The evaluation of Morphometric features of the catchments of Kotmale, Victoria Randenigala and Rantambe reservoirs using GIS as a tool

K P G W Senadeera* and Swarna Piyasiri
Department of Zoology, University of Sri Jayewardenepura, Nugegoda

The Kotmale, Victoria, Randenigala & Rantambe reservoirs are located within the Upper Mahaweli watershed extended over 3110 km^2 which is about one fifth of the total area of the country. These reservoirs are located within the most sensitive highland massive of the country. Water quality of the above reservoirs are available through a project titled" Limnology project at Mahaweli reservoirs for the last 15 year period. These data indicate that the source of many water quality issues stem from their catchments. It is important to identify the catchment issues related to water quality data in order to plan conservation strategies for the Upper Mahaweli Catchment.

The scope of the present work is an initial step to achieve this objective via evaluating the morphometric features of the catchments based on the available digital data using GIS as a tool. This study will focus on the morphometric features of their catchments, namely basin shape with reference to form factor, compactness factor, circulatory ratio, elongation ratio, mean slope & length of overland flow & the features of the catchment components namely; the stream order, drainage density, stream frequency and bifurcation ratio, using GIS.

The catchments of the reservoir were defined using contours with 20 m intervals using 1:50000-scaled maps obtained from the survey department. Arc GIS 8.2, Ilwis 3.1, & Arc View 3.2a were used in all the GIS analysis. The perimeter of the catchment, length of the basin, form factor, compactness factor & the area of the catchment were calculated using the digital data to interpret catchment characteristics. The mean slope of the catchment was evaluated using the contour length, its interval and the basin area. Stream segments belonging to each stream order were defined & all the segments were labeled. Lengths of stream segments and stream orders were used to calculate bifurcation ratio, stream density & the stream frequency.

The results indicated that all these catchments belong to 7^{th} order category. Victoria catchment contained the highest number of streams of 4930. The Kotmale catchment indicates well developed stream network with the highest stream density of 6.75 per km^2. Its drainage density value is 3.31 km per km^2. The average slope value ranged from 27% (Victoria) to 37% (Randenigala). The overland flow ranges between 0.15 – 0.23 with the highest value of 0.23 for Victoria catchment.

* s_wasantha@hotmail.com Tel: 011 2804295