

UNIVERSITI TEKNOLOGI MARA

**WATER QUALITY STUDY OF
MELAKA RIVER USING WQI,
REMOTE SENSING AND GIS**

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ABSTRACT

Melaka River is a popular tourism attraction in Melaka and it is crucial to ensure it is clean and crystal clear. In Malaysia, water pollution is identified using Water Quality Index (WQI), by the Department of Environment (DOE), since 1986. The WQI parameters are Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Ammoniacal Nitrogen ($\text{NH}_3\text{-N}$), Suspended Solids (SS), and pH. Additional parameters of Temperature, Colour, Turbidity, Level (Depth) and Conductivity were used as support data. SPOT-5 Pansharped Supermode All Bands as near-real-time data provides an ideal 2.5m high resolution within appropriate availability time provided with the Digital Elevation Model (DEM). The Geographical Information System (GIS) used as a mapping tool to conclude and better gathered all information and current condition of the river water and the potential pollution sources can be monitored. The combination of on-site data, laboratory testing data and satellite imagery data could support each method limitations that produce GIS mapping and analysis for future water quality control and management. The correlation of all six parameters of pH, SS, BOD, COD, $\text{NH}_3\text{-N}$ and DO versus Band 1, Band 2, Band 3 and Band 4 show low values of regressions with the highest reading of 0.2970. All six parameters were being estimated using the SPOT 5 image. The regression values indicated that the best band to estimate the value of $\text{NH}_3\text{-N}$ is Band 3, pH, BOD, COD and DO are using Band 2 and SS using Band 1. All additional parameters of Level, Colour, Conductivity, Temperature and Turbidity versus Band 1, Band 2, Band 3 and Band 4 show even lower values of regressions 0.1957. All five additional parameters were also being estimated using the SPOT 5 image. The regression values above indicated the best band to estimate Level is Band 4, Colour is Band 3, Conductivity and Temperature is Band 2 and Turbidity is Band 1. Red Zone Mapping of Very Critical parameters of DO, BOD, COD, $\text{NH}_3\text{-N}$, Temperature and Conductivity show that those parameters are the top priority to be monitored and managed.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Melaka River has always been the most popular tourism attractions in the state of Melaka which offering lots of tourism gathering activities throughout the year. Figure 1.1 below shows the location of Melaka in Peninsular Malaysia. It is crucial to ensure the water is clean and unpolluted while the area is continuously being used for various kind of human activities.

FIGURE 1.1
Melaka in Peninsular Malaysia
(Source: Google Earth, 2013)



The most critical area of Melaka River identified is from Spice Garden towards the river mouth near the New Custom Building Site. This is the area where most of the human activities throughout the year in Melaka took place. Figure 1.2 shows the area of study from Spice Garden towards river mouth near New Custom Building Site.