



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: OH2922

Title: Hydrological reconnection of a coastal wetland to Lake Erie: potential for outwelling of organic matter?

Focus Categories: Wetlands, Hydrogeochemistry

Keywords: coastal wetland, stable isotope, restoration, Lake Erie, outwelling

Start Date: 06/01/2001

End Date: 05/31/2002

Federal Funds: \$29,224

Non-Federal Matching Funds: \$58,882

Congressional District: 15

Principal Investigator:

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Abstract

Due to natural and human disturbances, an estimated 95 percent of coastal wetlands have been destroyed in the last 200 years in the western basin of Lake Erie. In addition, dikes have been built around most of the few remaining wetlands to create and manage waterfowl habitat. Because diked coastal wetlands are isolated from the lake, their functions of flood control, water quality improvement and habitat for aquatic species have been lost. In addition their potential function of outwelling of organic matter to the lake is certainly limited. In marine coastal systems, considerable research has demonstrated that tidal events export detrital material produced in saltmarsh to marine waters. There is also strong evidence that this "outwelling" of organic matter consequently supports secondary production in coastal waters. Despite the fact that coastal wetlands around Lake Erie are also under the influence of regular water level fluctuations through seiche events, little or no discussion of the outwelling paradigm has occurred. The objective of this proposal is to test the outwelling concept in a coastal wetland (Metzger Marsh) hydrologically connected to Lake Erie by an opening in the dike. After the marsh was destroyed by a severe storm, the site was restored to mimic the protective function of a barrier beach and includes an opening that allows hydrologic connections. Our hypothesis is that seiche events allow detrital material to be quantitatively exported in the water column to the lake. The objective of the proposal will be achieved by a combination of field sampling at the site during seiche events and lab analysis including carbon species (dissolved, coarse and particulate) and stable isotope analysis. Metzger Marsh represents a unique opportunity to test the outwelling concept because of the existence of an outlet where water and carbon budget during seiche events can be quantified. The US Fish and Wildlife Service and the Ohio Department of Natural Resources - who both manage Metzger Marsh - are looking for such data to assist them in the decision they will have to make in 2003 - as an agreement with the Army Corps of Engineers in charge of the restoration project - to decide whether Metzger Marsh should be kept connected or not to Lake Erie. As the restoration at Metzger Marsh is a pilot project, this research - together with those of other scientists involved at the site - will have further consequences on future restoration projects on Lake Erie.