

## WOODS LAKE WATERSHED STUDY AND IMPLEMENTATION PROJECT KALAMAZOO, MI

In March of 1996, the City of Kalamazoo authorized Kieser & Associates, LLC (K&A) to perform a study of Woods Lake with the focus of improving water quality conditions. This water body is unique in that it does not have natural streams flowing into or out of the lake. The lake does, however, have a decades-long history of receiving stormwater runoff from over 200 acres of land surrounding the lake through six different storm drains. This has created numerous water quality problems including nuisance weed growths, diminished water clarity, bacterial contamination, outfall sedimentation and accumulation of pollutants from roadway runoff.

The essential components of this study included:

- An assessment of current conditions
- Pollutant loading and sediment analyses
- Options for restored conditions of the lake

Products of the initial one-year study effort included some of the following:

- Bathymetric map of Woods Lake
- Pollutant loading estimates
- Outfall/lake sediment thickness survey
- Long-term water quality management goals
- Bottom sediment survey
- Identification of baseline water quality
- Updated drainage basin characterization
- Stormwater and road maintenance practices
- Best Management Practices needed
- Engineering analysis of stormwater treatment
- Citizen outreach
- Weed treatment options
- Citizen's educational brochure
- Preliminary dredging feasibility analysis

As a result, a stormwater detention/wetland treatment system was designed by K&A for nearly two-thirds of the lake's drainage area. Constrained by a very limited site area, system design included detailed meteorological and hydraulic analyses to determine optimal sizing of the treatment facility.

Such efforts resulted in a treatment system one-third the size of that prescribed for a 5-year design storm yet capable of still treating nearly 98% of all storms. Treatment specifically focuses on phosphorus and sediment removal from stormwater while maintaining the hydraulic balance to sustain adequate lake levels. Other design elements included outfall sediment dredging, property enhancements into a more usable park with educational features, and boardwalk access for fishing and other recreational activities. This new treatment facility was completed in the Spring of 2003.



Subsequent performance monitoring by K&A in 2007, revealed 81% removal of TP and 81% removal of TSS loads that would otherwise discharge into Woods Lake. Overall, the system's treatment efficiency for phosphorus is above what was originally designed.

### *Contact:*

Mr. Frank Wolf  
Woods Lake Association  
2248 Crest Drive  
Kalamazoo, MI 49008  
(269) 383-4995

*Project Costs:*  
\$362,500 (K&A)

*Project Duration:*  
1997-Water Quality Study;  
Oct. 1999-Design Phase;  
Nov. 2002-Construction  
May 2007-Monitoring