ANALISIS PERUBAHAN KARAKTERISTIK HIDROGRAF BANJIR DI WILAYAH SUNGAI JRATUNSELUNA AKIBAT PERUBAHAN TUTUPAN LAHAN DARI PENGEMBANGAN KAWASAN STRATEGIS NASIONAL KEDUNGSEPUR

INTISARI
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Wilayah Sungai Jratunseluna termasuk dalam kategori rawan banjir berisiko tinggi. Kondisi ini dapat diperparah dengan rencana pembangunan kota melalui kawasan strategis nasional Kedungsepur. Oleh karena itu, perlu dilakukan analisis banjir di Wilayah Sungai Jratunseluna khususnya DAS Garang, DAS Babon, dan DAS Tuntang untuk mengidentifikasi karakteristik banjir di wilayah sungai ini yang disebabkan oleh perubahan penggunaan lahan melalui simulasi 2D curah hujan-limpasan. Model RRI 2D dipilih karena dapat mensimulasikan genangan banjir secara komprehensif di semua sistem sungai sedangkan model lain seperti model HEC-HMS, TOPMODEL, dan Tank memiliki keterbatasan. Data masukan yang digunakan untuk model RRI adalah data curah hujan, topografi (DEM), dan peta tata guna lahan. Data hujan yang digunakan dalam simulasi adalah Global Precipitation Measurement (GPM) dari tahun 2010 hingga 2020. Hasil studi menunjukkan bahwa tingkat risiko banjir akan meningkat selama implementasi pengembangan kawasan strategis nasional Kedungsepur. Peningkatan risiko banjir terutama ditandai dengan durasi banjir dan peningkatan debit puncak. Peningkatan debit puncak yang paling signifikan diantara ketiga DAS tersebut diperoleh di DAS Garang. Pada kasus banjir 2 tahun, debit puncak meningkat 44,91% dari 262,18 m^3/s menjadi 379,92 m^3/s dan untuk kasus banjir 50 tahun, debit puncak meningkat 54,34% dari 331,63 m^3/s menjadi 511,83 m^3/s.

Kata kunci: banjir, GPM, hidrograf, model RRI

ANALYSIS OF CHANGES IN FLOOD HYDROGRAPH CHARACTERISTICS ON THE JRATUNSELUNA RIVER BASIN DUE TO LAND COVER CHANGES FROM THE DEVELOPMENT OF THE KEDUNGSEPUR NATIONAL STRATEGIC AREA

ABSTRACT

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The area of the Jratunseluna river basin is categorized as a high-risk flood vulnerability. This condition can be worsened by the urban development plan through Kedungsepur national strategic area. So, it is necessary to conduct flood analysis on the Jratunseluna river basin especially in Garang watershed, Babon watershed, and Tuntang watershed to identify flood characteristics in this river basin caused by the alteration of land use through the rainfall-runoff 2D simulation. The RRI 2D model was chosen because it could simulate flood inundation comprehensively in all river systems while the other models such as HEC-HMS, TOPMODEL, and Tank models have a limitation on it. The input data used for the RRI model were rainfall data, topography (DEM), and land use maps. The rain data used in the simulation was the Global Precipitation Measurement (GPM) from 2010 to 2020. The study results indicate that The flood risk level would increase during the implementation of the Kedungsepur national strategic area development. The increase in flood risk is mainly characterized by the flood duration and peak discharge increase. The most significant increase in peak discharge among the three watersheds is obtained in the Garang watershed. In the case of a 2-year flood, the peak discharge increased by 44.91% from 262.18 m^3/s to 379.92 m^3/s and for the case of a 50-year flood, the peak discharge increased by 54.34% from 331.63 m^3/s to 511.83 m^3/s.

Keywords: flood, GPM, hydrograph, RRI model