CHAPTER V

CONCLUDING REMARKS

From the study of Tha Chin estuarine physical environment on the reconnaissance level which have been carried out both in field and laboratory in 1979, the following findings are achieved :

1) The Tha Chin river which is among one of the major river flowing through the Central Plain and eventually terminates on the northern coast of the Upper Gulf of Thailand contributes resonable amount of sediment deposited in the estuarine environment. The meandering nature of the Tha Chin river at the lower part of the Central Plain is bordered on bothsides by the natural levees, flood plain, refered to as Tha Chin alluvial plain. Bordering the seaward side of this alluvial plain is the Tha Chin coastal plain. The coastal plain may be divided into its original characteristics as nipa/grasslands, mangrove/supra-tidal salt flat respectively. In addition to the subaerial coastal plain mentioned earlier, there is, however, open intertidal mud flat bordering the most seaward part of the coastal plain. Further south, the Upper Gulf of Thailand is characterized by the shallow marine. The Tha Chin estuary occupies all of the coastal plain and lower part of the alluvial plain. As the sedimentation of the Tha Chin estuary progrades seaward, the alluvial plain, the nipa/grasslands, the mangrove/supra-tidal salt flat and the open intertidal mud flat shift their geographic positions and their aerial extent seaward respectively. The

maximum rate of growth of the coastline of the northern part of the Upper Gulf of Thailand particularly in the vicinity of Tha Chin estuary is approximately 20 m. per year on the eastern side of the estuary. However, the rate of growth on the western side is much smaller. The sediment supply of Tha Chin river is obtained from the drainage area of 6,300 sq.km. with the basin length of 225 kms and channel length of 295 kms.

2) The climatic and hydrological condition of Tha Chin estuary particularly concerning the rainfall pattern and the discharge pattern shows that maximum rainfall is in the month of September (420 mm.) while maximum discharge appears in the month of October (240 m^3/s). Therefore, the high-flow condition of Tha Chin river is set up covering August to November. The low-flow condition is considered from February to April with minimum rainfall in the month of January and minimum discharge in the month of April. Besides, considering from the monsoon point of view the season of the area under present investigation can be divided to four monsoon seasons, namely South-west Monsoon season during mid-May to September, retreating South-west Monsoon season during September to October, North-east Monsoon season during November to February and retreating North-east Monsoon season during March to mid-May. It is against these data, 3 field investigation programmes have been set up to cover the low-flow condition in March, the high-flow in August and the intermediate-flow in December. It is important to note that the discharge data of Tha Chin river previously mentioned is obtained from Po Phraya Irrigation Gate which is located approximately 100 kilometers further upstream from the area studied. Therefore, the validity of data with reference to Tha Chin estuary is not fully satisfactory.

3) The Tha Chin estuary is considered to be a coastal plain estuary with mixed-type of tide in the shallow marine of the river mouth. The influence of seawater into the Tha Chin river obviously proceeds further upstream beyond the area studied (beyond channel length of 10.6 kilometers) during both high-flow and low-flow conditions including ebb and flood stages. The salt intrusion in the estuarine water is a complicated salt-wedge pattern with a certain degree of interfingering below the water surface. This is due to the complexity of the bottom topography of the river channel and further complicated by the freshwater influx from Klong Mahachai and Klong Sunak Hon in the Tha Chin estuary.

4) Deformation of the normalized current speed of Tha Chin river mostly occurs between T2 to T5 which may result from the freshwater influx, irregularities of channel geometry both shape and bottom topography, and different degree of salt water intrusien. The deformation is more pronounced during the low-flow and intermediate-flow conditions, whereas relatively normalized during the high-flow condition.

5) General pattern of the dissolved oxygen of the Tha Chin estuarine water tends to increase in the seaward direction. However, the fluctuation of dissolved oxygen both in the positive and negative manner have been observed in the channel course of 10.6 kms. The abnormally high dissolved oxygen content is in part resulted from the flattening of the channel and turbulence, whereas the abnormally low values are due to the pollution from the urban area including industrial pollution along the river channel.

6) Variation in estuarine water pH is limited and appears to show low significant correlation with other parameters. The increase in

salinity shows only slightly progressive increase in dissolved oxygen content.

7) The relationships between salinity and pH of the estuarine water shows a significant correlation. The increasing in pH results in the progressive increasing in salinity. This relation is a positive linear which can be expressed as

$$pH = 0.022\ S\%. + 7.183$$

8) Regarding the bottom sediment along the 10.6 kms. distance of Tha Chin estuary, it is recognized that the colour varies from green-yellow, green, neutral gray to yellow shades. Differences in colour may be essentially due to the content of organic matter, content and kinds of iron compounds. The size of the bottom sediment falls within the range of mud and clay with small amount of human artifacts. The carbonate-carbon content varies between 0.08 - 2.07 percent, while the total organic carbon c ntent lies in the range of 4.36 - 17.54 percent.

a) The suspended sediment content shows a significant variation in different flow condition. Mean suspended sediment contents of the Tha Chin estuarine water are 350 mg/l, 120 mg/l and 220 mg/l for high-flow, intermediate-flow and low-flow conditions respectively. The suspended sediment content is a function of the freshwater discharge and the tidal effect depending on seasonal time of the year. Marine influence is more pronounced during low-flow, whereas the opposite occurs during the high-flow condition. The balanced influence of the freshwater discharge and the tidal effect is concerned during the intermediate-flow condition.