

ABSTRAK

Ketika musim hujan di akhir tahun, Sungai Belutu sering sekali meluap dan menimbulkan bencana banjir. Menurut masyarakat sekitaran sungai, luapan banjir terjadi dengan durasi waktu yang cukup lama yaitu, kurang lebih terjadi banjir selama sebulan, dan paling cepat 2 pekan airnya surut dikarenakan sungai tersebut dangkal dan bantaran sungai yang sudah tidak terawat sehingga daya tampung air tidak memadai. Akhirnya terjadi peningkatan debit air dalam saluran yang mengakibatkan meluapnya air. Penelitian ini bertujuan untuk mengetahui ketinggian muka air banjir yang meluap sehingga dapat mengetahui solusi dalam pengatasan masalah banjir yang terjadi di Sungai Belutu, kecamatan Sei Rampah, kabupaten Serdang Bedagai. Penelitian ini menerapkan pendekatan berbasis kuantitatif. Dari hasil analisis hidrologi didapatkan hasil debit banjir rencana dengan metode Hidrograf Satuan Sintetik Nakayasu (HSS Nakayasu) untuk sungai Belutu adalah untuk $Q_{2\text{tahun}} = 143.200 \text{ m}^3/\text{det}$, $Q_{5\text{tahun}} = 158.435 \text{ m}^3/\text{det}$, $Q_{10\text{tahun}} = 160.133 \text{ m}^3/\text{det}$, $Q_{25\text{tahun}} = 169.990 \text{ m}^3/\text{det}$, $Q_{50\text{tahun}} = 176.780 \text{ m}^3/\text{det}$, $Q_{100\text{tahun}} = 183.233 \text{ m}^3/\text{det}$. Dari hasil analisis hidrolika dengan menggunakan software HecRas 5.0.7, menunjukkan bahwa total keseluruhan tinggi muka air dari kala ulang Q_2 , Q_5 , Q_{10} , Q_{25} , Q_{50} , Q_{100} bahwa muka air banjir naik sebesar $\pm 1 \text{ m}$ dari dasar sungai. Sehingga diperlukan pembangunan tanggul setinggi $+1 \text{ m}$ di pada penampang sungai.

Kata Kunci : Debit Rencana, Sungai Belutu, Banjir, Tinggi Muka Air, HecRas 5.0.7 (Hydrologic Engineering Center River Analysis System 5.0.7)

ABSTRACT

During the rainy season at the end of the year, the Belutu River often overflows and causes flooding. According to local residents around the river, the floodwaters tend to remain for a long duration, approximately up to a month, and the quickest recession of water occurs within two weeks. This is due to the river's shallow depth and poorly maintained riverbanks, which result in insufficient water capacity. Consequently, there is an increase in water discharge within the channel, leading to overflow. This study aims to determine the flood water level rise in order to identify solutions to mitigate flooding in the Belutu River, located in Sei Rampah District, Serdang Bedagai Regency. The research applies a quantitative-based approach. From the results of the hydrological analysis, the design flood discharge obtained using the Nakayasu Synthetic Unit Hydrograph (HSS Nakayasu) method for the Belutu River is as follows: Q_2 -year = 143.200 m³/s, Q_5 -year = 158.435 m³/s, Q_{10} -year = 160.133 m³/s, Q_{25} -year = 169.990 m³/s, Q_{50} -year = 176.780 m³/s, and Q_{100} -year = 183.233 m³/s. Based on the hydraulic analysis using HEC-RAS 5.0.7 software, the overall flood water surface elevations for the return periods Q_2 , Q_5 , Q_{10} , Q_{25} , Q_{50} , and Q_{100} show an increase of approximately ±1 meter from the riverbed. Therefore, the construction of an embankment with a height of +1 meter along the river cross-section is required.

Keywords: *Design Discharge, Belutu River, Flood, Water Surface Elevation, HEC-RAS 5.0.7 (Hydrologic Engineering Center River Analysis System 5.0.7)*