A STUDY OF SEDIMENT YIELD IN KERTEH RIVER CATCHMENT AREA USING GIS TECHNOLOGY

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FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
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A STUDY OF SEDIMENT YIELD IN KERTEH RIVER CATCHMENT AREA BY USING GIS TECHNOLIGY

By

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DECLARATION AND VERIFICATION REPORT

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

A STUDY OF SEDIMENT YIELD IN KERTEH RIVER CATCHMENT AREA BY USING GIS TECHNOLOGY by **CHEAH MUN WEI,** Matric No. **UK17102** have been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree of (Science) Marine Science, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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%	-	Percentages
°C	-	Degree Celsius
µm	-	Micrometer
am	-	morning
ARS	-	Agriculture Research Service
AVSWAT	-	Arc View Soil Water Assessment Tools
CONCEPTS	-	Conservation Channel Evolution and Pollutant Transport System
dbf-	-	dBase file
DEM	-	Digital Elevation Model
E	-	East
FRSR	-	Forest evergreen
g	-	Gram
GIS	-	Geographic Information System
GPS	-	Global positioning System
ha	-	Hectare
hr	-	Hour
HRU	-	Hydrology Respond Unit
km	-	Kilometer
mg/L	-	milligrams per liter
mm	-	Millimeter
m/s	-	meter per second

$MJ/m^2/day$	-	Megajoule per square meter per day
N	-	North
NSL	-	National Sedimentation Laboratory
ORCH	-	Orchard
pm	-	Afternoon
.shp.	-	Shape file
R^2	-	Correlation Coefficient
SSC	-	Suspended Sediment Concentration
SWAT	-	Soil Water Assessment Tools
TSS	-	Total Suspended Solid
USDA	-	United State Department of Agriculture
USGS	-	United State Geological Survey

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ABSTRACT

To date, Kerteh is under rapid development via expansion of the industrialization area as well as the increase in population. Thus, the study of sediment yield was conducted in Kerteh River catchment area. The methodology of this study is divided into two parts which is the ground sampling and using GIS technology (AVSWAT) to create a watershed model to predict the sediment yield in the study area. For the ground sampling, the water samples from the station 1 and station 2 were collected to determine the suspended sediment concentration (SSC) from the study area by using SSC method. Furthermore, the actual land use activity of the study area was recorded which the latter was used in the AVSWAT. The digital elevation model, land cover data, stream network data, soil data, weather data, and precipitation data were loaded into AVSWAT to simulate the suspended sediment yield in the study area. The simulation of the sediment yield must be compare with the SSC to make the AVSWAT to simulate an accurate data of sediment yield in the study area. The correlation coefficient is use in this study to determine the relationship between SSC and the simulation of suspended sediment load by the AVSWAT in the station 1 and station 2. The correlation coefficient has shows a very strong relation between the SSC and simulation data by the AVSWAT. This is due to the R value of the station 1 is 0.926 and station 2 is 0.864. The prediction of the sediment yield in the Kerteh River catchment area from year 2015 until year 2040 is in the ranges 731700 metric tonne until 1782000 metric tonne.

Thus, it can concluded that, the study of the sediment yield in a catchment area can be using GIS technology (AVSWAT) to create a watershed model to predict the sediment yield. Since, it is easier and economic if compare to do the ground sampling at the study area for a long period to collect the useful data.

Kajian Terhadap Jumlah Hasil Sedimen Yang Berada Pada Kawasan Tadahan Kerteh Dengan Menggunakan GIS Teknologi

ABSTRAK

Pada masa kini, Kerteh serdang mengalami perkembangan yang peasat melalui perluasan kawasan perindustrian dan peningkatan penduduk. Dengan demikian, satu kajian yang berkaitan dengan jumlah hasil sedimen yang berada di kawasan tadahan Kerteh telah dilakukan. Metodologi bagi kajian ini telah dibahagikan kepada dua bahagian. Bahagian pertama ialah mengambil sample air daripada stesen 1 dan stesen 2 untuk mengkaji kepekatan sedimen terapung (SSC) dengam mengunakan kaedah SSC. Selain itu, penggunaan tanah yang berada di kawasan tadahan Kerteh telah dicatatakan untuk digunakan dalam AVSWAT. DEM, data penggunaan tanah, data rangkaian aliran sungai Kerteh, data tanah dan data cuaca telah dimasukan ke dalam AVSWAT untuk mensimulasikan jumlah hasil sedimen yang ada pada kawasan kajian. Simulasi hasil sedimen perlu dibandingkan dengan SSC untuk membantu AVSWAT mensimulasikan data yang lebih tepat di kawasan kajian tersebut. Pekali korelasi telah digunakan dalam kajian ini untuk mengetahui hubungan antara SSC dengan hasil sedimen yang disimulasikan oleh AVSWAT pada stesen 1 dan stesen 2. Pekali korelasi pada stesen 1 dan stesen 2 telah menunjukkan hubungan yang sangat kuat antara SSC dengan data simulasi. Hal ini disebabkan, nilai R bagi stesen 1 adalah 0.926 dan stesen 2 adalah 0.864.

Ramalan jumlah hasil sedimen di kawasan tadahan Kerteh dari tahun 2015 hingga tahun 2040 adalah berada pada langkungan 731.700 metrik tan hingga 1.782.000 metrik tan. Dengan demikian, kajian ini menyimpulkan bahawa hasil sedimen di kawasan tadahan Kerteh boleh dilakukan dengan menggunakan teknologi GIS (AVSWAT) untuk mencipta satu model bagi meramalkan jumlah hasil sedimen. Hal ini disebabkan, AVSWAT adalah lebih mudah dan ekonomi jika dibandingkan dengan kaedah tradisional yang menggunakan jangka masa yang lama untuk mengumpul data yang bermanfaat.