

**HYDRAULIC MODELING ON STEEP SLOPE WATERSHEDS  
(AT KALI PUTIH WATERSHED, MAGELANG, CENTRAL JAVA, AND  
NASIRI WATERSHED, WEST SERAM, MALUKU)**

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**ABSTRACT**

Hydrologic and hydraulic modeling is important to be conducted to examine the watershed response based on a rainfall input, especially over disaster-prone watersheds such as Kali Putih watershed in Magelang, Central Java, and Nasiri watershed in West Seram District, Maluku Province. A GIS-based grid-based distributed rainfall-runoff model was used to simulate the rainfall-runoff transformation. The 2 dimensional hydrodynamic flow modeling was then carried out to simulate the flood processes on the stream and floodplain area. A sensitivity analysis was conducted on infiltration rate, Manning's n value, and rainfall intensity. A case study of rainfall-runoff modeling in Nasiri based on real rainfall events on April 19th, May 3rd, and November 12th 2016 was conducted. The modeling results show that the results of hydrologic-hydraulic modeling has a good agreement with the observed results. Infiltration rate, Manning's n value, and rainfall intensity give considerable effects to the resulted flow hydrographs. Human activities on the ground surface give effects on the change of soil infiltration rate and Manning's n value.

**Keywords:** hydrologic-hydraulic model, rainfall-runoff model, two-dimensional hydrodynamic model.



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**PEMODELAN HIDRAULIKA PADA DAS DENGAN KELERENGAN CURAM  
(PADA DAS KALI PUTIH, MAGELANG, JAWA TENGAH, DAN  
DAS NASIRI, SERAM BAGIAN BARAT, MALUKU)**

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## **INTISARI**

Pemodelan hidrologi dan hidraulika penting dilakukan untuk meneliti respon sebuah Daerah Aliran Sungai (DAS) berdasarkan pada data masukan hujan, khususnya pada DAS yang rawan bencana seperti DAS Kali Putih di Magelang, Jawa Tengah, dan DAS Nasiri di Seram Bagian Barat, Maluku. Model hidrologi hujan – aliran terdistribusi berbasis grid digunakan untuk mensimulasi transformasi hujan – aliran. Pemodelan aliran hidrodinamika 2 dimensi dilakukan untuk mensimulasi proses banjir pada sungai dan daerah bantaran banjir. Analisis sensitivitas dilakukan terhadap laju infiltrasi, nilai  $n$  Manning, dan intensitas hujan. Studi kasus pemodelan hujan – aliran di DAS Nasiri berdasarkan kejadian hujan lapangan pada 19 April, 3 Mei, dan 12 November 2016 juga dilaksanakan. Hasil pemodelan menunjukkan bahwa model hidrologi – hidraulik mampu menghasilkan hasil yang sesuai dengan data terukur. Laju infiltrasi, nilai  $n$  Manning, dan intensitas hujan memberikan pengaruh yang perlu dipertimbangkan terhadap hidrograf aliran yang dihasilkan. Aktivitas manusia di permukaan tanah terbukti mempengaruhi nilai laju infiltrasi dan koefisien  $n$  Manning.

**Kata kunci:** model hidrologi – hidraulika, model hujan – aliran, model hidrodinamika 2 dimensi.