THE EFFECT OF RUNOFF ON FLOODED WATER IN THE RIVER FLOW AREA

Acep Hidayat, Muhammad Isradi
Faculty of Engineering, Univeristy Mercu Buana Jakarta, Indonesia
acep.hidayat@mercubuana.ac.id, isradi@mercubuana.ac.id

Joewono Prasetijo
Faculty of Engineering, Universiti Tun Hussein Onn Malaysia, Malaysia
joewono@uthm.edu.my

Rudi Hendrawan
Director Restu CIpta Persada company Water Resources, Indonesia
rudihes.studio@gmail.com

Abstract
Efforts to increase the utility have led to changes in land use, especially forests. Land use is one of the factors that influence the water function of a watershed. Appropriate land use can provide benefits for the surrounding area but improper land use can provide disadvantages for the surrounding area. Changes in land use in an area can affect the function of water management (hydro-orology). This is in accordance with the opinion of Lily Montarcih L (2009), which states that any treatment given to a plot of land can affect the water system in that place and places downstream. The hydrological condition of the Banjar-Jeruk legi watershed is currently experiencing a change in the watershed hydrological characteristics which is marked by an increase in the potential for flooding due to increased river discharge and drought in the dry season. This can cause huge losses, damage to facilities and infrastructure, deteriorate food pre-conditions and disrupt people's living arrangements. Apart from natural factors such as climate and extreme rainfall, these threats can also occur due to human factors such as land use. Based on one of the land functions as a regulator of the cycle, the effect of land use changes on hydrological characteristics needs to be studied. The hydrological characteristics used as parameters in this study are fluctuation of discharge and runoff coefficient.

Keywords
watershed, land use, river characteristics

1. Introduction
Along with the increase in the number and activities of humans, the need for land has also increased. To meet these needs, humans tend to use the land towards a higher use and increase the potential of the land. Efforts to increase the utility have led to changes in land use, especially forests. Land use is one of the factors that influence the water function of a watershed (Hidayat, Acep . 2017). Appropriate land use can provide benefits for the surrounding area but improper land use can provide disadvantages for the surrounding area. Changes in land use in an area can affect the function of water management (hydro-orology). This is in accordance with the opinion of Lily Montracih L (2009), which states that any treatment given to a plot of land can affect the water system in that place and places downstream. The hydrological condition of the Banjar-Jeruk legi watershed is currently experiencing a change in the watershed hydrological characteristics which is marked by an increase in the potential for flooding due to increased river discharge and drought in the dry season and figure 1 shows the watershed areas Banjar-Jeruklegi. This can cause huge losses, damage to facilities and infrastructure, deteriorate food pre-conditions and disrupt people's living arrangements. Apart from natural factors such as climate and extreme rainfall, these threats can also occur due to human factors such as land use. Based on one of the land functions as a regulator of the cycle, the effect of land use changes on hydrological characteristics needs to be studied. The hydrological characteristics used as parameters in this study are fluctuation of discharge and runoff coefficient (Sari, I, Hidayat, A, Indah, N, 2018).

1.2. Identification of problems
Based on the background of the problem, it can be identified the problems to be discussed, namely:
1. The factor of the amount of runoff.
2. Effect of runoff on river volume

Figure 1 shows watershed areas:

2. Research Methodology
The analytical method used to In HEC-RAS version 4.1 the hydraulic analysis provided includes two analyzes, namely steady flow and unsteady flow (Hidayat, Acep. 2017). Steady flow is a flow in which the amount of liquid flowing per second through any part is constant. Whereas Unsteady Flow is a flow in which the amount of fluid flowing per second through any part is not constant.
The analysis was carried out to determine the ability of the channel to drain the discharge (Husain, A. 2017).
The modeling steps are as follows:
- a. Make a schematic of the channel network that will be modeled based on the results of field measurements.
- b. Enter channel geometry data.
- c. Define the boundary conditions to be used in the analysis.
- d. Run a modeling program.
- e. Print results / output.

3. Result And Analysis
The calculation of flood discharge for the study location was taken using the rational and Haspers method, the calculation shows in Table 1 Rational method and Haspers, which has a horizontal area. Where then the results are compared, which will then take the possible values with the existing environmental conditions. The results to be determined are for flood discharge with return periods of 2, 5, 10, 25, 50, and 100 years.

<table>
<thead>
<tr>
<th>Return Period (years)</th>
<th>Rain Plan (R24) mm</th>
<th>Planned Flood Discharge (kubik/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rasional Method</td>
<td>Haspers Method</td>
</tr>
<tr>
<td>2</td>
<td>79.322</td>
<td>3.947</td>
</tr>
<tr>
<td>5</td>
<td>102.756</td>
<td>5.113</td>
</tr>
<tr>
<td>10</td>
<td>115.000</td>
<td>5.722</td>
</tr>
<tr>
<td>25</td>
<td>127.177</td>
<td>6.328</td>
</tr>
<tr>
<td>50</td>
<td>134.203</td>
<td>6.677</td>
</tr>
<tr>
<td>100</td>
<td>139.879</td>
<td>6.960</td>
</tr>
</tbody>
</table>

Table 1 Rational method and Haspers
Hydraulics Analysis

Flood Water Level Calculation.

The calculation of the flood water level is carried out if the conditions in the field can be calculated based on the survey conducted. However, there are several bridges based on surveys that are carried out in a safe position from flooding by looking at environmental conditions such as crossing rice fields, crossing roads and areas plantation. This is based on a survey conducted in 44 locations in looking shows Table 2 the calculation of flood water in the rivers.

<table>
<thead>
<tr>
<th>No</th>
<th>Kode Sungai</th>
<th>KM</th>
<th>Depth Channel</th>
<th>Area Channel</th>
<th>Flow</th>
<th>Discharge</th>
<th>Depth Flood</th>
<th>Area Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>04-1439</td>
<td>3150</td>
<td>34.15</td>
<td>0.962</td>
<td>8.00</td>
<td>6.00</td>
<td>7.96</td>
<td>6.96</td>
</tr>
<tr>
<td>2</td>
<td>04-1439</td>
<td>3210</td>
<td>40.30</td>
<td>0.621</td>
<td>4.50</td>
<td>4.50</td>
<td>4.60</td>
<td>4.60</td>
</tr>
<tr>
<td>3</td>
<td>04-1439</td>
<td>3270</td>
<td>41.00</td>
<td>0.528</td>
<td>2.80</td>
<td>2.80</td>
<td>2.76</td>
<td>2.76</td>
</tr>
<tr>
<td>4</td>
<td>04-1439</td>
<td>3330</td>
<td>42.00</td>
<td>0.500</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>5</td>
<td>04-1439</td>
<td>3390</td>
<td>43.75</td>
<td>0.600</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>6</td>
<td>04-1439</td>
<td>3450</td>
<td>45.10</td>
<td>0.650</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Tabel 2 Calculation of flood water

4. Conclusion

1. Starting from the upstream pattern of surface runoff is very small, seeing the conditions around the river there are still many hard plants so that the runoff is very small and the biggest is infiltration.

2. The more downstream the runoff occurs, considering that the land use pattern is changing, where around the river, there are smaller plants around the riverbank, which results in greater runoff and a very large volume increase in the river.

References


Biographies

Acep Hidayat, born in Jakarta on 23 June 1975 in Indonesia. He is Head of study program of Civil Engineering of Mercu Buana University. He earned his Bachelor Degree in Civil Engineer from Mercu Buana University in 1994 with the title of his Mitigation structure with SAP 90 Programme. Then he earned his master degree in Civil Engineer with concentration in Water Resources from Institute Tecnology Bandung, ITB in 2019 with the title of thesis is optimization water in Irigation with Fuzzy programa linear. He also teaches several courses such as Hidrology, Mechanical Fluida and Hidrolrika and Water Resources Development

Muhammad Isradi, born in Kandangan on 18 August 1972. He is secretary of study program of Civil Engineering of Mercu Buana University. He earned his Bachelor Degree in Civil Engineer from Muhammadiyah Malang University in 1998 with the title of his thesis is One Way Flat Plate Planning at Ratu Plaza Madiun. Then he earned his master degree in Civil Engineer with concentration in Transportation from Brawijaya University in 2001 with the title of thesis is Model Analysis of Family Movement Awakening in Resident Area Sawojajar Malang. He also teaches several courses such as Pavement Planning, Road Geometric Planning, Transportation Planningm and Environmental Engineering.

Dr.-Ing. Joewono Prasetijo, born in Pontianak on 18 October 1969. He earned his Engineer title in Civil Engineering in Tanjungpura University, Pontianak, Indonesia in 1993. He earned his Master of Science in Road and Transportation Engineering from Delft University of Technology, The Netherlands in 1996. He earned his Doctor Ingenieur from Ruhr-Universität Bochum, Germany in 1996. Now he is a Head Of Department of Rail Transportation Engineering Technology, Faculty of Engineering Technology, Univerisity Tun Hussein Onn Malaysia

Rudi Hendrawan is Director Restu CIpta Persada company Water Resources, Indonesia.