

Water quality indexing of coastal waters off Cochin

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Water Quality Index (WQI) condenses the information from numerous water quality parameters into a simpler version which can be used to appraise and compare water quality data from a number of sites as well as to look at trends of water quality over a period of time from a single site. WQI is means for simplifying the reporting of detailed water quality assessment and providing meaningful summaries of overall water quality and its trends. It also creates an output that is easy to understand for managers and non-technical public.

WQI is not meant to replace a detailed analysis of environmental monitoring data, nor should it be used as the only device for management of water

bodies. Rather it gives a broad overview of the environmental performance of the assessed aquatic system. Water quality indices for the year 2002 and 2012 were prepared, using the grading of selected environmental indicators (Table 1), as per USEPA (2004). The data on water quality at selected sites off Cochin on monthly intervals was used. The selected environmental indicators were dissolved oxygen (DO, mg l⁻¹), dissolved inorganic phosphorus (DIP, mg l⁻¹), dissolved inorganic nitrogen (DIN, mg l⁻¹) and chlorophyll a (µg l⁻¹). These indicators were assessed, based on estimation of water samples using standard analytical methods (APHA, 1981) for DO, dissolved orthophosphate, NO₂ -N, NO₃ -N, total NH₃- N and chlorophyll a.

Table 1. Range of selected environmental indicators for water quality indexing




Ranking	Grade colour	DO mg l ⁻¹	Chl a µg l ⁻¹	DIP mg l ⁻¹	DIN mg l ⁻¹
Good		> 5	<5	<0.01	<0.1
Fair		2-5	5-20	0.01-0.05	0.1-0.5
Poor		< 2	>20	>0.05	>0.5

Table 2. Water Quality index of surface waters, off Cochin (January-December 2002)































Latitude	Longitude	Depth	DO mg l ⁻¹	DIP mg l ⁻¹	DIN mg l ⁻¹	Chl a µg l ⁻¹	WQI
09°58' 13" N	76° 14' 50" E	5m	 5.58	 0.032	 0.021	 1.054	 Good
09° 57' 24" N	76°09' 06 " E	10m	 5.77	 0.020	 0.010	 0.823	 Good
09° 57' 6" N	76°06' 27 "E	20 m	 6.74	 0.027	 0.005	 0.443	 Good

Table 3. Water Quality Index of surface waters, off Cochin (January - December 2012)

Latitude	Longitude	Depth	DO mg l ⁻¹	DIP mg l ⁻¹	DIN mg l ⁻¹	Chl a µg l ⁻¹	WQI
09° 58' 13" N	76° 14' 50" E	5m	 5.27	 0.012	 0.076	 1.52	 Good
09° 57' 24" N	76°09' 06 " E	10m	 7.01	 0.006	 0.011	 0.777	 Good
09° 57' 6" N	76°06' 27 "E	20 m	 7.20	 0.008	 0.035	 0.268	 Good

The results obtained were judged against the corresponding baseline range concentrations quoted by National Coastal Assessment Report (USEPA, 2004) after arriving at the annual mean and graded accordingly as good, fair and poor for each environmental indicators *viz.* DO, DIP, DIN and Chl a, for each site.

For a site to be ranked as good, it should have not more than one indicator rated as fair. For a site to be ranked as fair, it would have one indicator rated as poor or two or more indicators rated as fair. A site would be ranked as poor if it had two or more indicators rated as poor.

Accordingly, the selected sites, off Cochin were indexed for water quality for the years 2002 and 2012.

The water quality indexing shows that the quality of near-shore waters, off Cochin has not been deteriorated. There is also an indication of improvement in quality of water with regard to the content of dissolved inorganic phosphorus at 10m and 20 m depths. These stations were ranked 'fair' during 2002, whereas in 2012, they are of rank 'good'. But it is always better to remain cautious and not pollute the near-shore waters which support fisheries.