

A PALEOLIMNOLOGICAL PERSPECTIVE ON LAKE RECOVERY: FORTY YEARS AND COUNTING

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Waters in the United States that are deemed impaired require plans for remediation; however, bringing lakes back from impairment is rarely straightforward. We used multiproxy paleolimnological analysis (dating, geochemistry, diatoms, fossil pigments) of sediment cores recovered from Bartlett Lake in northern Minnesota to determine the lake's environmental history of degradation and recovery. Bartlett Lake has a long history of degradation—logging, shoreline sawmills, and discharges directly to the lake by a creamer, primary treated sewage, and storm sewers—whose impacts caused Bartlett Lake to become hypereutrophic by the 1970s. In the late 1970s, most of the point source loadings were curtailed and the lake began the slow process of recovery. Our multiproxy analysis showed the lake underwent 70 years of degradation following Euroamerican settlement with dramatic restructuring of its diatom and cyanobacterial community, has continued to suffer from internal loading of legacy phosphorus (P), but that burial of P is slowly removing the legacy P in a process that has led to over 40 years of incremental lake recovery. Our estimates suggest that the lake will require between 10 and 20 more years to fully recover enough to meet current lake standards. Equally important in this study has been our efforts to communicate our findings to agency and local groups most affected and concerned by the lake's health and allowing them use fact-based results to weigh their options for remediating Bartlett Lake.