OF ISLAND	BIL. STESEN NO. OF STATION	PULAU ISLAND	NO. STESEN STATION NO	KATEGORI CATEGORY
		1	LIGITAN	7SR13	PERANGINAN / RESORT
		1	MOLLEANGAN BESAR	7SR14	PERANGINAN / RESORT
		1	BANGGI	7SR15	PERANGINAN / RESORT
		1	BALAMBANGAN	7SR16	PERANGINAN / RESORT
		1	SILINGAN	7SP17	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

Jadual 5.5 Malaysia: Stesen-Stesen Pulau, 2013

Table 5.5 Malaysia: Island Stations , 2013

Sebanyak 74 buah pulau telah dipantau dalam tahun 2013. Pulau-pulau ini termasuk Pulau Pembangunan (3 buah pulau), Pulau Peranginan (30 buah pulau), Pulau Taman Laut (29 buah pulau) dan Pulau Dilindungi (12 buah pulau). Sebanyak 90 stesen telah dipantau, dianalisis serta dilaporkan sebagai Indeks Kualiti Air Marin. Hasil analisis menunjukkan hanya (1) stesen (1.1%) dikategorikan sebagai terbaik, 34 stesen (37.8%) dikategorikan sebagai baik, 50 stesen (55.6%) dikategorikan sebagai sederhana dan hanya lima (5) stesen (5.6%) dikategorikan sebagai tercemar. **(Rajah 5.3)**

The waters around 74 islands were monitored in 2013. They include development islands (3 islands), Resort Islands (30 islands), Marine Park Islands (29 islands) and Protected Islands (12 islands). 90 island stations were monitored and analyzed to determine the Marine Water Quality Index. The results indicated that one (1) station (1.1%) as excellent, 34 stations (37.8%) as good, 50 stations (55.6%) as moderate and 5 stations (5.6%) as poor. **(Figure 5.3)**



Rajah 5.3 Malaysia: Tren Status Kualiti Air Marin Bagi Pulau, 2012-2013

Figure 5.3: Malaysia: The Trend of Marine Water Quality Status for Islands, 2012-2013

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Kedah	Pulau / Island	Singa Besar	7KR01	72.54	79.56	74.45	Sederhana / Moderate
		Dayang Bunting	7KR02	68.99	27.51	75.91	Sederhana / Moderate
		Payar	7KM03	81.67	81.67	83.73	Baik / Good
		Kaca	7KM04	81.67	81.67	85.84	Baik / Good
		Pantai Kuah	7KD07	63.95	73.88	74.45	Sederhana / Moderate
		Pantai Chenang	7KD08	74.63	87.61	83.07	Baik / Good
		Tanjung Rhu	7KD09	78.74	94.68	69.05	Sederhana / Moderate
		Teluk Ewa	7KD10	74.88	73.36	81.15	Baik / Good
		Segantang	7KR01	-	-	84.69	Baik / Good
		Dayang Bunting	7KR02	68.99	27.51	75.91	Sederhana / Moderate
Pulau Pinang	Pulau / Island	Batu Maung	7PD01	95.58	76.78	49.71	Tercemar / Poor
		Padang Kota	7PD04	96.00	54.29	50.50	Sederhana / Moderate
		Aman	7PR05	63.01	63.01	83.95	Baik / Good
		Jerejak	7PR06	64.88	64.88	75.63	Sederhana / Moderate
		Kendi	7PR07	86.35	86.35	73.86	Baik / Good
		Rimau	7PR08	89.88	89.88	85.96	Baik / Good
		Teluk Bahang	7PD03	-	-	51.06	Sederhana / Moderate
		Gedong	7PR09	67.21	67.21	84.97	Baik / Good
Perak	Pulau / Island	Pantai Teluk Gedong	7AR01	87.21	73.35	54.52	Sederhana / Moderate
		Pantai Puteri Dewi	7AR02	78.34	83.00	74.58	Sederhana / Moderate
		Pangkor Laut	7AR03	85.62	68.44	72.07	Sederhana / Moderate
		Sembilan	7AR04	54.44	69.63	80.45	Baik / Good
		Tukun Perak	7AP05	94.18	68.69	82.35	Baik / Good
Selangor	Pulau / Island	Ketam	7BR01	80.16	88.92	87.70	Baik / Good
		Angsa	7BR02	91.18	84.89	92.07	Terbaik / Excellent
		Lumut	7BR03	39.93	84.89	56.73	Sederhana / Moderate

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

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Negeri Sembilan	Pulau/ Island	Arang	7NP01	81.24	81.24	68.56	Sederhana / Moderate
Melaka	Pulau/ Island	Upeh (Point A)	7MR02	51.52	38.05	43.76	Tercemar / Poor
		Upeh (Point B)	7MR02	61.00	54.88	41.08	Tercemar / Poor
		Besar (Point A)	7MR01	75.70	72.07	56.27	Sederhana / Moderate
		Besar (Point B)	7MR01	65.99	66.67	46.81	Tercemar / Poor
		Undan (Point A)	7MP03	76.02	80.44	47.02	Tercemar / Poor
		Undan (Point B)	7MP03	51.22	68.95	55.18	Sederhana / Moderate
Johor	Pulau / Island	Setindan	7JR01	94.57	96.10	85.80	Baik / Good
		Babi Tengah	7JR02	97.00	96.20	86.92	Baik / Good
		Dayang	7JM03	96.37	95.98	87.03	Baik / Good
		Nanga Besar	7JM08	96.56	95.80	86.64	Baik / Good
		Sibu Tengah	7JM11	96.96	94.85	86.35	Baik / Good
		Pemanggil	7JM15	96.90	96.63	85.95	Baik / Good
		Kukup	7JP17	75.78	90.43	82.27	Baik / Good
		Pisang	7JP18	80.64	93.45	84.29	Baik / Good
Pahang	Pulau / Island	Tioman (Teluk Salang)	7CM01	97.75	61.15	71.84	Sederhana / Moderate
		Tioman (Kg. Nipah)	7CM01	97.85	61.35	73.89	Sederhana / Moderate
		Tulai	7CM05	97.91	61.52	73.99	Sederhana / Moderate
		Labas	7CM07	97.91	61.64	73.88	Sederhana / Moderate
		Cebeh	7CM04	97.86	53.38	73.90	Sederhana / Moderate
		Sepui	7CM08	97.86	58.86	73.90	Sederhana / Moderate
		Sembilang	7CM08	97.87	55.26	73.91	Sederhana / Moderate
		Seri Buat	7CM03	97.97	56.05	73.89	Sederhana / Moderate
		Tokong Bahara	7CM09	50.12	50.12	74.00	Sederhana / Moderate
Terengganu	Pulau / Island	Gemia	7TR01	81.96	77.43	61.96	Sederhana / Moderate
		Perhentian Besar (South)	7TM04	32.69	68.70	69.03	Sederhana / Moderate
		Perhentian Besar (West)	7TM05	55.87	71.08	67.88	Sederhana / Moderate

Jadual 5.6 Malaysia: Status Kualiti Air Marin Bagi Pulau

Table 5.6 Malaysia: Marine Water Quality Status for Islands

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Terengganu	Pulau / Island	Perhentian Kecil	7TM06	59.55	71.68	64.88	Sederhana / Moderate
		Redang (North)	7TM06	71.77	66.91	66.65	Sederhana / Moderate
		Redang (South)	7TM08	65.48	65.48	68.87	Sederhana / Moderate
		Lang Tengah	7TM11	87.63	70.44	65.89	Sederhana / Moderate
		Pinang	7TM12	88.56	62.99	68.11	Sederhana / Moderate
		Ekor Tebu	7TM13	73.82	62.83	67.51	Sederhana / Moderate
		Lima	7TM14	68.38	69.85	66.19	Sederhana / Moderate
		Kapas	7TP16	88.14	68.50	67.89	Sederhana / Moderate
Kelantan	Pulau / Island	Panjang	7DP01	76.01	62.79	65.20	Sederhana / Moderate
		Kundur	7DP02	82.47	61.16	69.22	Sederhana / Moderate
Sarawak	Pulau / Island	Satang	7QP01	61.21	92.00	58.98	Sederhana / Moderate
		Talang-Talang Kecil	7QP02	58.71	92.17	70.35	Sederhana / Moderate
		Talang-Talang Besar	7QP03	78.87	92.58	70.87	Sederhana / Moderate
Sabah	Pulau / Island	Gaya	7SR01	80.56	80.56	67.05	Sederhana / Moderate
		Mabul	7SR03	70.17	70.17	82.35	Baik / Good
		Sipadan (N)	7SR04	66.01	66.01	81.39	Baik / Good
		Sipadan (W)	7SR05	70.55	70.55	67.73	Sederhana / Moderate
		Sapi	7SM08	81.51	81.51	69.67	Sederhana / Moderate
		Manukan	7SM09	76.35	76.35	69.13	Sederhana / Moderate
		Tiga	7SR10	69.73	69.73	77.13	Sederhana / Moderate
		Kalampunian Besar	7SM11	64.74	64.74	66.79	Sederhana / Moderate
		Kapalai	7SR12	69.74	69.74	81.32	Baik / Good
		Molleangan Besar	7SR14	54.93	54.93	86.61	Baik / Good
		Banggi (South)	7SR15	60.59	60.59	84.16	Baik / Good
Banggi (East)	7SR20	55.57	55.57	85.67	Baik / Good		

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

NEGERI / STATE	KLASIFIKASI STESEN / STATION CLASSIFICATION	KAWASAN / AREA	NOMBOR STESEN / STATION NUMBER	NILAI IKAM / MWQI VALUE			KATEGORI (2013) / CATEGORY (2013)
				2011	2012	2013	
Sabah	Pulau / Island	Balambangan	7SR16	80.08	80.08	84.95	Baik / Good
		Selingan	7SP17	64.77	64.77	68.34	Sederhana / Moderate
		Gulisan	7SP18	67.76	67.76	81.40	Baik / Good
		Bakungan Kecil	7SP19	64.19	64.19	84.07	Baik / Good
		Mantanani Besar	7SR21	-	-	83.41	Baik / Good
Labuan	Pulau / Island	Kuraman	7LM05	60.23	83.10	81.63	Baik / Good
		Rusukan Besar	7LM07	62.15	85.26	84.15	Baik / Good
		Rusukan Kecil	7LM06	63.35	86.21	81.68	Baik / Good
		Pohon Batu	7LD01	66.08	90.71	78.08	Sederhana / Moderate
		Water Front	7LD02	56.90	71.80	72.81	Sederhana / Moderate
		Lubuk Temiang	7LD03	63.45	86.23	79.85	Sederhana / Moderate
		Ranca-Ranca	7LD04	63.15	86.19	88.04	Baik / Good

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

STATUS KUALITI AIR MARIN

Jadual 5.7 dan **Jadual 5.8** menunjukkan senarai stesen Pantai dan Kuala yang mencapai kategori terbaik bagi tahun 2013.

STATUS OF MARINE WATER QUALITY

Table 5.7 and **Table 5.8** shows the list of coastal and estuary stations that have

BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Sarawak	Kuala Pantai Nyalau

Jadual 5.7 Malaysia: Senarai Kuala Kategori Terbaik, 2013
Table 5.7 Malaysia: List Of Excellent Estuaries, 2013

BIL. / NO.	NEGERI / STATE	LOKASI / LOCATION
1	Negeri Sembilan	Port Dickson Batu 10
2	Negeri Sembilan	Port Dickson Batu 8
3	Negeri Sembilan	Pantai Cermin
4	Negeri Sembilan	Telok Pelanduk

Jadual 5.8 Malaysia: Senarai Pantai Terbaik, 2013

Table 5.8 Malaysia: List Of Excellent Coastals, 2013

Stesen Pulau yang mencapai Kategori Terbaik bagi tahun 2013 adalah seperti di **Jadual 5.9**.

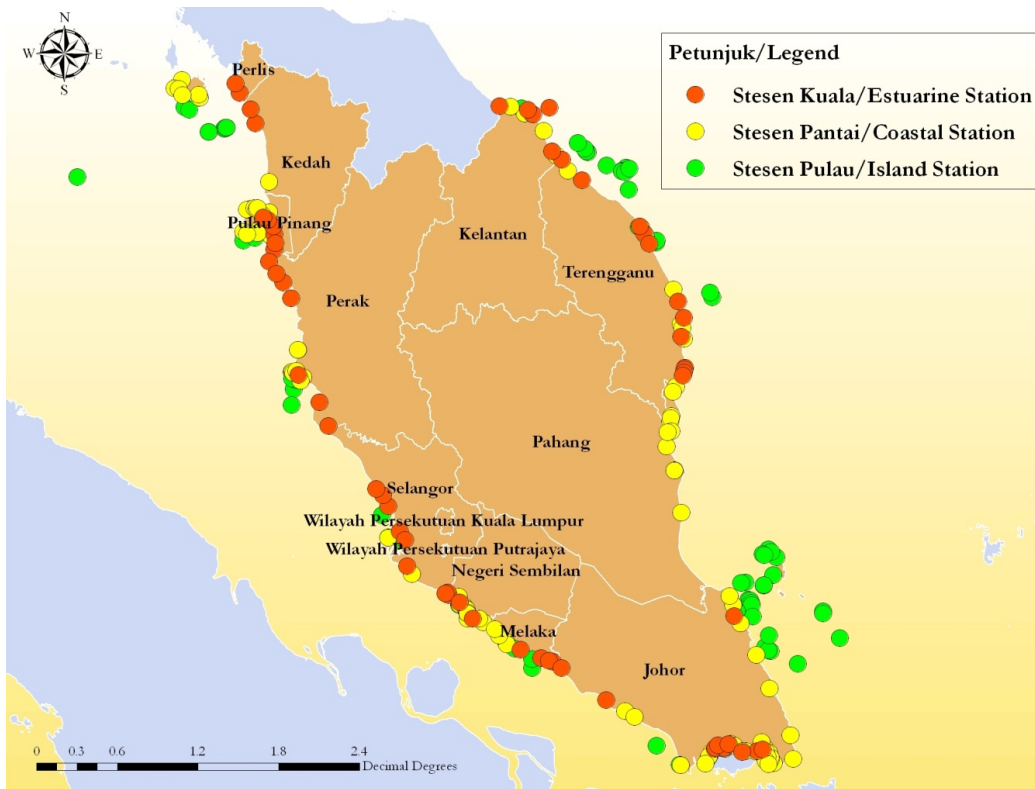
achieved the Excellent Category for 2013. The islands that achieve the Excellent Category for Marine Water Quality Index in 2013 are listed in **Table 5.9**.

BIL. / NO.	NEGERI / STATE	PULAU / ISLAND	KATEGORI PULAU / ISLAND CATEGORY
1	Selangor	Angsa	Peranginan / Resort

Jadual 5.9 Malaysia: Senarai Pulau Terbaik, 2013

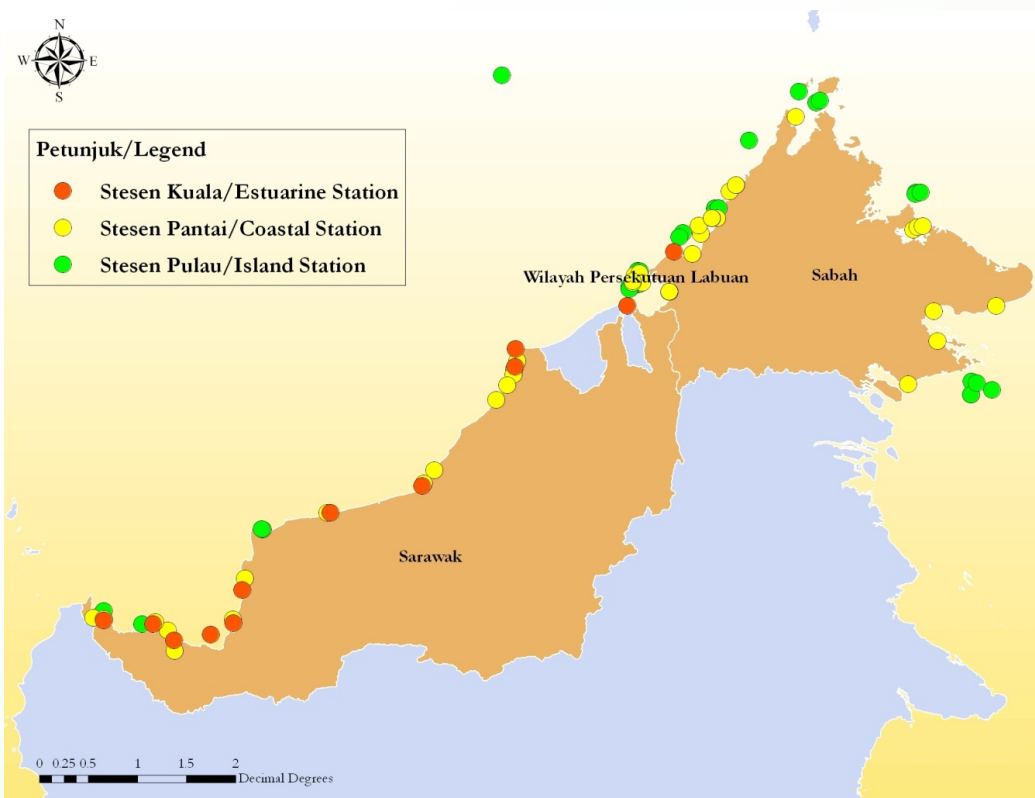
Table 5.9 Malaysia: List of Excellent Islands, 2013





Peta 5.1: Semenanjung Malaysia: Lokasi Stesen Pengawasan Kualiti Air Marin

Map 5.1: Peninsular Malaysia: Location of Marine Water Quality Stations



Peta 5.2: Sabah & Sarawak: Lokasi Stesen Pengawasan Kualiti Air Marin

Map 5.2: Sabah & Sarawak: Location of Marine Water Quality Stations