



USDA-CSREES 2006 National Water Quality Conference

[Relationships between total phosphorus and transparency guide a TMDL volunteer monitoring network in southwest Michigan](#)

Detailed water quality data are needed by the Lake Allegan/Kalamazoo River TMDL Implementation Committee to focus phosphorus reduction efforts in a large agricultural watershed. USDA Water Quality project funds are currently generating three years of extensive data on phosphorus fate, transport and behavior. These data are guiding a volunteer monitoring network designed to provide long-term, low cost phosphorus estimates using transparency tubes.

A study to explore relationships between total phosphorus and transparency (using a 120 cm transparency tube) was conducted in the TMDL watershed during summer 2005. Correlations with R^2 between 0.69 and 0.94 were found for nine of the 13 test locations. Four locations, downstream of impoundments, were not well correlated. The strong correlation of non-impounded stream locations suggests that volunteer generated transparency readings could predict total phosphorus for these locations.

Volunteers were trained in the use of transparency tubes using five water samples of known transparency values. The means of duplicate practice readings were tracked by participant number, and standard deviations calculated for the group. After two rounds of practice readings, all participants achieved a range of accuracy within that observed in the correlation study.

To further explore the correlations, volunteers are paired with cooperating municipal waste water laboratories through 2006. Volunteer tube readings and laboratory grab samples are being collected on the same days at assigned locations. The volunteer enters the mean of duplicate tube readings into the project website which calculates an estimate of total phosphorus -- providing information to the TMDL and immediate feedback to the volunteer. Laboratory results are also posted for comparison.

Volunteer monitoring, using transparency tubes to estimate total phosphorus, has the potential to provide reliable, low cost, long-term water quality data for decision-making by the Lake Allegan/Kalamazoo River TMDL Implementation Committee. This methodology may also be applicable in other watersheds.

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