USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: The Use of Subsurface Irrigation to Restore Degraded Groundwater-Fed Wetlands

Focus Categories: Wetlands

Keywords: Wetlands, plant-water relationships, urban hydrology

Duration: August 1, 1998 through July 31, 2001.

Federal funds requested: $34,825

Non-federal funds pledged: $70,790

Principal Investigators: Drs. Kenneth W. Potter and Jean M. Bahr, University of Wisconsin - Madison.

Congressional district: Wisconsin 2nd District

Statement of critical regional or state water problems:

Development can cause significant degradation of aquatic ecosystems, desiccating wetlands and springs by reducing recharge (increased impervious area) and lowering water table levels (groundwater extraction or drainage), or increasing flooding due to urban stormwater. Wetland restoration efforts have been undertaken more frequently in recent years as society in general has recognized the value of wetland functions lost due to human impact. Unfortunately, these projects have often been less than successful in restoring the conditions conducive to the development of natural wetland communities. This is especially true for groundwater-fed wetland systems because of the difficulty in establishing an appropriate hydrologic regime. Because of this difficulty, most groundwater-fed wetlands harmed by the effects of development have either been replaced with systems fed by surface water, which often results in completely different wetland communities, or have not been replaced at all. The net result is that the groundwater-fed wetlands that were major constituents of the pre-settlement lowlands in Wisconsin and much of the rest of the Midwest are steadily declining.

Research into the mitigation of development impacts on groundwater-fed wetlands has applications across most areas of water resources. Resource agencies are charged with permitting and enforcement responsibilities with regard to wetlands impacts and restoration, and perform wetland restorations to enhance natural resources within their jurisdictions. Water utilities aim to meet increased demands for groundwater resources while reducing the environmental degradation caused by water table drawdown. Wastewater and stormwater utilities look to meet their mandated responsibilities while facing greater pressure to reuse their effluents and not shunt flows out of their watersheds. Finally, landowners such as private citizens or park agencies are interested in

controlling the invasive species accompanying wetland desiccation, specifically reed canarygrass (*Phalaris arundinacea*), and restoring natural communities for habitat and aesthetic purposes. By developing a means to restore groundwater-fed wetlands using water sources such as stormwater or wastewater effluent, future wetland degradation may be minimized, historical degradation reversed, and water that would otherwise be quickly flushed out of the watershed would be used to maintain important biological communities.

Statement of results or benefits:

This project should provide information in three areas vital to the field wetland restoration. First, the project should show whether or not subsurface irrigation is a viable means to restore wetlands. An inability to restore groundwater-fed wetlands may have vast implications regarding the effectiveness of efforts to preserve wetland functions (Bedford 1996). Second, the project should provide information relating to the importance of nutrients in wetland restoration. Finally, this type of subsurface flooding could be an effective way of controlling reed canarygrass. The combination of isolation and subsurface flooding has apparently not been attempted to this point and surface flooding without isolation has been only mildly successful at removing the species. Developing a method to control this species would be a significant achievement in and of itself. The laboratory funded under this grant would be a long-term facility to develop more effective ways to restore groundwater-fed wetlands.