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Identifying Beach and Nearshore States at "Hot Spot" Drowning Locations in the Great Lakes

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Identifying Beach and Nearshore States at “Hot Spot” Drowning Locations in the Great Lakes

Rip currents are a natural hazard on coastlines worldwide, including the Great Lakes. Rips are narrow, localized currents that flow seaward at high velocities, resulting from alongshore variation in wave breaking. Conditions that can contribute to their formation including variable bathymetry, edge waves, geological features, or hard engineering structures. Rips pose a significant danger to beachgoers because they vary in space and time and are difficult to avoid without proper warning or education. This study will focus on identifying the “hot spot” drowning locations in the Great Lakes to determine relationship between morphological states and drownings. Beach and nearshore states will be assessed using subset of hydrographic and bathymetric variables collected from the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Army Corps of Engineers, while drownings will be derived from the Great Lakes Surf Research Project (GLSRP) and the Great Lakes Current Incident Database. Indices supported by satellite images from 1983, 1997, 2005, 2010, and 2015 will be developed to qualitatively and quantitatively compare each location. Based on criteria, 3 or more drownings within 0.5 km that resulted in death, 20 locations have been selected for analysis: 11 on Lake Michigan, 1 on Lake Erie, 5 on Lake Huron, 1 on Lake Superior, and 2 on Lake Ontario. Results allow the determination of typical beach states, temporal and spatial distribution of beaches, probability of rip states, and likelihood of rips as cause of drownings. This will contribute to the growing body of research on rip current conditions and relationship between physical and social variables of drownings in lake environments.

Key Words: Beach, Drowning, Great Lakes, Hot Spot, Nearshore, Rip Current, Rips