

ABSTRAK

Aplikasi Model QUAL2Kw Dalam Evaluasi Kualitas Air Sungai Kambang

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xviii + 141 halaman, 29 tabel, 49 gambar, 5 Lampiran

ABSTRAK

Sungai Kambang Kota Jambi berpotensi mengalami penurunan kualitas air yang dipengaruhi oleh masukan limbah domestik dan aktivitas perkotaan di sepanjang sempadan sungai. Penelitian ini bertujuan untuk menganalisis kualitas air Sungai Kambang berdasarkan parameter fisika-kimia dan mikrobiologi, menentukan status mutu menggunakan Metode Indeks Pencemaran (IP), serta mensimulasikan kondisi kualitas air setelah pemodelan menggunakan QUAL2Kw. Metode penelitian menggunakan pendekatan deskriptif kuantitatif melalui pengambilan sampel pada 9 titik, pengukuran in-situ (suhu, pH, DO) serta analisis laboratorium (TSS, BOD, NH₃-N, Fecal Coliform, dan logam Cu), kemudian dibandingkan dengan baku mutu yang berlaku. Hasil pengukuran menunjukkan sebagian besar parameter kunci tidak memenuhi baku mutu, terutama DO yang rendah, BOD dan NH₃-N yang tinggi, serta Fecal Coliform yang jauh melampaui ambang batas; sementara TSS dan logam Cu cenderung memenuhi baku mutu. Perhitungan IP menghasilkan nilai PIj 10,9063 yang mengklasifikasikan Sungai Kambang sebagai perairan tercemar berat dengan kontribusi dominan dari parameter Fecal Coliform dan NH₃-N. Simulasi QUAL2Kw menunjukkan peningkatan beban pencemar pada skenario masukan point source memperburuk kualitas air (menaikkan BOD dan NH₃-N serta menekan DO), sedangkan peningkatan debit hulu memberikan perbaikan parsial melalui pengenceran namun belum mampu memulihkan kualitas air secara signifikan.

Kata Kunci: Sungai Kambang, Kualitas Air, Indeks Pencemaran, QUAL2Kw, BOD, NH₃-N, Fecal Coliform

ABSTRACT

Application of the QUAL2Kw Model in Evaluating Kambang River Water Quality

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xviii + 141 pages, 29 tables, 49 figures, 5 appendices

ABSTRACT

The Kambang River in Jambi City has the potential to experience a decline in water quality, influenced by inputs of domestic wastewater and urban activities along the riverbanks. This study aims to analyze the water quality of the Kambang River based on physicochemical and microbiological parameters, determine water quality status using the Pollution Index (PI) method, and simulate post-modeling water quality conditions using QUAL2Kw. The research employed a quantitative descriptive approach by collecting samples at nine stations, conducting in-situ measurements (temperature, pH, and DO), and performing laboratory analyses (TSS, BOD, NH₃-N, Fecal Coliform, and Cu), which were then compared with the applicable water quality standards. The results indicate that most key parameters did not meet the standards, particularly low DO, high BOD and NH₃-N, and Fecal Coliform concentrations far exceeding the threshold; meanwhile, TSS and Cu generally met the standards. The Pollution Index calculation produced a PI_j value of 10.9063, classifying the Kambang River as heavily polluted, with dominant contributions from Fecal Coliform and NH₃-N. The QUAL2Kw simulation shows that increasing pollutant loads under the point-source input scenario further deteriorates water quality (raising BOD and NH₃-N and depressing DO), while increasing upstream discharge provides partial improvement through dilution but remains insufficient to significantly restore overall water quality.

Keywords: *Kambang River, Water Quality, Pollution Index, QUAL2Kw, BOD, NH₃-N, Fecal Coliform*