CHAPTER 4

CONCLUSION

This study was undertaken to characterize ecological risk associated with eutrophication and contamination of lead in Pattani Dam Reservoir. The reservoir ecosystem was studied during May 2000 – May 2001. The measurement of physico-chemical parameters and the observation of macrophyte communities were carried out in ten sampling sites.

The trophic state of Pattani Dam Reservoir was classified by the trophic state index and by the squared Euclidean distance. The trophic state index showed contradictory cases: the reservoir was classified into a eutrophic water body from secchi depth, whereas it is classified into a mesotrophic water body from chlorophyll-a and from total phosphorus concentration. However, the squared Euclidean distance clearly indicated that the reservoir water was mesotrophic.

The cluster analysis indicated seasonal pattern of less to high eutrophic in the wet to the dry season, respectively. The regression analysis revealed that the nitrite-nitrogen is the limiting factor. Seasonal pattern plays a significant role in the physico-chemical state of water. For long term monitoring, nitrogen is recommended as the key-parameter.

Bioindicator using macrophyte composition, extent and cover was performed. Their occurrence and distribution were analyzed statistically. Based on the cluster analysis, the results showed significant different among the sampling sites from poor to rich communities, which is in concurrence with the aerial photo. All sampling sites were classified with the aid of the coincidence analysis into four groups: eastern, western, middle, and shoreline parts of the reservoir. The habitat, both water dept and

water movement, play more important role in macrophyte distribution than the seasonal pattern.

Lead contamination in sediments from Pattani Dam Reservoir evaluated by multiple ecological risk indices indicated that the lead contamination was at a heavily polluted level by sediment quality guidelines and at moderately to very highly contaminated level by contamination factors. The hazard quotients of lead for most sites in the reservoir were greater than 6 indicating risk from sediment contaminated by lead considered not negligible. A significant positive correlation ($r=0.748$) exits between lead in sediments and lead in macrophytes suggesting bioavailability of lead.

The shallow depressions of the Pattani Dam Reservoir system already gained excessive organic matter deposits through submersed and floating-leaved macrophytes indicated fundamental to the terminal stages of the biotic transformation from lake-like condition to a landscape with the rapid rate of transformation.

On the basis of results mentioned above, following recommendation are proposed. The Pattani Dam Reservoir has to be carefully studied further, in order to characterize the self purification processes of the reservoir system, and to suggest procedures for the improvement of the cleaning processes in order to restore the reservoir water and sediment quality, as well as its ecosystem functioning. Moreover, the government should constantly monitor the water and sediments of the reservoir to determine the concentration of lead and other toxic metals, as well as carry out a campaign to warn the people of the area against the danger of consuming fish and bivalve captured from this reservoir. Finally, a more realistic determination of the ecological risk is required; therefore, additional tiers of evaluation should be performed. For example, a second level risk assessment may incorporate additional variables such as drainage basin size, surface area, nutrients in reservoir sediments, lead species in sediments, plants, fish, benthic invertebrate, and in human blood samples of different population groups of the area.