

ABSTRAK

PEMETAAN AREA GENANGAN BANJIR BERBASIS HEC-RAS 2D DAN SIG DI DAS WAY LUNIK KOTA BANDAR LAMPUNG

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Banjir merupakan bencana alam yang sering terjadi di Indonesia dan menimbulkan dampak signifikan terhadap masyarakat dan infrastruktur. Salah satu wilayah yang rawan banjir DAS Way Lunik di Kota Bandar Lampung, yang dipengaruhi oleh tingginya curah hujan. Penelitian ini bertujuan untuk menganalisis debit banjir, dan luasan area genangan banjir di DAS Way Lunik.

Data yang digunakan meliputi DEM tahun 2024 dan data curah hujan periode 2015 sampai 2024. Analisis hidrologi menggunakan metode Hidrograf Satuan Sintetik Nakayasu untuk kala ulang 2, 5, 10, 25, 50, dan 100 tahun, yang selanjutnya dimodelkan menggunakan HEC-RAS 2D. Hasil pemodelan kemudian diintegrasikan dengan SIG untuk menghasilkan peta sebaran genangan, analisis kedalaman banjir, serta perhitungan luas area terdampak secara spasial.

Hasil analisis menunjukkan bahwa debit banjir maksimum meningkat dengan nilai sebesar 4,175 m³/s untuk kala ulang 2 tahun, 5,546 m³/s kala ulang 5 tahun, 6,435 m³/s kala ulang 10 tahun, 7,542 m³/s kala ulang 25 tahun, 8,347 m³/s kala ulang 50 dan 9,175 m³/s kala ulang 100 tahun. Luas genangan banjir menunjukkan peningkatan seiring bertambahnya kala ulang, namun pada kala ulang 50 tahun ke kala ulang 100 tahun area genangan sedikit mengalami penurunan. Hasil penelitian ini diharapkan dapat menjadi dasar dalam upaya mitigasi banjir serta perencanaan pengelolaan wilayah rawan banjir di DAS Way Lunik.

Kata kunci: Banjir, DAS Way Lunik, HSS Nakayasu, HEC-RAS 2D, debit banjir, genangan banjir

ABSTRACT

FLOOD INUNDATION AREA MAPPING USING HEC-RAS 2D AND SIG IN THE WAY LUNIK WATERSHED BANDAR LAMPUNG CITY

By

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Flood is one of the most frequent natural disasters in Indonesia and causes significant impacts on communities and infrastructure. One of the flood-prone areas is the Way Lunik Watershed (DAS Way Lunik) in Bandar Lampung City, which is strongly influenced by high rainfall intensity. This study aims to analyze flood discharge and the extent of flood inundation areas within the Way Lunik Watershed. The data used in this study include the 2024 Digital Elevation Model (DEM) and rainfall data from 2015 to 2024. Hydrological analysis was conducted using the Nakayasu Synthetic Unit Hydrograph (HSS Nakayasu) method for return periods of 2, 5, 10, 25, 50, and 100 years, which were subsequently modeled using HEC-RAS 2D. The modeling results were then integrated with Geographic Information Systems (GIS) to produce flood inundation distribution maps, flood depth analysis, and spatial calculations of affected areas. The results indicate that the maximum flood discharge increases with return periods, reaching 4.175 m³/s for the 2-year return period, 5.546 m³/s for the 5-year return period, 6.435 m³/s for the 10-year return period, 7.542 m³/s for the 25-year return period, 8.347 m³/s for the 50-year return period, and 9.175 m³/s for the 100-year return period. The flood inundation area also increases along with the return period; however, from the 50-year to the 100-year return period, the inundation area slightly decreases. The results of this study are expected to serve as a basis for flood mitigation efforts and spatial planning in flood-prone areas of the Way Lunik Watershed.

Keywords: Flood, Way Lunik Watershed, Nakayasu Synthetic Unit Hydrograph, HEC-RAS 2D, flood discharge, flood inundation