

Building a Great Lakes Lake Level policy for agency-owned and managed lands in northwestern Lower Michigan

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Water level fluctuations of up to five feet characterize Lakes Michigan and Huron, creating a biologically diverse zone along the shoreline, but at the same time, creating complex conditions for management by shoreline owners, managers, and governing agencies. Emmet County, located at the northwestern tip of Michigan's Lower Peninsula, contains several communities, including Petoskey, Harbor Springs, and Mackinaw City, as well as popular state parks, county, and private recreation facilities. The area is not only important for human settlement and recreation, but also is recognized as important for wildlife habitat, including many rare coastal species. Water level fluctuations impact both human communities and habitat, and because this juxtaposition results in conflicting coastal land uses, we are proposing Emmet County as the site for this planning grant.

The county has a long history of human settlement, which is similar to that of many coastal communities along northern Lakes Michigan and Huron, making it a good area for exploring the development of land use regulations and other mechanisms for addressing water level fluctuation. The county's history includes fishing, farming, timber harvest, and recreation.

There are numerous stakeholders in Emmet County currently involved in management and regulation of the GL coastal environment, at the local, state, and federal levels, including the Little Traverse Bay Band of Odawa Indians, three state parks, and coastal state forests. The county manages lands for recreation and conservation along the Lake Michigan shoreline, and has local zoning responsibility. The Little Traverse Conservancy manages several preserves for biological diversity and passive recreation on the Lake Michigan Shoreline. The Tip of the Mitt Watershed Council is involved in educational and policy issues related to GL coastal habitats, and monitors water quality, develops and implements watershed management plans, and conducts invasive plant surveys of the entire county shoreline. Another important partner in the project is the University of Michigan Biological Station, whose students regularly conduct environmental studies along the shoreline in Emmet County during its summer sessions in nearby Pellston. It maintains a spatial database that includes the Lake Michigan shoreline of the county, as well as hundreds of biological studies of these shores.

There are numerous water level fluctuation issues for public land managers in the county, including invasive plant expansion during recent extended low water conditions, reduced water access, increased ORV damage to wetlands, and increases in algal blooms and outbreaks of avian botulism. High water brings other problems, such as storm and ice damage, flooded docks, coastal erosion of dunes and roads, flooded septic systems, and increased conflicts between recreational users and endangered species habitat.

Several agencies have data and permitting records that can allow quickly identification of major regional planning issues. Local agencies and planners, as well as UMBS, have spatial data that can be efficiently joined to create a plan to address Great Lakes water issues. A GIS-based model will identify agency managed parcels vulnerable to Great Lakes lake level extremes, and will allow monitoring of lake-level caused damage and development of management protocols to reduce damage in future extreme lakelevel events.

The results of a study in Emmet County will be readily transferable to other nearby communities. The ecological conditions and physical features along the Emmet County shoreline are shared by counties and shoreline communities throughout the northern portions of Lakes Michigan and Huron.