ABSTRAK

PERENCANAAN PENGENDALIAN BANJIR SUNGAI WAEPESI DI KOTA REO, KABUPATEN MANGGARAI, PROVINSI NUSA TENGGARA TIMUR, BERBASIS PEMODELAN HEC-RAS

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Perubahan fungsi lahan dari hutan menjadi area non-hutan akibat aktivitas perusakan kawasan hutan lindung menjadi salah satu faktor utama penyebab terjadinya banjir yang sering melanda berbagai wilayah di Indonesia, termasuk di Kabupaten Manggarai, Nusa Tenggara Timur. Kondisi ini diperparah oleh sistem drainase lokal yang belum tertata dengan baik, sehingga aliran air hujan tidak dapat mengalir secara optimal dan menimbulkan genangan. Selain itu, peningkatan intensitas curah hujan turut menyebabkan kenaikan debit puncak aliran yang berpotensi menimbulkan banjir. Situasi tersebut juga terjadi di daerah aliran Sungai Waepesi, Kabupaten Manggarai, yang memerlukan perencanaan sistem pengendalian banjir yang tepat. Penelitian ini dilakukan di Sungai Waepesi dengan menggunakan pendekatan analisis hidrologi dan hidraulika. Analisis hidrologi dilakukan dengan menggunakan data curah hujan wilayah menggunakan metode Polygon Thiessen untuk memperoleh debit banjir rancangan, dengan bantuan software HEC-HMS. Sementara itu, pemodelan hidraulika dilakukan menggunakan software HEC-RAS untuk memvisualisasikan aliran sungai sesuai kondisi eksisting. Pengendalian banjir dirancang melalui dua pendekatan, yaitu metode struktural dan non-struktural. Selain itu, karena terdapat tanggul penahan di sekitar aliran sungai. Hasil dari seluruh analisis tersebut digunakan sebagai dasar dalam perencanaan sistem pengendalian banjir yang sesuai bagi Sungai Waepesi agar permasalahan banjir di wilayah tersebut dapat diminimalkan.

Kata Kunci: Pengendalian banjir, Sungai Waepesi, pemodelan hidrologi dan hidraulika, HEC-HMS, HEC-RAS, mitigasi banjir.

ABSTRACT

Flood Control Planning of the Waepesi River in Reo City, Manggarai Regency, East Nusa Tenggara Province, Based on HEC-RAS Modeling.

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The conversion of forested land into non-forest areas due to the degradation of protected forest zones has become a major contributing factor to frequent flooding in several regions of Indonesia, including Manggarai Regency, East Nusa Tenggara. This issue is exacerbated by the poorly managed local drainage system, which prevents runoff from flowing properly, resulting in water accumulation. Moreover, the increasing rainfall intensity leads to a higher peak discharge, further elevating the risk of flooding. Such conditions are also found in the Waepesi River basin, Manggarai Regency, where an appropriate flood control system is required.

This research was conducted on the Waepesi River using both hydrological and hydraulic analyses. The hydrological analysis employed regional rainfall data processed using the Polygon Thiessen method to determine the design flood discharge, with computations performed in the HEC-HMS software. The hydraulic modeling was carried out using HEC-RAS to simulate river flow conditions. Flood control planning was divided into two approaches: structural and non-structural methods. In addition, since there are levee structures along the riverbanks. The results from these analyses serve as the foundation for designing an appropriate flood control system for the Waepesi River, aiming to mitigate flood problems in the area.

Keywords: Flood control, Waepesi River, hydrological and hydraulic modeling, HEC-HMS, HEC-RAS, flood mitigation.