

Sawitree Nakhorn 2007: Decision Support System for Water Resource Management of Bung Boraphet Basin. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Associate Professor Nuchanat Sriwongsitanon, Ph.D. 179 pages.

Bung Boraphet Basin is a sub-basin of the Chao Phraya Basin. The outlet of the Bung Boraphet Basin is Bung Boraphet, which is a large and important freshwater lake and wetland system in Nakorn Sawan Province. At present, Bung Boraphet Basin and particularly Bung Boraphet is facing severe water shortages. Therefore water management is urgently needed to better allocate the water resource. This research has the main objective to develop a decision support system for Water Resource Management of Bung Boraphet Basin. This decision support system consists of a Rainfall-Runoff Model System, a Geographic Information System (GIS) of Bung Boraphet Basin, and a Database System for Bung Boraphet and its basin. For the Rainfall-Runoff Model System, the URBS Model has been chosen for daily runoff estimation using daily rainfall data and basin characteristics. Daily runoff estimates for the Bung Boraphet Basin between 2003 and 2005 resulting from an application of the URBS Model were compared to observed daily runoff flowing into Bung Boraphet. The URBS Model was then applied for daily runoff estimation between 1973 and 2002. The results revealed that the minimum runoff of 683.24 MCM occurred in 1991. It was also found that the rainfall in that year was only 697.65 mm, which is around 33 percent of the average rainfall during that period. By reducing the rainfall between 2003 and 2005 by 33 percent and then applying these rainfalls for runoff estimation during this period, the results show that runoff flowing into Bung Boraphet for this case reduces to only 57 percent of the real situation. If this situation really occurs, the water shortage in Bung Boraphet would be worsen and would cause a lot of damages to the whole ecological system of the Bung Boraphet Wetland. The URBS Model System was later developed and connected to the Database System for the convenience of the model application. For GIS, layers of data needed for spatial analysis were prepared to support the URBS Model application and to show spatial results clearly. Once the URBS Model System and the GIS are connected to the Database System, it will be an internet based Decision Support System to support decision makers for water resource management of Bung Boraphet Basin more efficiently.

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