Thesis Title   The Development of a Mathematical Model for Predicting
                      Water Quality and Ecological Parameters in Small Reservoirs

Thesis Credits   12

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Abstract

A one-dimensional multi-layer model was developed to predict the vertical distribution of eight important water quality and ecological parameters considered appropriate for water quality management in small-scale reservoirs. The model was written in Microsoft Visual Basic 5.0 and was based upon the continuity equation and the mass-balance equation appropriate to each of the water quality and ecological parameters considered, namely: D.O., BOD, phytoplankton (as Chlorophyll a), fish biomass, organic N, ammonia N, Nitrate N, and total P.

The model was calibrated and verified against the actual data collected during 12 months period (during years 1989 – 1990) in the Nong Sano Reservoir in Mahasarakam Province. The model was found to give satisfactory predictions of almost all the parameters considered except phosphorus, in which the predicted P concentration was found to be consistently higher than the measured values. This discrepancy was believed to be caused either by making wrong comparison between total P concentration (predicted) against unspecified measured P concentration (which could be dissolved P), or by the use of inappropriate phosphorus model in this study. Further improvement and extension of the capability of the existing model was suggested.

Keyword : Mathematical Models / Small Reservoir / Water Quality / Ecology / Water Quality
          Management.