

# TEMPORAL PATTERNS AND VARIABILITY OF TROPHIC STATE PARAMETERS IN MISSOURI RESERVOIRS

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## Abstract

Eutrophic reservoirs in Missouri, as a group, do not display the bimodal spring and fall pattern of peak algal biomass that is accepted phenology in eutrophic temperate lakes. Instead, Missouri's eutrophic reservoirs display a range of temporal patterns, influenced by both nutrient and non-volatile suspended solid concentrations. Oligo- and mesotrophic reservoirs mimicked the pattern of algal biomass identified in a previous study of temperate oligotrophic lakes, with a single algal peak during spring. Seasonal trends in the water quality parameters influenced trophic state assessments, with sampling during spring resulting in an over-estimation of trophic state. Seasonal patterns in algal abundance and variability also influenced the number of samples needed to estimate mean trophic conditions. Four samples collected throughout summer would lead to a coefficient of variation of ~25% for algal chlorophyll. Seven samples would be required to achieve the same level of precision in chlorophyll estimation if the sampling period were expanded to spring-fall. Nitrogen and phosphorus display lower temporal variability than chlorophyll, so greater precision in estimating mean conditions is achieved with a given sampling effort. Nutrient stimulation experiments indicate that the nutrient limiting algal growth in Missouri reservoirs does not remain constant temporally, and that limitation of algal growth by a single nutrient is generally not acute.