Nuttawut Intaboot 2014: The Study of Hydrodynamic Conditions and Salinity Intrusion in Thachin River. Doctor of Engineering (Irrigation Engineering), Major Field: Irrigation Engineering, Department of Irrigation Engineering. Thesis Advisor: Mr. Wisuwat Taesombat, D.Eng. 236 pages.

This study aimed to predict the salinity intrusion in the Thachin River due to rising sea level at the mouth of the river in order to setup water management guidelines in alleviating the suffering caused by the intrusion of salinity. The study was divided into four parts: first, a study on hydrodynamic conditions in the river and upper Gulf of Thailand was carried out including model calibration to find out proper parameters. Second, a study on the rise in sea level at the river mouth is determined by taking an adjustment of the effects of land subsidence at the river mouth into the account. Third, a prediction on the longitudinal saltwater intrusion along the Thachin River. Finally, a study on the measures for the control of salinity in order to minimize saltwater intrusion impact. The roughness coefficients along the Thachin River, the upper Gulf of Thailand and the diffusion coefficient were calibrated from the observed flow rate, water level and salinity in the year 2008-2010. The results founded that statistical induces between simulated and observed values were acceptable. The study of sea level change later revealed that the average sea level rise in the estuarine was higher than those in other parts of the Gulf in which the value was approximately 3.1 mm/year and corresponded to the world wide rate of sea level rise. While in the estuarine was around 19.2 mm/year. This high sea level rise was mainly caused by land subsidence of about 14.5 mm/year. Thus, the sea level rises by the sea itself was around 4.7 mm/year. The large rate of the sea level rises would cause salinity to intrude into the river to a longer distance. The predicted salinity intrusion in the year 2015, 2020, 2025 and 2030 indicated that the salinity would intrude as far as 55.5 river km from the estuarine which would be around 3.5 km further upstream along the river than the current intrusion distance. To control the salinity for reducing the impact, the increasing of flow rate in Thachin River was considered as a suitable measure. The results showed that the increasing flow rate is directly proportional to the increasing distance downstream of repel salinity. However, the increasing distance of repel salinity is not the same proportion for every range of the increasing flow rate. The appropriate flow rates for repelling salinity in Thachin River are around 20-40 cms. Because these flow rates will repel salinity to leave more distance downstream comparing with other higher flow rates. In addition, the higher flow rates in excessive amounts of river capacity may cause inundation problems, which will affect the farmers along the river.

Student's signature

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