

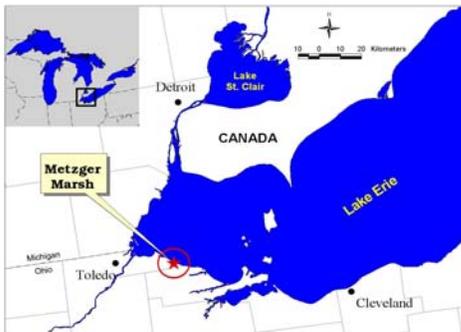


Great Lakes Science Center

Metzger Marsh Restoration Project

Role of USGS:

The USGS Great Lakes Science Center (GLSC) has broad capabilities in the area of wetland research and conducts studies that produce information critical to wetland protection and restoration. Research conducted for the Metzger Marsh restoration project has provided managers with important information regarding project design, implementation, and evaluation. The research is designed to allow the results of the restoration effort to be applied at other diked wetland sites.



Historical Analysis:

Examination of aerial photography and incorporation of a geographic information system (GIS) provided insight into the historical condition of wetland vegetation and its relationship with water levels and status of the protective barrier beach. This information helped project managers design and build a dike to mimic the protective functions of the former barrier beach and include a water-control structure to maintain the natural hydrologic connection between the marsh and Lake Erie.



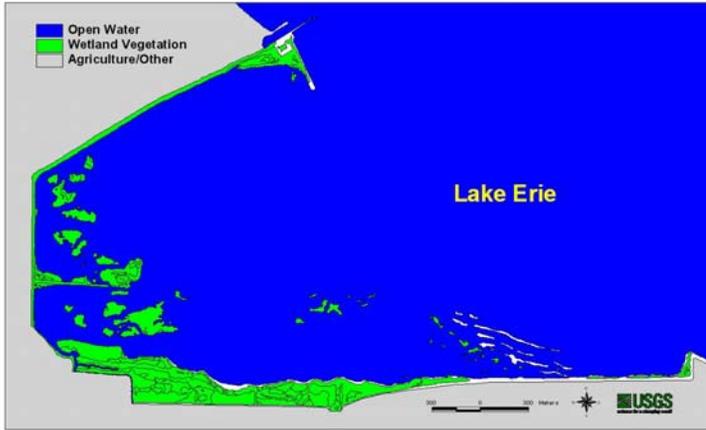
Plant Communities:

The wetland vegetation types identified from aerial photography were quantitatively sampled before and during restoration to characterize the diversity and abundance of component species. The sampling will continue to document how the marsh vegetation responds to the new management actions and lake-level changes. These data provide managers with unbiased information on which they can base management decisions.



GIS Applications:

A geographic information system (GIS) was created to analyze spatial and ecological data on pre- and post-restoration wetland plant communities. Vegetation maps, based on aerial photography dating back to 1940, were created to study vegetation types and to provide insight into historical conditions of the wetland. The GIS is an evolving product of the research conducted by USGS and will be useful to state and federal agencies as they plan management actions.



GIS map of 1994 wetland vegetation.

Native Clam Populations:

Twenty-two species of native clams were discovered and relocated by USGS researchers during the 1996 water-level drawdown in Metzger Marsh. Native clams survived at this site, in spite of the presence of zebra mussels, because warm water temperatures



prompted burrowing into the soft wetland sediments where oxygen levels were too low for zebra mussels to survive. Managers can now attempt to maintain Metzger Marsh and other wetlands as refuges for native clam populations.

Fish Communities:

The USGS Great Lakes Science Center funded a study of the fish community in Metzger Marsh prior to restoration and is now funding follow-up studies after restoration and hydrologic reconnection with the lake. The water-control structure in the Metzger dike maintains the hydrologic connection between the marsh and the lake that is critical to allow fish to use the wetland as a spawning and nursery area.



The structure also contains a series of grates that will be used to monitor fish passage and use of the marsh. Scientists at the USGS used laboratory studies to determine the optimal grate size to allow the passage of desirable fish species while excluding large destructive carp. Managers and USGS researchers can now modify the size, design, and placement of the grates to study and promote fish community use of the wetland.

Investigators:

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