

Rationale:

- Hypoxic areas in Gulf of Mexico and Great Lakes linked to nutrient transport from agricultural drainage
- Lack of current conservation practices and programs to adequately reduce transport
- acceptable quality water supplies for downstream reuse including ecosystem function and sustainability, drinking water supplies, and recreation



Goal:

- Design and test the efficacy of a flow through filter system using an array of natural and synthetic by-product materials to reduce nutrient and pesticide transport from a mixed-used watershed.

Objective: Identify materials having both chemical capacity and hydrologic properties necessary to be used as drainage water filtering media

Approach: Using literature review and investigation of industrial by-products conduct laboratory batch tests and breakthrough curves to identify optimum materials

Findings:

- ✓ Approximately 60 different materials have been screened for their ability to filter nutrients and atrazine
- ✓ Five materials show considerable promise in reducing pollutant concentrations both individually and in tandem



Objective: Assess the ability of some commercially available systems to filter soluble pollutants from drainage waters originating from a managed turf site

Approach: Laboratory testing with flow rates equivalent to those measured in field studies and field testing on drainage pipe outlets from managed turf sites

Findings:

- ✓ Reduction in nitrate nitrogen concentration was 4.7%, dissolved reactive phosphorus, 51.6%, chlorothalonil, 58.2%, and metalaxyl, 28.8%
- ✓ System has been installed on tile drainage outlet at a private golf course in MN



Objective: Design, develop, and field test effectiveness of delivery systems and identified by-product materials

Approach: Field testing at a near 6 square mile mixed use watershed located within UBWC.

Progress:

- ✓ Field site has been instrumented with access pipe and sampling equipment
- ✓ Materials have been identified and an experimental design developed



Cooperators: U.S. Golf Association, Spectrum Research Inc., Northland Country Club, Royal American Golf Links, Kristar Enterprises Inc.