

An Integrated Assessment on Water Level Variability and Coastal Bluff Erosion in Northern Milwaukee County and Southern Ozaukee County, Wisconsin

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The Graham Sustainability Institute at the University of Michigan is leading an integrated assessment (IA) on Great Lakes Water Levels (<http://graham.umich.edu/knowledge/ia/water-levels>). The central charge is “to identify and assess environmentally, socially, politically, and economically feasible policy options and management actions that people, businesses, and governments can implement in order to adapt to current and future variability in Great Lakes water levels.” A total of seven research teams received planning grants of \$10,000 to scope local problems that arise from dynamic water levels. This proposal responds to a competition for a subset of the research teams to receive \$50,000 to collaborate in a full IA lasting 18 months and building on the findings of the planning grants.

The Lake Michigan coast from Shorewood to Port Washington in southeastern Wisconsin is characterized by coastal bluffs ranging from 70 to 140 feet in height. Lake Michigan water levels were below the long-term average from 1999 to 2013, but began to rise in March 2014. It is anticipated that the current higher water levels above long-term averages in Lake Michigan coming after the extended period of low levels could have a significant impact on the stability of coastal bluffs. Parallel with the change in Lake Michigan shore caused by rising water levels, the enabling legislation for shoreland zoning in Wisconsin was significantly changed in July 2015. Shoreland zoning, enabled by state law and implemented by local governments, is a primary management tool for addressing development along both inland and Great Lakes waters in Wisconsin. The combination of these two events has precipitated a need to synthesize existing bluff erosion research and engage local stakeholders and broader partners to explore policy options and decision tools for increasing resilience to coastal bluff erosion in the face of possible increases in the variability of water levels.

A team of investigators representing disciplines including coastal engineering, geology, urban and regional planning, law, policy studies, ecology, landscape architecture, and social science led by the University of Wisconsin Sea Grant Institute received a planning grant from the University of Michigan to explore the impact of changing water levels on coastal bluffs in northern Milwaukee County and southern Ozaukee County. The key activities associated with the planning grant included information gathered from interviews with 19 stakeholders, partners and investigators on their perceptions of the issues, solutions, barriers, and information needs related to changing Lake Michigan water levels and coastal bluff erosion and a workshop held in late July to connect stakeholders, partners and investigators. A discussion and vote during the last hour of the July workshop indicated there was support for continued participation in the Great Lakes Water Levels Integrated Assessment.

The full IA consists of three phases: synthesis of existing data and information, identification and assessment of a range of policy alternatives and adaptive actions, and integration of local findings into a regional report. The first phase includes two day-long synthesis workshops in Milwaukee and Madison. The workshops leverage a new online bibliography of 89 studies relevant to coastal hazards in the study area. Phase 1 also includes facilitated community meetings to engage stakeholders in the seven municipalities in the study area to bridge synthesis and initial identification of policy alternatives and adaptive actions. The second phase of the IA analyzes policies and adaptive actions to determine those that best meet local objectives. It includes collaboration with the National Sea Grant Law Center to identify and evaluate innovative coastal bluff erosion policies, regulations and actions. The final phase covers developing a final report to serve as a vehicle to integrate Wisconsin findings with those of other project teams. The desired outcome of the IA would be adoption of a select set of policy alternatives by local governments and adaptive actions by coastal property owners leading to a measurable increase in the resilience of bluffs in the study area to coastal erosion.