CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The escalating environmental contamination of the environment by toxic substances is of growing concern especially in our country which developed rapidly these days. A wide range of contaminants are recently introduced into the aquatic environment mainly due to increased rate of industrialization, technological development, growing human population, oil exploration and exploitation, agricultural and domestic wastes run-off (Lima et al., 2008). Among these contaminants, heavy metals constitute one of the most dangerous groups because of their persistent nature, toxicity, tendency to accumulate in organisms and undergo food chain amplification and they are non-degradable. When released into the environment, heavy metals find their way into the aquatic systems and deposited in aquatic organisms like fishes through the effects of bio-concentration, bioaccumulation and the food chain process and eventually threaten the health of humans that consume them.

Heavy metals concentrations in aquatic ecosystems are usually monitored by measuring their concentrations in water, sediments and biomass. Bioaccumulation is the building up of a chemical to a toxic level in an organism’s body (Ezemonye and Enuneku, 2012). Fishes are notorious for their ability to concentrate heavy metals in their muscles and since they play important role in human nutrition, they need to be carefully screened to ensure that unnecessarily high level of some toxic trace metals are not being transferred to man through fish consumption (Adeniyiet et al., 2008). Several studies have indicated
enhanced level of both essential and nonessential heavy metal load in muscle and liver tissues of fishes (Obasohan, 2007; Adeniyiet et al., 2008).

Assessment of toxic heavy metals in fishes can serve as a bio-indicator of their impacts on these organisms as well as give an insight to the degree of pollution of the water body in particular. The aim of this study is to determine the concentration of heavy metals (Iron, Zinc, Manganese and Nickel) in surface water and bioaccumulation of these metals in fish of River Owan.

3.2 STUDY AREA DESCRIPTION

Sungai Tunggak is situated in between 30° 56'06" to 30° 59'44" N and 103° 22'42" to 103° 24'47" E adjacent to the Gebeng industrial town which is located at 3° 55' 39" N to 4° 00' 10" N and 103° 22'42" E to 103° 26'30" E (Fig. 1). The area is near the Kuantan Port. The selection of monitoring stations were done based on location, land use pattern and site elevation. The Global Positioning System (GPS) was used to determine the actual coordinate of monitoring stations and it was reconfirm during the subsequent sampling periods. A total of 3 monitoring stations were selected across the river basin for sampling.

Figure 3.2.1: Station 1 of Tunggak River.
Figure 3.2.2: Station 3 of Tunggak River.