CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Flood is unusual high stage of a river that overflows the natural or manmade banks thus spreading water to its floodplains that are thickly populated due to obvious advantage of water supply and irrigation (Patra, 2008). Flood is the one of the most serious natural disasters (Kim, 2004) compared to other natural disasters, flooding is regarded as one of the most frequent events and causes the greatest amount of economic loss. On the other hand, flood disasters have directly affected human’s lives such as traffic confusion, properties damage, loss of life and inconvenience to the residents. The water resources around the world are under increasing pressure due to rapid population and economic growth, aggravated by lack of coordinated management and governance. This problem has somehow become more critical over the years when more physical development taking place in the upstream area of the river basin.

Massive flooding normally occurred in protracted consequence of the rain north-east rainy season in everywhere and covers big area. States often facing this season are Pahang, Terengganu, Kelantan, Sabah and Sarawak.
Occasional flooding is a problem to homeowners and to entire cities. Crops do not grow at the optimum rate when soil is either too wet or too dry. Manufacturing operations require a constant water supply over time for a variety of purposes, such as to provide cooling water and to assimilate wastes. Thus, although earth’s total volume of water may be adequate to meet all needs, problems are created by variations in both the spatial and temporal distributions of water availability. Extreme problems, including life-threatening situations, can result from extreme variations in either the spatial or temporal distribution of water, or both.

In Malaysia, the major problem due to hydrological problem is flooding. A flood is an unusually high stage in a river, normally the level at which the river overflows its bank and inundates the adjoining area. Flooding happens due to heavy rainfall and rivers do not have the capacity to convey excess water. Besides that, it can occur due to dam failure and results in flooding of the downstream area, even in dry weather conditions.

Hydrological modeling is a commonly used tool to estimate the basin’s hydrological response due to precipitation. It allows to predict the hydrologic response to various watershed management practices and to have a better understanding of the impacts of these practices (Kadam, 2011). It is evident from the extensive review of the literature that the studies on comparative assessment of watershed models for hydrologic simulations are very much limited in developing countries (Kumar and Bhattacharya, 2011). There is bare necessity to undertake study on hydrologic simulation through development of a suitable watershed model. The Hydrologic Engineering Centers Hydrologic Modeling System (HEC-HMS) is a popularly used watershed model to simulate rainfall runoff process.
The importance in this study is being able to predict the hydrologic model of the Lipis River using HEC-HMS. This study will determine the rainfall-runoff when optimizing the rainfall station derived from the HEC-HMS computer program. HEC-HMS was developed to predict rainfall data and to determine runoff process. The parameter estimations in HEC-HMS hydrologic model are structure of the model, analysis of sensitivity, results obtained from the data and calibration and verification procedures. By using HEC-HMS hydrologic model, the rainfall-runoff relationship can be obtained by producing a hydrograph.

1.2 PROBLEM STATEMENT

Monsoon floods are not a new phenomenon in Malaysia, where each year-end east coasters face heavy rain falls, which result in flash flooding. Most floods that occur are a natural result of cyclical monsoons during the local tropical wet season that are characterized by heavy and regular rainfall. Inadequate drainage in many urban areas also enhances the effects of heavy rain, though efforts are underway to resolve it. Flood disaster causes loss of life, disease outbreak, property damage, crop loss of earning and broken transport relationship among other problem. Lipis River which is one of the rivers which can contribute to this problem. To prevent the occurrence of flood, HEC-HMS is used to analyze the hydrologic process and to determine the optimization rainfall-runoff process of Lipis River. The software includes hydrologic analysis procedures such as infiltration, unit hydrographs, and hydrologic routing.