

INTISARI

Sungai Pepe berperan penting bagi kehidupan masyarakat Boyolali, terutama yang tinggal di sepanjang Daerah Aliran Sungai (DAS). Sungai Pepe yang berada di wilayah Kabupaten Boyolali telah mengalami pencemaran dan terdegradasi kualitas airnya sehingga diperlukan upaya konservasi supaya sungai tetap terjaga dan lestari. Dalam upaya konservasi kualitas air sungai Pepe perlu diketahui tolok-ukur yang menggambarkan kondisi alamiah sungai Pepe. Tujuan penelitian ini adalah mencari tolok-ukur konservasi kualitas air sungai Pepe dan mengetahui Indeks Kualitas Air (IKAs) dengan beberapa tolok-ukur yaitu tolok-ukur konservasi, Baku Mutu Kelas I sesuai dengan PP. No. 82 tahun 2001 dan rerata konsentrasi air sungai terukur.

Tolok-ukur konservasi air sungai Pepe disusun berdasarkan parameter kualitas air sumber air, Besi (Fe), Klorida (Cl⁻), Nitrat (NO₃), Nitrit (NO₂), pH, Zat Organik (KMnO₄) dan *Total Coliforms*, menggunakan teknik statistik *Analysis Of Varians* (ANOVA) dan nilai minimum parameter TSS, BOD₅, Sulfat dan Detergen air sungai Pepe. Parameter signifikan tingkat pencemaran air dicari dengan metode *Principal Component Analysis* (PCA) dan *Biplot* menggunakan data kualitas air sungai Pepe tahun 2012 sampai 2016. Indeks Kualitas Air dihitung dengan metode IKAs dan metode Daya dukung/Daya tampung berdasarkan analisis faktor dengan target tolok-ukur konservasi, Baku Mutu Kelas I dan rerata konsentrasi air sungai terukur selanjutnya dikaji silang dengan kondisi visual di lapangan.

Hasil penelitian menunjukkan tolok-ukur konservasi sungai Pepe untuk parameter Besi (Fe) 0,08 mg/L, Klorida (Cl⁻) 28,69 mg/L, Nitrat (NO₃) 5,05 mg/L, Nitrit (NO₂) 0,05 mg/L, pH 7,28, Zat Organik (KMnO₄) 7,42 mg/L, *Total Coliforms* 5,00 MPN/100 ml, TSS 6 mg/L, BOD₅ 1,61 mg/L, Sulfat 1,30 ug/L dan Detergen 0,03 mg/L. Hasil kaji silang nilai IKAs dengan metode Daya dukung/Daya tampung untuk 7 parameter signifikan hasil PCA dan *Biplot*, yang dengan tolok-ukur konservasi menunjukkan kesesuaian antara keduanya serta sesuai pula dengan kondisi lapangan, dimana sungai Pepe di bagian hulu, tengah dan hilir tercemar dengan beban pencemaran dari *Total Coliforms* dan BOD₅ jauh melebihi daya tampungnya.

Kata kunci : *daya dukung-daya tampung, IKAs, konservasi kualitas air.*

ABSTRACT

The Pepe River plays an important role in the lives of the Boyolali people, especially those living along the watershed. Pepe River in Boyolali Regency has been polluted and water quality has been degraded so conservation efforts are needed so that the river is maintained and sustainable. In an effort to conserve the water quality of the Pepe river, we need to know the parameters that describe the natural condition of the Pepe river. The purpose of this study is to find the water quality conservation measures for Pepe river and find out the Water Quality Index (IKAs) with some benchmarks, namely conservation benchmarks, Class I Quality Standards in accordance with PP. No. 82 of 2001 and mean measured river water concentration.

Benchmarks for Pepe river water conservation are compiled based on water quality parameters of water sources, Iron (Fe), Chloride (Cl⁻), Nitrate (NO₃), Nitrite (NO₂), pH, Organic Substances (KMnO₄) and Total Coliforms, using statistical techniques Analysis of Variance (ANOVA) and minimum values of TSS, BOD₅, Sulfate and Detergent of Pepe river water. Significant parameters of the level of water pollution are sought by the Principal Component Analysis (PCA) and Biplot methods using Pepe river water quality data from 2012 to 2016. The Water Quality Index is calculated by the IKAs method and the carrying capacity/Capacity based on factor analysis with conservation benchmarks, Class I Quality Standards and mean measured river water concentration are then cross-examined with visual conditions in the field.

The results showed that the Pepe river conservation parameters for the parameters of Iron (Fe) 0.08 mg/L, Chloride (Cl⁻) 28.69 mg/L, Nitrate (NO₃) 5.05 mg/L, Nitrite (NO₂) 0,05 mg/L, pH 7.28, Organic Substance (KMnO₄) 7.42 mg/L, Total Coliforms 5.00 MPN/100 ml, TSS 6 mg/L, BOD₅ 1.61 mg/L, Sulfate 1, 30 ug/L and Detergent 0.03 mg/L. The cross-assessment results of the IKAs value with the Carrying/Carrying Capacity method for the 7 significant parameters of the PCA and Biplot results, which with conservation benchmarks indicate the compatibility between the two and also in accordance with the field conditions, where the Pepe River is upstream, midstream and downstream contaminated with the pollution load of Total Coliforms and BOD₅ far exceeds their capacity.

Keywords: carrying capacity, IKAs, water quality conservation.