

Temporal and Spatial Patterns of Oxygen Depletion in Reservoirs

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The production and consumption of dissolved oxygen results in concentration fluctuations at both temporal and spatial scales. Temporal and spatial development of density gradients, due primarily to changes in vertical temperatures in the water column, results in vertical and longitudinal zonation in aquatic systems. Extinction of light with depth results in the establishment of two primary vertical zones. In the upper, photic zone net oxygen production typically exceeds consumption. In a lower zone where photosynthesis is limited and oxygen production is exceeded. This results in net consumption of dissolved oxygen often followed by the establishment of hypoxic or anoxic conditions. The extent and the rate of oxygen depletion can be used to evaluate the "health" of the aquatic system and provide information critical for design guidance for remediation. Factors contributing to the establishment of these zones will be presented for selected reservoirs, assessment methods will be described, and implications for in-lake management techniques will be discussed.