



Urban Closed Lakes: Sources of Pollution, Pollution Capacities and Pollutant Reductions for Different Precipitation Frequencies

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With urbanization, many natural and man-made urban lakes have formed. Many of these unique lakes are hydrologically closed, and they are defined as urban closed lakes (UCLs) in this paper. UCLs often experience unexpected eutrophication and other environmental issues related to climate change and human activities. In this study, we investigated the main sources of pollution for three UCLs based on site investigations. Based on Carlson's Trophic State Index (TSI), the three UCLs are typically eutrophic during the summer. The pollutant sources mainly include atmospheric deposition, rainwater transport and sediment release. The highest contributions of TN and TP were from surface runoff in the UCL basin. At a precipitation frequency of 25%, the TN and TP capacities were much higher than those at a frequency of 50%, and the lowest capacity was observed for a frequency of 75%. Additionally, the TN capacity was highest in dry years, and the TP capacity was highest in wet years. Finally, the effects of wind, temperature, and rainfall on the cyanobacteria bloom on 29 May 2015 in LJL were discussed. The results provide support for the government management of UCLs.