Increasing Productivity Amid Stable Nutrient Regimes in Rhode Island Lakes and Reservoirs

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Managing anthropogenic impacts on aquatic ecosystems has been the focus of lake management efforts for several decades. Research that supports management suggests that controlling phosphorus and nitrogen can mitigate the impacts of eutrophication but require long-term datasets to determine their effectiveness. The “LAke multi-scaled GeOSpatial and temporal database”, or LAGOSNE, is one such dataset. Studies using LAGOSNE found stable water quality at regional spatial scales, however, these studies may mask trends at smaller scales. To address this, we analysed the University of Rhode Island’s Watershed Watch Volunteer Monitoring Program (URIWW) dataset. These data are included in LAGOSNE allowing us to compare long-term water quality trends at regional and state spatial extents. To assess the data for trends, we calculated z-scores (i.e. scaled anomalies) on a per-station basis and averaged them for each year. URIWW data show increasing temperature and chlorophyll *a*. Total nitrogen showed a weak increasing trend. Total phosphorus and the nitrogen:phosphorus ratio (N:P) were stable. Applying the site-specific z-score approach to LAGOSNE found similar trends to prior studies with chlorophyll *a*, total nitrogen, total phosphorus, and N:P all stable over time. In short, productivity in Rhode Island lakes and reservoirs is increasing, in spite of stable nutrient regimes. Although this analysis cannot discern causation, it suggests an association between lake temperature and productivity. This analysis also demonstrates 1) the value of long-term monitoring programs, like URIWW, for identifying trends in environmental condition, and 2) the utility of site-specific z-scores for analysing for long-term trends.