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Analysis of Water Quality Status In Porong River, Sidoarjo By Using NSF-WQI *(Nasional Sanitation Foundation – Water Quality Index)* Index

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Abstract : Porong River can be described as a walking landfill that can deliver variety of waste to go to estuary, where it would be settled and accumulated. That numerous waste in the river will lead to pollution and provide huge negative impact for water quality status and organism life. Therefore, this study aims to assess the extent of contamination that occurred in Porong river by using WQI NSF (National Sanitation Foundation - Water Quality Index) Index. The research site was in along Porong river from Mojokerto to Jaban Sidoarjo estuary, which will be divided into 7 sampling sites. Next, the determination of the sampling location was conducted by using purposive sampling method. The use of WQI NSF index is able to analyze data using 8 or 9 parameters. In order to obtain complete overview of water quality status in Porong River, then this research used 9 parameters, including: BOD, DO, nitrate, total phosphate, temperature, turbidity, total solids, pH, and Fecal Coliform. Based on the results of 9 parameters data analysis using NSF-WQI index, it is known that the recent water quality status in Porong River is classified as Medium criteria. By knowing the results of data analysis showing the criteria of medium, so we are obliged to maintain the water cleanness, so that the water quality status will not decline.
Keywords : NSF-WQI, Porong River, Status of Water Quality.

Introduction

Porong River is one of large rivers coming from Brantas River. Porong River can be described as a walking landfill that can deliver variety of waste to go to estuary, where it would be settled and accumulated. The main cause of water quality declining in the Porong River is the pollution caused by disposal of industrial waste, domestic waste, agricultural pesticides remnants and Lapindo mud.

Lapindo mud, which flows to Porong River also provides a negative impact on aquatic organisms and also causes silting at river Porong estuary[1]. That numerous waste in the river will lead to pollution and provide huge negative impact for water quality status and organism life. Therefore, this study aims to assess the extent of contamination that occurred in Porong river by using WQI NSF (National Sanitation Foundation - Water Quality Index) .

Research Method

Research site was in along Porog River from Mojokerto to Jabon Sidoarjo estuary Jabon Sidoarjo, which will be divided into 7 sampling sites. The enforcement of sampling was conducted in August 21st, 2016

Figure 1. Research Site in Porong River

The determination of the sampling location was conducted by using purposive sampling method that takes into account the various considerations for waste input from households, agriculture, livestock, fisheries and business/industry activity occurring in watershed as well as the impact inflicted on the river.

Data Collection Method

In order to obtain complete overview on recent status of water quality in Porong, Sidoarjo River, and then data analysis can be carried out by using NSF-WQI index. The use of WQI NSF index is able to analyze data using 8 or 9 parameters. In order to obtain complete overview on water quality status in Porong River, then this research used 9 parameters, including: BOD, DO, nitrate, total phosphate, temperature, turbidity, total solids, pH, and Fecal Coliform[2].

Furthermore, weight from each parameter is multiplied by score obtained from sub-index curve (Li). For obtaining score of sub-index, the researcher used online NSF-WQI Calculator (http://www.waterresearch.net/watrqualindex/index. htm).

Next, scores from all of parameters are summed up with formula presented below: NSF-WQI / Index of Water Quality are determined by criteria in Table 1.

$$\text{NSF-WQI} = \sum_{i=0}^{n} Wi \times Li$$

Note:

NSF-WQI: Index of Water Quality

Wi: Weight

Li: Scores from sub-index curve

Table 1. Criteria of Index of Water Quality (NSF-WQI).

NSF-WQI Score	Criteria
0 – 25	Very Bad
26 – 50	Bad
51 - 70	Medium
71 – 90	Good
91 - 100	Excellent

Finding and Discussion

Based on the result of observation and sampling in the sites, it is obtained result of water quality parameter measurement as follows:

Table 2. Result of Water Quality Parameter Measurement

Water Quality Parameter	Station1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
DO (mg/L)	7.62	6.90	4.83	5.89	4.93	4.90	5.38
Suhu (^{o}c)	29^{o}c	29^{o}c	29^{o}c	29^{o}c	28^{o}c	28^{o}c	28^{o}c
BOD (mg/L)	3.12	1.35	1.13	1.47	2.16	1.6	2.68
Total Solids (mg/L)	9	26	223	44	42	175	55
Turbidity	12	8	41	8	12	68	26
Nitrat(mg/L)	4.8	5.1	4.8	4.7	4.9	6.2	5
Total Pospat (mg/L)	0.109	0.080	0.068	0.068	0.068	0.061	0.036
pH	8.1	6.8	7.7	7.9	7.6	8.1	7.8
E.Coli Jml/100 ml	20	150	39	93	210	210	120

Based on result of data analysis of water quality by using NSF-WQI *(Nasional Sanitation Foundation–Water Quality Index)*index, it is known that water in Porong River is classified as medium criteria. The result can be seen in Table 3.

Table 3. The Result of Water Quality in Porong River Using NSF-WQI Method

No.	Sampling Sites	Skor NSF-WQI	Criteria
1.	Station 1	**57.49**	Medium
2.	Station 2	**58.62**	Medium
3.	Station 3	**56.5**	Medium
4.	Station 4	**59.89**	Medium
5.	Station 5	**57.55**	Medium
6.	Station 6	**52.41**	Medium
7.	Station 7	**56.41**	Medium

Watering Parameters used in data analysis using NSF-WQI *(Nasional Sanitation Foundation–Water Quality Index)* are 9 parameters instead of using 8 parameters. The use of 9 parameters was intended to have further description on actual condition in nature due to organic material effect, because basically, this method was used to assume waters that are more affected by organic material rather than heavy metals[2].

Conclusion

Based on result of 9 parameters data analysis using NSF-WQi *(Nasional Sanitation Foundation–Water Quality Index*) index, it is known that the recent status of water quality in Porong, River is classified as Medium criteria. By knowing results of data analysis showing the criteria of medium, so we are obliged to maintain the

water river cleanness, so that the water quality status will not decline. Besides, it is also expected that there would be another study focus on water quality status in Porong River, which is based on water organism in it.

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