PALEOLIMNOLOGICAL ASSESSMENT OF HARMFUL ALGAL BLOOM TRENDS IN TEXAS RESERVOIRS

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Harmful Algal Blooms (HABs) caused by cyanobacteria and *Prymnesium parvum* are responsible for economic losses in tourism and fishing industries. The environmental factors that drive bloom formation and toxin production are not well understood. By identifying the environmental stressors that prompt HABs, lake management strategies can be improved to reduce HABs and unhealthy lake occurrences. This project investigates the dynamics of HABs in Texas reservoirs over the past ~100 years in order to identify potential trends of increasing bloom events like those occurring in northern lakes, correlating those trends with potentially important environmental stressors. Diatom subfossils were collected from sediment cores collected from three Texas reservoirs, and their relative species abundance was used to infer environmental conditions over the last 60-80 years. Sedimentary DNA from those cores indicated the occurrence of bloom events, and further HPLC analysis determined if blooms were toxin producing. The occurrence of events such as floods and drought were detected using X-ray diffraction, which assessed mineral composition and grain size. Additionally, as a supporting proxy for nutrient loading and salinity, the relative abundance of elements 1-92 was assessed using X-ray fluorescence. The cores will be dated using Cs-137, charcoal deposits, and sedimentation rate data maintained for the reservoirs. Additionally, we used sedimentary genetic markers to determine if *P. parvum* is a native or invasive organism in North America, the earliest reported presence of which occurred in 1980. This project serves to develop the potential to apply paleolimnological techniques to reservoirs, which are largely understudied due to their short lifespan and challenges associated with their hydrology and deposition. Nonetheless, reservoirs are commonly used sources of freshwater and often the only source of paleolimnological records in arid regions, and so contain a wealth of untapped data.