

An approach to classify seasonal reservoirs of Sri Lanka using Carlson's Trophic State Index

U. A. D. Jayasinghe¹, U. S. Amarasinghe¹ and S. S. De Silva²

1 Department of Zoology, University of Kelaniya, Kelaniya 11600

*2 School of Ecology and Environment, Deakin University, P.O. Box 423,
Warrambool, Victoria, Australia 3280.*

Seasonal reservoirs of Sri Lanka are small, shallow, man-made impoundments, commonly referred to as village tanks. These are almost always rainfed and generally retain water for 6 to 9 months in the year. About 12,000 village reservoirs are operational and irrigate some 269,000 ha of agricultural lands mainly in the dry zone and to a lesser extent, in the intermediate zone. These reservoirs are productive biological resources and have the potential for the development of culture-based fisheries. However, due to the absence of an objective method to classify these reservoirs based on trophic status, development of management strategies for culture-based fisheries is difficult. In the present study, an attempt is made to classify the seasonal reservoirs using Carlson's Trophic State Indices (TSI). Thirty eight seasonal reservoirs were selected randomly from five administrative districts in the dry and intermediate zones. Several limnological parameters including Secchi disk visibility, chlorophyll-a content and total phosphorus content were determined in individual reservoirs using standard analytical methods. Results demonstrate that TSI values based on Secchi disk depths (TSI_{SD}) and total phosphorus concentrations (TSI_{TP}) were of similar magnitudes and were significantly higher than that based on chlorophyll-a content (TSI_{CHL}). When $TSI_{TP} = TSI_{SD} > TSI_{CHL}$, the non-algal turbidity, which has little relationship to reservoir productivity, is known to dominate light attenuation in reservoirs. On the other hand, scores of principal component analysis of limnological characteristics of seasonal reservoirs are linearly related to TSI_{CHL} . As such, TSI_{CHL} is an appropriate means to classify seasonal reservoirs of Sri Lanka for the development of culture-based fisheries.