

**ANALISA LAJU SEDIMENTASI VOLUME TAMPUNGAN WADUK
PADA BENDUNGAN KELAY DESA LONG BELIU, KECAMATAN
KELAY, KABUPATEN BERAU, PROVINSI KALIMANTAN TIMUR**

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Abstrak

Bendungan Kelay di Kabupaten Berau, Kalimantan Timur, merupakan infrastruktur vital yang menghadapi tantangan serius akibat sedimentasi, mengancam kapasitas tampungan dan efisiensinya. Penelitian ini bertujuan menganalisis laju sedimentasi pada volume tampungan waduk tersebut, dengan fokus pada perhitungan debit rencana dan estimasi volume sedimen yang masuk. Metode penelitian meliputi analisis hidrologi menggunakan software ArcGIS untuk delineasi DAS seluas 3167,693 km² dan penentuan curah hujan rencana dengan Hydrognomon (distribusi Log Pearson III), serta pemodelan debit banjir rencana menggunakan HEC-HMS (memilih HSS SCS). Untuk analisis sedimentasi, diterapkan Metode Equal Discharge Increment (EDI) untuk menghitung debit sedimen tersuspensi dan membangun kurva rating sedimen. Hasil penelitian menunjukkan debit puncak banjir yang signifikan pada berbagai kala ulang (misalnya, 5614,0 m³/detik untuk 100 tahun). Debit sedimen rata-rata Sungai Kelay selama 20 tahun adalah 407,24 ton/hari, menghasilkan estimasi volume sedimen sebesar 120.103,25 m³/tahun yang masuk ke waduk. Data ini menggarisbawahi urgensi pengelolaan sedimen untuk keberlanjutan fungsi bendungan.

Keywords: Angkutan sedimen; Debit banjir; Hidrograf Satuan Sintetik; Laju sedimentasi; Waduk.

**SEDIMENTATION RATE ANALYSIS OF RESERVOIR STORAGE
VOLUME AT KELAY DAM, LONG BELIU VILLAGE, KELAY DISTRICT,
BERAU REGENCY, EAST KALIMANTAN PROVINCE**

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Abstract

Abstract is written in English which contains the main issues, research objectives, methods / approaches and research results. Abstract is written in one paragraph, not more than 200 words. This e-document is a "live" template and already defines the components of your paper [title, text, header, etc.] in the "style" setting. Do not Use Special Characters, Symbols, or Formulas in Paper Headings or Abstracts. Kelay Dam in Berau Regency, East Kalimantan, is a vital infrastructure facing significant challenges from sedimentation, threatening its reservoir capacity and efficiency. This study aims to analyze the sedimentation rate in the dam's reservoir volume, focusing on calculating the design discharge and estimating the incoming sediment volume. The research method includes hydrological analysis using ArcGIS for a 3167.693 km² watershed delineation and Hydrognomon for design rainfall determination (Log Pearson III distribution), along with HEC-HMS for flood design discharge modeling (opting for SCS Unit Hydrograph). For sedimentation analysis, the Equal Discharge Increment (EDI) Method was applied to calculate suspended sediment discharge and establish a sediment rating curve. Results show significant peak flood discharges for various return periods (e.g., 5614.0 m³/second for 100 years). The average sediment discharge of the Kelay River over 20 years is 407.24 tons/day, resulting in an estimated sediment volume of 120,103.25 m³/year entering the reservoir. This data highlights the urgency of sediment management for the dam's long-term functionality.

Keywords: Dam; Flood discharge; Sediment transport; Sedimentation rate; Synthetic Unit Hydrograph.