WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: OH3821

Title: The interactive effects of hydrology and fertility on synthesized wetland plant communities

Focus Categories: Wetlands, Ecology

Keywords: watershed management, restoration, wetland plants

Start Date: 03/01/2001

End Date: 02/28/2002

Federal Funds: $12,540

Non-Federal Matching Funds: $25,853

Congressional District: summit-14

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Abstract

Approximately 90% of the original wetlands in Ohio have been lost over the last two hundred years, mainly as a direct consequence of human use. There is an urgent need to conserve and restore the remaining wetlands because wetlands serve a very important role in our environment. Wetlands have been described as 'the kidneys of the landscape' and 'biological supermarkets'. They play major roles in the landscape by providing unique habitats for a wide variety of flora and fauna. Acknowledging the importance of wetlands demands conservation and restoration measures.

The objective of this project is to further understand the role of hydrology and nutrients on a wetland ecosystem and an invasive (Phalaris arundinaceae). These two environmental factors, especially hydrology, have been relatively understudied in wetland ecology. Given these two factors, the morphological variables (height, canopy, rooting depth, biomass) and growth rates, can be compared between treatments. These comparisons will result in a better understanding of the individual and combined roles of hydrology and nutrients on a wetland ecosystem. The data and research sites will also provide a substrate for (1) further studies in wetland ecology, (2) educational programs, and (3) comparative analysis with other wetlands.

The main objective is to understand how hydrology and nutrients, individually and combined, contribute to the growth of wetland communities and if those communities respond differently to the introduction of the invasive P. arundinaceae. Measuring the growth rates and morphological variables in both experiments allows for predictive power of the role of hydrology and nutrients on individual wetland plant species and a community of wetland plant species. This data can be applied to a 45-acre site on the BNP that was formerly a wetland but is currently drained with buried tile, and therefore has good wetland restoration potential. Studying the effects of hydrology on the invasive P. arundinaceae individually in experiment 2 and then comparing the results when grown in a community in experiment 1 allows for (1) the isolation of the role of hydrology on the invasive and (2) the effect of an established community on the invasive. These results will provide insight as to why some wetlands are more prone to invasiveness and how to create an invasive resistant wetland community. The BNP is virtually surrounded by development and is prone to a high level of disturbance, a factor that has conclusively been linked with invasive establishment in many different ecosystems. Understanding the roles of hydrology and nutrients will provide valuable information

on how a wetland community responds to invasive introduction and will enable better decisions to be made concerning the restoration of a wetland on the BNP.