Preserving Minnesota's Legacy: Effectively Managing Eutrophied Lakes

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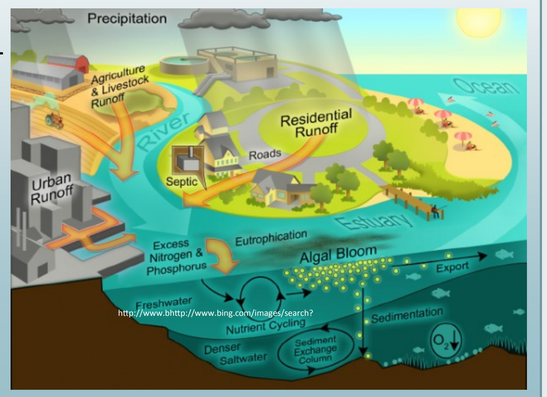
Abstract

In recent years, many of Minnesota's lakes have experienced steep nutrient increases due to increased shoreline development, runoff carrying fertilizers and livestock excrement, and internal nutrient loading. These larger nutrient abundances have lead to a water quality condition referred to as eutrophication. Despite efforts to improve the water quality of lakes, particularly within 50 miles of Minneapolis and St. Paul, historically only three lakes have been de-listed from the Minnesota Pollution Control Agency's List of Impaired Waters. Although mitigation strategies have been put in place, there are several points of improvement which can result in more effective lake management.

Source: http://www.lakescientist.com/wp-content/uploads/2010/04/clip_image001.jpg

What is Eutrophication?

Eutrophication is defined as "The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates," and results in expansive algal blooms, reductions in available oxygen, loss of recreational activities and aesthetic value, and overall water quality degradation. Eutrophication is caused by anthropogenic nutrient inputs from fertilizers, livestock manure, and other pollutants.



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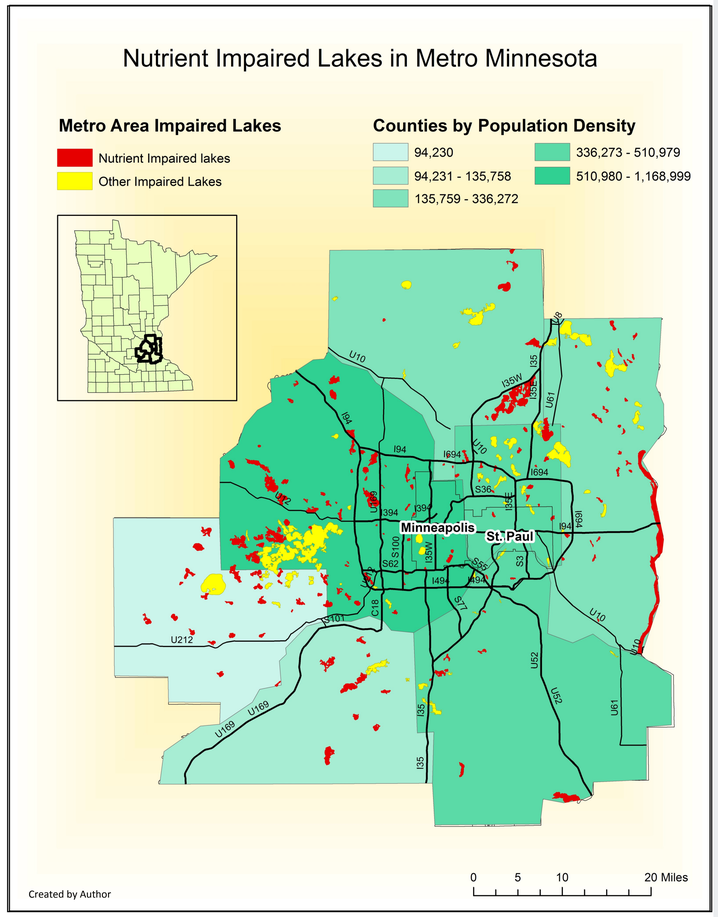

Methods

For this study, I conducted a review of the current Management techniques used to fight eutrophication. To determine areas of failure and possible improvement I used four case study lakes. For each lake I determined the major nutrient inputs, the tools implemented to reduce the nutrient load, and the effectiveness of these strategies. By comparing successful and unsuccessful management plans, I was able to determine general areas of improvement for the effective management of eutrophied lakes.

Conclusion

The case studies indicate multiple points of possible improvement. Lack of enforcement in both urban and rural areas was the driving force for limited success.

Creating policies which enforce agricultural Best Management Practices, improving community involvement and compliance, combating internal loading, and increasing water retention in areas with high impervious surface area will foster the improvement of water quality.

For this to be successful it will take a dedicated team of professionals, committees, and interested groups to significantly improve eutrophied lakes. Alliances between local, state, and federal stakeholders must work more closely to focus their efforts on the implementation of effective strategies to protect our water resources

Problems	Improvement Strategies
Lack of Farmer Receptivity to Installation of Agricultural Best Management Practices	Municipalities within lake watersheds can create a polluter permitting system. Farmers must then comply to stipulations agreements regarding nutrient inputs and Best Management Practices.
Lack of Community Involvement and compliance	Form alliances between local and state stakeholders and community members. Increase public education and outreach. More stringent enforcement of shoreline policies.
Lack of Consistent Internal Loading Reductions	Combat internal loading with consistent Alum treatments.
Soil Compactions and Impervious Surface area	New turf lawn and developments would be required to use turf and soil that is 9 or more inches in total depth to foster water percolation and retention.