

INTISARI

Meningkatnya aktivitas domestik, pertanian, dan industri kecil menambah beban pencemar yang berdampak pada penurunan kualitas air Sungai Biyonga. Fungsi ekologis badan air tersebut terancam karena sejumlah parameter kualitas air telah melampaui baku mutu. Tujuan penelitian ini adalah menganalisis kondisi kualitas air dan status mutunya, menghitung beban pencemaran serta daya tampung beban pencemar, dan merumuskan strategi pengelolaan Sungai Biyonga.

Studi ini menerapkan pendekatan kuantitatif dengan pengambilan sampel menggunakan metode *purposive sampling* pada 7 titik pemantauan yang ditentukan berdasarkan karakteristik segmen sungai dan aktivitas di sekitarnya. Analisis dilakukan melalui pengukuran parameter kualitas air, penentuan status mutu menggunakan indeks pencemaran, pemodelan kualitas air dengan QUAL2Kw, serta analisis SWOT berdasarkan hasil wawancara dan kuesioner masyarakat sekitar bantaran sungai.

Hasil penelitian menunjukkan bahwa parameter suhu, pH, dan DO masih memenuhi baku mutu air kelas II, sedangkan BOD₅, COD, dan TSS pada beberapa titik telah melampaui baku mutu. Nilai Indeks Pencemaran sebesar 4,23-4,51 dengan rata-rata 4,38 menunjukkan status mutu air tergolong cemar ringa. Beban pencemar didominasi oleh aktivitas pertanian dan domestik. Hasil pemodelan QUAL2Kw menunjukkan peningkatan konsentrasi pencemar pada segmen tengah dan penurunan di hilir, dengan nilai RMSE masing-masing sebesar 0,52, 0,59, dan 0,38. Daya tampung beban pencemar menunjukkan kemampuan asimilasi badan air menurun dari hulu ke hilir, dengan nilai sebesar 797,47 kg/hari BOD₅, 6.820 kg/hari COD, dan 13.605 kg/hari TSS. Analisis SWOT menghasilkan strategi pengelolaan berupa penguatan pengendalian pencemaran, peningkatan pemantauan kualitas air, dan optimalisasi pengelolaan limbah melalui dukungan masyarakat dan kebijakan yang berkelanjutan.

Kata kunci: Daya Tampung Beban Pencemar, QUAL2Kw, Indeks Pencemaran, Kualitas Air, Sungai Biyonga.

ABSTRACT

Increasing domestic, agricultural, and small industrial activities add to the burden of pollutants that have an impact on the decline of the water quality of the Biyonga River. The ecological function of these water bodies is threatened because a number of water quality parameters have exceeded quality standards. The purpose of this study is to analyze the condition of water quality and its quality status, calculate the pollution burden and the capacity of pollutant loads, and formulate a management strategy for the Biyonga River.

This study applied a quantitative approach by sampling using the purposive sampling method at 7 monitoring points determined based on the characteristics of the river segment and the surrounding activities. The analysis was carried out through measuring water quality parameters, determining quality status using the pollution index, water quality modeling with QUAL2Kw, and SWOT analysis based on the results of interviews and questionnaires from the community around the riverbank.

The results showed that the temperature, pH, and DO parameters still met the class II water quality standards, while BOD₅, COD, and TSS at some points had exceeded the quality standards. The Pollution Index value of 4.23-4.51 with an average of 4.38 indicates that the water quality status is classified as light polluted. The pollutant load is dominated by agricultural and domestic activities. The results of QUAL2Kw modeling show an increase in pollutant concentration in the middle segment and a decrease in downstream, with RMSE values of 0.52, 0.59, and 0.38, respectively. The capacity of pollutant loads shows that the assimilation ability of water bodies decreases from upstream to downstream, with values of 797.47 kg/day of BOD₅, 6.820 kg/day of COD, and 13.605 kg/day of TSS. The SWOT analysis resulted in management strategies in the form of strengthening pollution control, improving water quality monitoring, and optimizing waste management through community support and sustainable policies.

Keywords: Pollutant Load Capacity, QUAL2Kw, Pollution Index, Water Quality, Biyonga River.