CHAPTER I
INTRODUCTION

Background and justification

The Upper Gulf of Thailand is a highly productive tropical marine ecosystem. The Gulf is rich in terms of primary productivity, due to the high nutrient input from four major rivers along the northern boundary (Department of Health, 1981). It located on the area where is strongly affected by contaminants such as industrial wastes, agricultural wastes and waste water from the aquaculture and municipalities along the coastline and where major biogeochemical transformations is very important and rapid (Silpipat *et al.*, 1981). These have caused low quality of seawater and the nutrient enrichment problem in the Upper Gulf, have endangered many valuable natural marine resources, like fisheries and aquacultures: decreased in qualities and quantities, and have reduced the aesthetic value of the Upper Gulf (Department of Health, 1984; Sitthichaikasem and Sittichokchai, 1984).

Although there have been a lot of measurements of the hydrochemistry in the Upper Gulf of Thailand since 1974, most studies have emphasized on the distribution and the concentration of nutrient (water quality) of the Gulf such as Survey of the Water Quality in the Estuary (Department of Health, 1981), Water Characteristics of Estuaries in the Inner Gulf of Thailand (Sitthichaikasem and Sittichokchai, 1984). Little information on biogeochemical transformations of nutrients in the Gulf has been provided such as The Seasonal Variation in Sources, Concentrations and Impacts of Nutrients in the Upper Gulf of Thailand (Silpipat and Chanpongsang, 1981), Observation of Nutrients Cycles in the Upper Gulf of Thailand during the periods of 1981 through 1983 (Silpipat *et al.*, 1984). While the study of nutrients in high biogeochemical transformation area particularly in the estuary and river mouth is widely advanced in the term of nutrient budget or developing the mathematical model for demonstrating the qualities and quantities of nutrients transformations including

the prediction of eutrophications. These studies will come to the progress on developing the efficient protection and management strategies in order to control the problems. In Thailand, biogeochemical transformations of nutrients in the Upper Gulf of Thailand: the mass balance of nutrients of the Gulf was studied in the only short period by using primary data (July, 1989) (Snidvongs, 1993). However, there are still lack of the basic understandings in the distribution and variation of nutrients in the Upper Gulf, particularly in the long-term period.

The better understandings of nutrient cycling and budgets of the Upper Gulf, namely: how much of nutrients entering the Upper Gulf is from the river discharge, how much the production and destruction of nutrients are, where they are located, how they function are, what the differences in behavior of dissolved nitrogen and phosphorus are and are there any seasonal or long-term variations? These basic understandings of factors controlling the nutrient concentration of the Upper Gulf are very important, useful, therefore, needed in order to develop and support the implementation of management strategies for reduce the problem.

Objectives

1. To study seasonal and long-term variations of nutrients in the Upper Gulf of Thailand by using the secondary data.
2. To evaluate and establish the nutrient budgets in the Upper Gulf of Thailand by the mathematical analysis.

Scope of the study

1. The study area was emphasized on the Upper Gulf of Thailand.
2. Field data of fresh water inputs, riverborne nutrient inputs, hydrochemical, bathymetical and meteorological observations obtained from Royal Irrigation Department, Pollution Control Department, Department of Health, Department of Fisheries, Hydrographic Department and Meteorological Department will be used

and stored in the Upper Gulf of Thailand database based on Paradox version 4.50 for DOS.

3. Secondary data during 1987-1994 will be studied and described the seasonal and long-term variations.

4. Secondary data in 1989, 1990 and 1994 will be analyzed to establish nutrient budgets by using mathematical methods.