CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF RESEARCH

Rivers in Malaysia under natural conditions were known to have stable regimes and carried low sediment loads. However, as a result of sedimentation process due to flood event, river sediment loads have gravely increased. Consequently, problems of the massive clearing of forest for oil palm plantations and vegetable farming. It has been estimated that more than 80% of the suspended sediment load is caused by human activities in the catchments. Besides that, there are also the sedimentation that cause by flood.

High level of sedimentation in rivers leads to physical disruption of the hydraulic characteristics of the channel. This can have serious impacts on navigation through reduction in depth of channel and can increased flooding because of reduction in capacity of the river channel to efficiently route water through the drainage basin. These problems also affect the water quality of the river.

1.2 PROBLEM STATEMENT

Lebir River is one of the river that are involved in the flood event at the end of 2014 which situated in the district of Kuala Krai, Kelantan. Previous floods, including those 1927 and 1967, were considered significant in Kelantan’s history. The 2014 flood was the most significant and largest recorded flood in the history of Kelantan. It was considered to be a ‘Tsunami-like disaster’. This flood was called ‘Bah Kuning’ (yellow-coloured flood) because of its high mud content. Nonpoint source pollutants come from
a number of sources and are washed into our waterways by surface runoff. When land disturbing activities occur, soil particles are transported by surface water movement. Soil particles transported by water are often deposited in streams, lakes, and wetlands. This soil material is called sediment. Sediment is the largest single nonpoint source pollutant and the primary factor in the deterioration of surface water quality. Land disturbing activities such as road construction and maintenance, timber harvesting, mining, agriculture, residential and commercial development, all contribute to this problem.

Flooding is a natural occurrence which can be an important source of sediment and nutrients to a variety of downstream riverine, estuarine and marine environments. However, when catchments are modified or floodwaters become increasingly large and more frequent, the benefits of flooding can be overridden by the excessive transport of freshwater, nutrients, sediment and pollution. Temporal variations in water quality also may occur, due to seasonal flow variations as a result of precipitation. Water quality during the dry season may remain fairly constant with some variations (provided there are no serious external disturbances or draught). During the wet season, where precipitation is at maximum, the water quality has the potential to get better or become worse, depending on input from runoff or non-point sources.

1.3 OBJECTIVES

To conduct a study, the aim of the ultimate objective of the study should be specified so that the study can be done thoroughly according to its aim. Several objectives have been set which are:

i. To analyze the water quality of Lebir river due to flood event and sedimentation process.

ii. To calculate the total sediment load at Lebir River.

iii. To identify the relationship between amounts of sediment load with water quality in the river.
1.4 SCOPE OF STUDY

Five stations will set up for sample collection of sediments and water which are situated at the upstream, middle stream and downstream at Lebir River. The analysis of the size and types of sediment sample is using sieve analysis method and several data from in-situ. The Total sediment load at Lebir River will calculate using Engelund-Hansen method. Water quality at Lebir River will analyse based on 6 parameters, which is taken in situ and by lab experimental. Six parameters were chosen for the Water Quality Index (WQI) which is Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD₅), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Ammoniacal Nitrogen (NH₃-N) and potential hydrogen (pH). The previous rainfall, sediment and water quality data taken from Department of Irrigation and Drainage (DID) will analyse in order to see the pattern of the changes and its effect.

1.5 SIGNIFICANCE OF STUDY

Identification of various size and types of sediments are vital to determine the total sediment loads due to transportability of sediment along the river. With the increase of sediment loads, the water level of river also increases which will cause flooding. Thus, this data analysis is important for authorities to take precautions. In addition, the sediments contain many toxic substances due to urban area which causes pollution to river. Therefore, it is vital for researcher to test and improve the water quality of the river.