CHAPTER 6

CONCLUSION

A study of diversity of benthic diatoms and application to monitors water quality in the Mekong River and it tributaries in the part of Thailand were carried out between July 2005 – April 2007. Physical, chemical water quality and diatom samples were collected 3 times per year. Fourteen sampling sites along the Mekong River and its tributaries were investigated.

A total 252 species of benthic diatoms were found and representing in 53 genera. The most occuring genera were *Nitzschia*, *Navicula, Gomphonema*, *Eunotia*, *Luticula* and *Pinnularia.* Twenty nine species were common species. The dominant species were *Nitzschia palea*, *Mayamaea atomus*, *Eolimna minima*, *Navicula cryptotenelloides*, *Achnanthidium minutissimum*, *Luticola goeppertiana*, *Navicula symmetrica*, *Gomphonema lagenula*, *Nitzschia inconspicua*, *Nitzschia supralitorea*, *Planothidium frequentissimum*, *Ulnaria ulna, Cymbella sumatrensis* and *Melosira varians*. Czarnecki. Sixty eight species of benthic diatoms were considered to be new records of Thailand.

The seasonal changes in turbidity, conductivity, pH, alkalinity, dissolved oxygen and ammonium nitrogen concentrations were significant ($P<0.05$) at all sampling sites over the last 4 sampling times of the study. The seasonal pattern of some physico-chemical parameters were different in each sampling site and each seasons. Soluble reactive phosphorus concentrations and water temperature were different between sampling site in Northern and North-Eastern, Thailand. Ammonium nitrogen concentrations were different between sampling site in the Mekong River and its tributaries.

Each sampling sites had distinct water chemistry and other physical variables. Cluster analysis identified 11 groups of sampling site at 80% similarity (A-I_2). There were high conductivity in group A ($P<0.05$) and high BOD in group C ($P<0.05$). All sampling sites in group D ($P<0.05$) were high in ammonium nitrogen concentrations. There were high values of alkalinity in group F_1 ($P<0.05$), low pH in group G ($P<0.05$) and high in soluble reactive phosphorus concentrations in group H ($P<0.05$).

The overall water quality of the Mekong River and its tributaries was classified into oligo-mesotrophic to meso-eutrophic status depending on sampling site and seasonal changes. Mesotrophic status was recorded for many sampling sites in each season over the two year periods.

The relationship between diatom community composition and water quality variables was determined using statistical techniques. The indicator species which indicated high conductivity was *Luticula goeppertiana* ($P<0.05$). The species related to high concentration of soluble reactive phosphorus was *Eolimna minima* ($P<0.05$). The species which indicated high BOD were *Mayamaea atomus* and *Ulnria ulna* ($P<0.05$).

Twenty nine species of diatoms were scored and listed in Mekong Diatom Index. Most of had a fourth score that indicated water quality in mesotrophic status excepted *Melosira varians* that had 3 scores that indicated water quality in oligo-mesotrophic status, and *Eolimna subminuscula*, *Fragilaria bidens*, *Mayamaea atomus*, *Navicula symmetrica*, *Nitzschia dissipata*, *Nitzschia palea*, *Nitzschia supralitorea* and *Planothidium frequentissimum* that had fifth score that indicated water quality in meso-eutrophic status. The index was based on nitrate nitrogen, ammonium nitrogen soluble reactive phosphorus and BOD_5. The comparisons between Saprobic Index of Rott (Rott *et al*. 1997) had variation in each sites. On the other hands, Mae Sa Index (Pekthong, 2002) and Ping and Nan Index (Kunpradid, 2005) showed a slight different result.
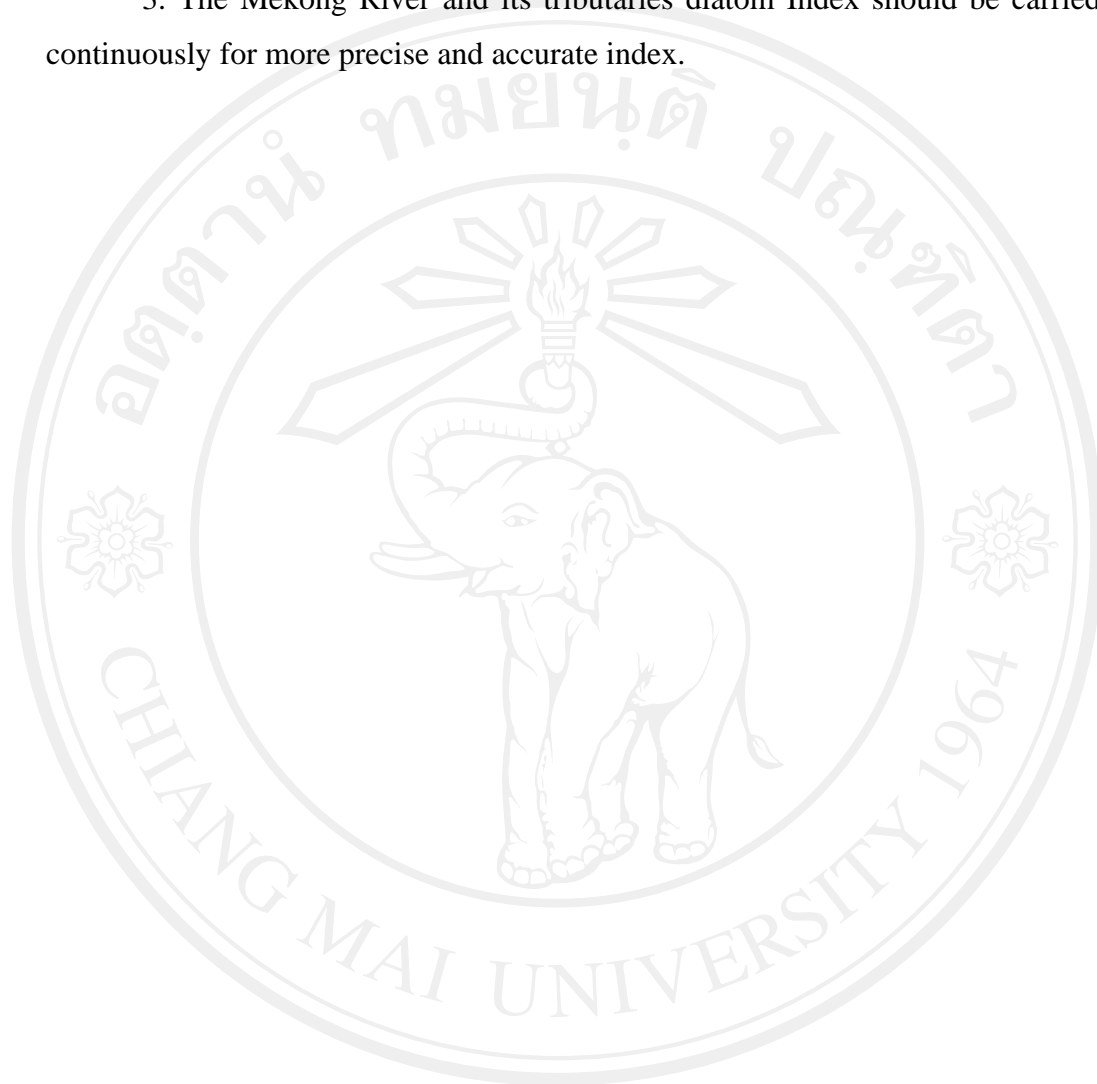
RECOMMENDATIONS

1. The water quality in the Mekong River should be monitored 2-3 times per year, at least twice a year in the rainy seasons and summer because in each season the effects from the environment around this river give different impacts to the water quality. In the case of biomonioting, the diversity and abundance of these organisms in different environments will give more accuracy for water quality monitoring.

2. The use of benthic diatoms in the Mekong River and its tributaries Index did not involved the conductivity. However, this parameters was one of the effective tools to indicate water quality. In the other areas that are not influence by the high

concentration of soluble ionic substrate should include the conductivities for consideration of the establishment of biomonitor index.

3. The Mekong River and its tributaries diatom Index should be carried out continuously for more precise and accurate index.