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A comparison of various fitting techniques for predicting yield for the Ubolratana reservoir (Thailand) from a time series data on catch and hydrological features

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Actual catch (commercial catch and local consumption) have been made available by the Royal Thai Department of Fisheries for the Ubolratana reservoir, North East Thailand, since the impoundment of the lake in 1965. The data have been used to assess the possible relationship between the actual catch and morphometric parameters of the lake (maximum area, depth, shore line, difference between maximum and minimum area) and actual catch the year before. A comparison of the predictive power is carried out between multiple linear regression analysis, a generalised additive model, a regression tree analysis, an autoregression analysis and an artificial neural network. Results show the poorly predictive power in linear system (around 40% of explained variances), compared to the non-parametric and non-linear systems, essentially the artificial neural network (more than 85% of explained variances). The morphometric parameters which displays the maximum contribution are the difference between the maximum and minimum area the year before for both pelagic Clupeid catches and littoral catch targeting other species. In addition, the catch during the previous year and the maximum area also influence the clupeid catch and the littoral catch respectively. The ecological significance of these results in terms of spatial distribution of fish populations and fisheries management is discussed.