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# Assessment of Water Quality of Batang Rajang at Pelagus Area, Sarawak, Malaysia

(Penilaian Kualiti Air Batang Rajang di Kawasan Pelagus, Sarawak, Malaysia)

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ABSTRACT

*This study was carried out to examine the water quality of Batang Rajang at Pelagus area, Sarawak, Malaysia. Water quality was determined at 12 stations along Batang Rajang and its tributaries in terms of* in-situ *and* ex-situ *water quality parameters. The results showed that most stations at main river were categorized as slightly polluted while most tributaries were clean according to the Water Quality Index. The river is suffering from organic pollution where almost all stations along the river contained high chemical oxygen demand (≈ 43.1 mg/L) and total ammonia nitrogen (≈ 0.520 mg/L) and were classified as Class III and IV at most of the stations. High suspended solids (218.3 mg/L) and low dissolved oxygen (4.6 mg/L) were observed at the main river. The low dissolved oxygen content from the Bakun dam upstream of the study area has an impact on the river particularly during dry season where DO dropped below the minimum required for sensitive aquatic organisms. As seven tributaries are within Class II indicating healthy freshwater ecosystems, they should be conserved as habitats for sensitive aquatic organisms. Conversely, proper management need to be initiated in particular, Sungai Merit tributary and the main river where DO were below the minimum required for sensitive aquatic organisms.*

*Keywords: Hydroelectric dam; longhouses; Pelagus rapids; regulated river; water quality index*

ABSTRAK

*Penyelidikan ini dijalankan untuk mengkaji kualiti air Batang Rajang di kawasan Pelagus, Sarawak, Malaysia. Kualiti air telah ditentukan di 12 stesen sepanjang Batang Rajang dan anak sungainya daripada segi parameter kualiti air secara* in-situ *dan* ex-situ. *Hasil kajian menunjukkan bahawa kebanyakan stesen di sungai utama dikategorikan sebagai sedikit tercemar manakala kebanyakan anak sungai adalah bersih mengikut Indeks Kualiti Air. Batang Rajang mengalami pencemaran organik dengan hampir semua stesen di sepanjang sungai mengandungi permintaan oksigen kimia (≈ 43.1 mg/L) dan jumlah nitrogen ammonia (≈ 0.520 mg/L) yang tinggi dan diklasifikasikan sebagai Kelas III dan IV di kebanyakan stesen. Pepejal terampai yang tinggi (218.3 mg/L) dan oksigen terlarut (DO) yang rendah (4.6 mg/L) diperhatikan di sungai utama. Kandungan oksigen terlarut yang rendah dari empangan Bakun di hulu kawasan kajian mempunyai kesan ke atas sungai terutamanya semasa musim kering dengan DO jatuh di bawah tahap minimum yang diperlukan untuk organisma akuatik sensitif. Memandangkan tujuh anak sungai berada dalam Kelas II yang merupakan ekosistem air tawar yang sihat, mereka harus dipelihara sebagai habitat untuk organisma akuatik yang sensitif. Sebaliknya, pengurusan yang betul perlu dimulakan terutamanya di anak sungai Merit dan sungai utama dengan DO adalah di bawah tahap minimum yang diperlukan untuk organisma akuatik sensitif.*

*Kata kunci: Empangan hidroelektrik; indeks kualiti air; jeram Pelagus; rumah panjang; sungai terkawal*

## INTRODUCTION

The whole area of Sarawak is dominated by river systems which play a significant part in its socio-economic development as it provides Sarawak with a steady water supply, hydroelectric power, irrigation and rich soil. Batang Rajang ('Batang' denotes big river) together with its main tributaries, has a length of 560 km and it is the largest river in Malaysia. Some of the important tributaries of Batang Rajang include Sungai Balui ('Sungai' denotes river) and Batang Baleh. These rivers flow through the Kapit Division and then to the South China Sea. The largest and tallest Bakun hydroelectric dam project (160 m) is located on the narrow Bakun Fall of Sungai Balui. There are 534 longhouses located along the major rivers and tributaries of Batang Rajang. These rivers also serve as the main means of transportation in the division. The heavy usage of the river and human activities in the watershed make it vulnerable to water quality degradation.

According to the Department of Environment, Malaysia, the river water quality in terms of Water Quality Index (WQI) had shown a decrease in year 2014 and the percentage of clean rivers has decreased from 58% to 52%; however, the percentage of polluted river has increased from 5% to 9% in the same year (Department