

CHAPTER 1

INTRODUCTION

1.1 Background

Sediment is natural earth material which consists of soil particles that are ranging in sizes from the smallest which are mud and sand to the larger sizes which include the gravels, cobbles and boulders. Sediment can move and deposited in a new location. Sediment can move from one place to another through the process of erosion. Erosion is the process of removal and transportation of rock or soil.

Sediment can be transported by a flow of water. Sediment transport can be in the form of bed-load and suspended load, which are depending on the size of the bed material particles and the flow conditions. Some factor which influence the sediment transport are flow conditions, sediment size and sediment density. Usually, the greater the flow of water, the more sediment will be transported while the movement of sediment will control the size and shape of bed forms.

The sediment load is varies from river to river. The velocity of the water is important in determining the way of how sediment is being transported. Bed-load transport depends on the flow characteristics and sediment properties, such as shear stress, surface roughness, and particle size, density, and shape. Bed load transport is the main connection between river hydraulics and river form and has a significant effect on restoring the channel geometry.

1.2 Background of Study

Tasik Jemberau is located in Tasik Chini, Pahang, Malaysia. The lake is located at the latitude and longitude coordinates of 3° 25' 31.8" (3.4255°) North and 102° 55' 8" (102.9189°) East. Sungai Jemberau is another river that connect with Tasik Chini. Besides, Laut Jemberau is a lake in Pahang and is nearby to Tanjung Kelantan, Tanjung Batu Busuk and Pulau Besar. Laut Jemberau is also close to Kawasan Cari Gali Batu Barik, Tasik Cini and Laut Gulum.

Human interference is one of the effects of sediment transport process that gives impacts on sediment load and bed load pattern. Vegetation removal from agricultural, logging activities, are the factor that will increase erosion and sediment loads of rivers. Erosion will cause the bed load to increase at the river. Therefore, the depth of river will decrease. When the depth of the river decreases, the volume of the flow rate remain same, and it will cause the flood.

The effect of excessive sediment in river will shorten the lifespan of dams and reservoirs. When a river is dammed and a reservoir is created, the sediments that used to flow along with the relatively fast-moving river water are, instead, deposited in the reservoir. Reservoirs will slowly fill up with sediment and mud.

Environmental science research there has been a great deal of important scientific research concerning issues relating to the Tasik Chini ecosystem and health of the lake, including the impact of the dam, the Sungai Chini Navigation Lock, deforestation and subsequent mining, and logging. This scientific research has highlighted problems, as residual fraction, with heavy metal concentrations, namely Cadmium, Copper and Lead, in the lake and sediment, although there is still a high level of organic content within the lakes (Ebrahimpour and Idris, 2008a). This indicates some hopefulness in respect of re-establishing the lake's ecology and future sustainability. Further research compared mean metal concentrations in Tasik Chini with a range of water quality standards showing that the mean metals concentration in surface water were low and within the range of natural background except for iron and aluminium, with increased localized concentrations being associated with natural causes such as the monsoon season but influenced by human activities through mining. The greatest concentrations were found at three sites, Tanjung Jerangking and Melai (Shuhaimi-Othman et al., 2008). It is possible to speculate that

mining activity has increased the concentrations reaching the lake during the monsoon season.

1.3 Problems Statement

In 1995, a barrage was built at the estuary of the Tasik Chini to raise the lake water level to benefit tourism. The barrage has drastically reduced the dynamism of the water movement of the lake. Furthermore, extensive human activities such as farming, produce mining and logging have adversely affected the ecosystem of the lake, causing the widespread growth of the aquatic weed *Cabomba furcata* and reduction of water quality.

The people can no longer use the lake water for washing, bathing or drinking without concern. At Kampung Ulu Melai they have been obliged to pay for piped water from the mining companies that are culpable for the environmental damage in the first place, adding to a local sense of grievance and injury. The people complain that their health is being damaged by the contaminants from mining and logging. They inform us that skin problems and respiratory diseases are more common across all age groups now, as are stomach problems and bloating, sore throats and headaches. Through this study, bed load pattern through the sedimentation process at Sungai Jemberau can be determined (Sara Ashencaen and Jonathan Parker, April 2014)

1.4 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 is:

- To identify bed material characteristic in Sungai Jemberau at Tasik Chini.
- To determine bed load concentration in Sungai Jemberau at Tasik Chini.

1.5 Scope of Study

The study will focus at Sungai Jemberau. The methods for bed load equation that will be used are Meyer-Peter and Muller, Schoklitsch, Duboys, Einstein. The methods will be selected based on their suitability for the river.