

ASSESSING COASTAL EROSION AND ACCRETION ALONG THE ILLINOIS LAKE MICHIGAN SHORE USING WATERBORNE GEOPHYSICS

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The Illinois Lake Michigan coast is a dynamic system undergoing constant changes due to increased human activities and complex natural processes. These processes significantly affect sand distribution along the shoreline. Beach sand is a critical coastal resource because it helps alleviate shoreline erosion when it is present. Despite decades of research along the Illinois coast sand management issues remain unresolved.

To address these issues and inform a regional sand management strategy, helicopter transient electromagnetic (HTEM) data were collected along the entire shoreline and coincident waterborne and ground based electrical resistivity (ERT) data were acquired in areas not accessible to HTEM method. The waterborne ERT imaging along the shore proved very efficient in characterizing the distribution and thickness of sand beneath the water column. The shore parallel results show thicker sand layers on the south side of the waterborne study area, characteristic of north-south trending lake currents. A decrease in sand thickness is observed lakeward, suggesting lakebed down-cutting in sand-starved areas. These results are consistent with HTEM results, increasing confidence in our interpretation.