



## **MARINE WATER QUALITY ASSESSMENT: MALAYSIAN MARINE WATER QUALITY INDEX**

Marine water quality assessment is an important element in evaluating the effectiveness of management strategies and action plans formed to protect the diverse and sensitive marine ecosystems around the country's marine waters. Generated data from manual marine water quality monitoring stations represent key parameters of marine water quality that are related with water quality in the area around the station. The assessment of water quality status is based on the Malaysian Marine Water Quality Standards.

Referring to other countries, the water quality index is also used to assess the status of water quality. The water quality index is a method used to summarize a large number of water quality parameters into one index value that gives an overview of the marine's water quality. The water quality index formulated is a general indicator of marine water quality.

In Malaysia, the formula for calculating the Malaysian Marine Water Quality Index (MMWQI) is as follows:-

$$\text{MMWQI} = q_{i\text{DO}}^{0.18} \times q_{i\text{FC}}^{0.19} \times q_{i\text{NH}_3}^{0.15} \times q_{i\text{NO}_3}^{0.16} \times q_{i\text{PO}_4}^{0.17} \times q_{i\text{TSS}}^{0.15}$$

Whereby,

$$\begin{aligned}
 q_{i\text{DO}} &= -85.816 + 55.4768(\text{DO}) - 4.142(\text{DO}^2) && \text{When DO is } < 3 \text{ mg/L, } q_{i\text{DO}} = 10 \\
 &&& \text{When DO is } > 10 \text{ mg/L, } q_{i\text{DO}} = 10 \\
 q_{i\text{FC}} &= 100 * \text{EXP}(-0.005(\text{Faecal coliform})) && \text{IF FC } > 500 \text{ Faecal coliform} \\
 &&& \text{count/100 ml, } q_{i\text{FC}} = 8 \\
 q_{i\text{NH}_3} &= 100 \text{ Exp}(-0.0046(\text{Unionized Ammonia})) \\
 q_{i\text{NO}_3} &= 94.8 \text{ EXP}(-0.00035(\text{Nitrate})) \\
 q_{i\text{PO}_4} &= 95.2 \text{ EXP}(-0.002(\text{Phosphate})) && \text{When PO}_4 > 900 \text{ } \mu\text{g/L, } q_{i\text{PO}_4} = 10 \\
 q_{i\text{TSS}} &= 95.8 \text{ EXP}(-0.0043(\text{Total Suspended Solid})) && \text{When TSS } > 100 \text{ mg/L, } q_{i\text{TSS}} = 20
 \end{aligned}$$

Based on the MMWQI, marine water quality is classified into the following classes:

MMWQI	Category
90 – 100	Excellent
80 – 89	Good
50 – 79	Moderate
0 – 49	Poor

## For Information

Matters that need to inform:-

- Data generated from the MMWQM stations is an ambient water quality data and do not necessarily reflect specific pollution source (s);
- Data displayed from the MMWQM stations are based on the latest six (6) times sampling frequency;
- MMWQI readings only provide general indicators of marine water quality generated using data from six (6) marine water quality parameters. Therefore, MMWQI is not suitable to be used for pollution caused by other than the water quality parameters. Data generated is only valid with respect to the location of the monitoring station and at the time of sampling or at the time when measurements are made;
- Data generated is only valid with respect to the location of the monitoring station and at the time of sampling or at the time when measurements are made;
- Water quality is also affected by various pollution factors such as natural factors, river flow and changes of weather.