

Introduction:

Pearl lake is a relatively small water body on the western edge of the Pelican River Watershed District. It is 244 acres with a maximum depth of 54 feet. Although essentially rural in character, this portion, of the Watershed District has seen rapid growth in recent years. Similar to other recently and rapidly developing lakes within the District that are off the main Pelican River system, such as Abbey, Meadow, Johnson/Reeves, Loon and Sands, Pearl Lake has a relatively small watershed and minor inlets.

Not much is known about the effects of the surrounding watershed on Pearl Lake. Pearl Lake often exhibits poor water quality and has years of high average TP levels. Residents of Pearl Lake have expressed concerns about the water quality of the lake and have requested that the District look further into the lake's water quality problems.

It is the District's desire to conduct an exhaustive diagnostic study on Pearl Lake and the surrounding watershed area. Additionally, the District's goal is to use this study to develop a protocol for analyzing other rapidly developing small lakes experiencing water quality problems.

Conditions:

The District began to gather data on Pearl Lake in 1998. Existing data primarily consists of in-lake Total Phosphorus and Secchi Disk readings. Very little data has been collected for Chlorophyll-A and there is a complete lack of data on nutrient loading from the surrounding watersheds. Results are somewhat mixed from year to year and appear to be cyclical. Pearl Lakes' yearly average TP values range from 21µg/L to 40µg/L; half of the sampled years being near 40µg/L and the other half being closer to 21µg/L. Data has been collected on shoreline development in the form of shoreline surveys.

Although the District lies primarily within the North Central Hardwood Forests ecoregion the District believes that its lakes should be held to the higher standard due to several of its lakes exhibiting more qualities of the Northern Lakes and Forest ecoregion. Even though Pearl is not listed on the impaired waters list, the District still considers the lake highly "at risk". (PRWD Revised Management Plan, 2005)

Pearl residents have complained of agricultural runoff, and it is apparent that some problems of that sort do exist. On the other hand, it seems likely that shoreline alterations and intensive resident development along the shores of these lakes lead to long-term problems. Over 50% of parcels on Pearl Lake have no shoreline alteration, which is one of the factors that lead us to focus of Pearl as representative of other similar lakes.

Project goals and objectives:

The District's main goal for Pearl is to maintain the current conditions on Pearl. The following are District goals, outlined in the 2005 Revised Management Plan:

- Improve diagnosis of Pearl water quality conditions.
- Investigate agricultural runoff problems, and prescribe BMPs to reduce runoff and runoff impacts.
- Assist residents in becoming informed about lake management issues.
- Encourage citizen involvement, especially through lake associations, and through the CLMP and DNR programs.

Planned investigation and diagnostic activities include, but are not limited to: quantifying water quality conditions by increasing in-lake water chemistry testing, monitoring sub-watershed runoff and loadings, gathering historical data on land use, assessing septic conditions, further assessing shoreline conditions, modeling external and internal nutrient loading, engaging public participation and conducting sediment core analysis of the lake bottom. The Lake Assessment Program developed by the PCA and the Sustainable Lakes Planning Workbook developed by the Minnesota Lakes Association offer framework for the District's efforts.

The desired outcome of this project will be to diagnose Pearl Lake's water quality problems. It is imperative that the District gains an understanding of problem sources in order to attain direction and focus to protect Pearl from further degradation. By conducting this study the District will also meet its goals laid out in the Districts Management Plan of investigation and diagnosis of Pearls conditions and problems. Public education of shoreline practices and preservation is also a desired outcome.

Coordination and cooperation of government agencies:

This project will address Management Plans from several agencies.

Agency	Management Plan	How Addressed?
Becker County	Water Management Plan	Identifying at risk lakes, public education, assist in preparation of lake management plans, septic surveys
Red River Basin Commission	Red River Basin Water Quality Plan 1999	Pearl listed as priority for water quality projects
	Red River Basin Natural Resource Framework Plan	Increase acres of lakes to determine compliance with WQ standards and uses, Promote consistency in programs
Pelican River Watershed District	Revised Management Plan 2005	Investigate and diagnose Pearl Lake water quality conditions

The Natural Resource Conservation Service will give assistance to this project by aiding in gathering land use, soil and other GIS data. They will also give technical assistance to review work performed by the District's GIS staff person. The Minnesota Pollution Control Agency, Detroit Lakes office, will also have staff available to aid in technical assistance and review of monitoring methods and analysis.

Historically the District has worked together with these agencies on a variety of projects. One of the larger District projects was the Detroit-Rice Lake Nutrient Reduction study in which the District received Clean Water Partnership money to conduct and phase one and phase two studies. In addition to the Rice Lake project to enhance Big Detroit's water quality, the District focuses on several target areas as outlined in the District's Management Plan. Similar to other agencies in the area, target items include education of shoreline development and BMPs, shoreline restoration, management plans for rapidly developing lakes, and monitoring.

Other sources of District funding include general levy revenue from the Watershed District, stormwater fees, Survey and Data Acquisition Funds, DNR shoreline restoration funds, and cooperative efforts with the City of Detroit Lakes for stormwater projects. The District has some implementation funds from stormwater utility fees and special project assessments.

Community support:

Pearl Lake residents have requested assistance to investigate water quality problems with the lake. Landowners have requested a meeting with MPCA representatives to review possible sources of nutrient loading including septic systems. Suggestions of monitoring activities were made, but not conducted as of yet. Both the Pearl Lake Association and Citizen Lake Monitoring Program representatives on Pearl Lake have pledged their support and willingness to give volunteer assistance to the District.

One of the watershed's approaches to helping solve this issue is to assist residents in becoming informed about lake management issues as well as encourage their involvement. Public input will be solicited in the form of lake association meetings and other public education tools used.

As one of the regularly monitored lakes within the Watershed District budget, Pearl will continued to be monitored long after this study is complete.

Demonstration Potential:

This project will give the District framework to apply to lakes in the district. There are several other lakes similar to Pearl Lake that would benefit from having a similar study conducted. This project will establish the protocol and determine the equipment necessary to prepare management plans for lakes not on the main Pelican River system that are encountering various stages of shoreline development.

Significance:

The Red River Basin recognizes Pearl Lake as a priority lake according to their Water Quality Plan. The District also emphasizes that this lake is in need of a diagnostic study in order to comply with the District's Management Plan.

Water Quality Protection:

Pearl Lake is also a priority for the District because it is still a developing lake. There is potential to stop further degradation and shoreline development. The District can use the lake as an example of a more sustainable way to develop around the lake while maintaining water quality conditions.