

Case Studies of Mitigation Methods against the Impacts of High Water Levels in the Great Lakes

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Abstract : Record high lake levels in 2017 and 2019 (2017 max lake level = 75.81 m; 2018 max lake level = 75.26 m; 2019 max lake level = 75.92 m) combined with a number of severe storms in the Great Lakes region, have resulted in significant wave generation across Lake Ontario. The resulting large wave heights have led to erosion of the natural shoreline, overtopping of existing revetments, backshore erosion, and partial and complete failure of several coastal structures, which in turn have led to further erosion of the shoreline and damaged existing infrastructure. Such impacts can be seen all along the coast of Lake Ontario. Three specific locations have been chosen as case studies for this paper, each addressing erosion and/or flood mitigation methods, such as revetments and sheet piling with increased land levels. Varying site conditions and the resulting shoreline damage are compared herein. The results are reflected in the case-specific design components of the mitigation and adaptation methods and are presented in this paper.

Keywords : erosion mitigation, flood mitigation, great lakes, high water levels

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