

Preliminary Study on Water Quality in the Estuary of the Tha Chin River, Thailand

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1. Introduction

Major impediment to water management in Thailand is lacking of effective monitoring plan and decision making support. This research aims to provide the basic information for water quality management in the estuary of the Tha Chin River Basin, Thailand where problems of water demand and water pollution become critical due to urbanization and industrialization. Secondary data related to water quality and water use in the study area was analyzed in order to define the basic characteristics of water quality and water problem in this area.

2. The Tha Chin River Basin

As shown in Fig.1, watershed of the Tha Chin River is located in the central region of Thailand with total catchment area of 13477.16 km² (Hydro and Agro Informatics Institute, 2014). According to the economic development, some agricultural area in the Tha Chin River Basin has been developed into sub-urban area and industrial area. As a result, pattern of water use in this watershed has changed and water demand has been rising. Recent annual report of the Pollution Control Department (2013) stated that water quality in the central and lower parts of the Tha Chin River Basin was in deteriorated level. To cope with the water problems mentioned above, a decision making support for water management in the Tha Chin River Basin becomes necessary.

3. Methodology

Information related to water quality and water use in this study was obtained from the monitoring systems of water related authorities in Thailand, namely Royal Irrigation Department, Marine Department, Pollution Control Department, Prapimol Operation Division and Construction Project, Pasichareon Operation Division and Construction Project and Regional Environmental Office 5. Figure 2 shows the monitoring stations of the Royal Irrigation Department. Collected data was graphically and statistically analyzed to determine the characteristics and trend of water quality in the estuary of the Tha Chin River Basin. Problems related to water quality in the study area were summarized from the analysis of secondary data, literature review and the interview with the responsible authorities mentioned above.

4. Results and Discussion

According to the surface water quality standard, the Tha Chin River in this area is classified as Class 4, which is not suitable for irrigation. As shown in Fig. 3, dissolved oxygen (DO) in this area was frequently below the surface water quality standard (2.0 ppm), which can be related to high BOD reported by the Pollution Control Department



Figure 1 The Estuary of the Tha Chin River Basin

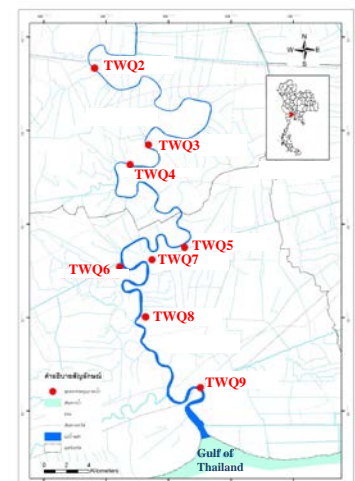


Figure 2 Water quality monitoring stations of the Royal Irrigation Department

(2013). Average salinity during dry season from 2008 to 2014 is shown in Fig. 4. The Royal Irrigation Department set the criteria of salinity for agriculture at 2.0 ppt at station TWQ4. It was found that salinity at station TWQ9 and TWQ8 was much higher than the criteria of salinity for agriculture according to the tidal movement in the Gulf of Thailand. It becomes clear that it is not feasible to use the water from the main river for irrigation especially in the vicinity of the river mouth. Since large agricultural area exists in this area, the Royal Irrigation Department had established several irrigation projects to provide irrigation water in this area. Water gates are utilized for flow manipulation and protection of tidal effect. The interview with responsible authorities indicated that water users especially the agricultural group actively participate in the water management and the control of seawater intrusion in this area.

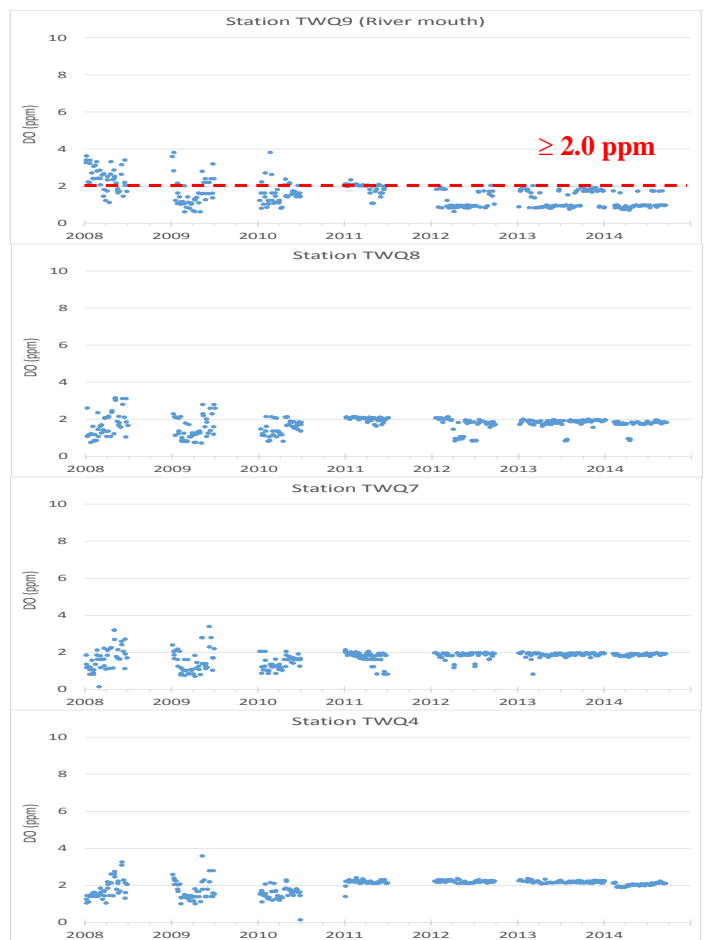


Figure 3 DO in the estuary of the Tha Chin River Basin

5. Conclusions

The analysis of water quality data indicated that water quality management in the estuary of the Tha Chin River Basin is necessary because water quality in this area is not suitable for water use while there is high water demand for irrigation, industry and households. Since each authority monitors water quality according to its own interest, it is recommended that water quality monitoring should be integrated among the responsible authorities.

6. Acknowledgement

The authors would like to thank Royal Irrigation Department, Marine Department, Pollution Control Department, Prapimol Operation Division and Construction Project, Pasichareon Operation Division and Construction Project and Regional Environmental Office 5 for offering useful information.

References

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- 2) Pollution Control Department (2013) Thailand State of Pollution Report 2013.

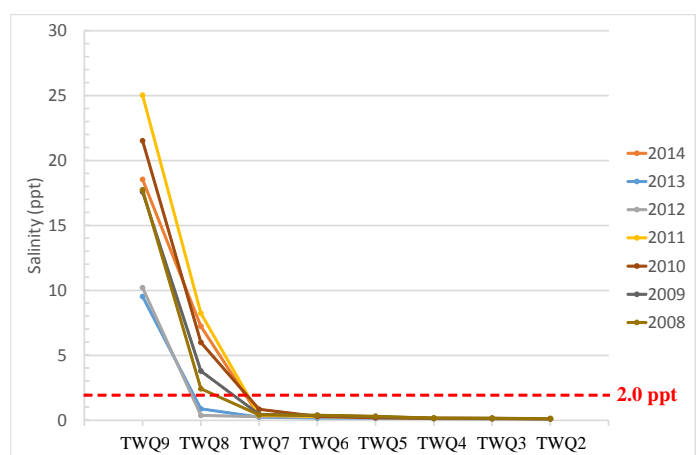


Figure 4 Average salinity in dry season (February)