Evolution of the Oxford sinkhole, Cumberland County, Nova Scotia, Canada

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A small, 30 cm-wide opening in the ground was first observed by groundskeeping staff at the Lion's Parkland in Oxford, Nova Scotia, on July 28, 2018. Over the following weeks the sinkhole slowly grew in both depth and diameter until a sudden collapse on August 20 gave rise to a period of rapid development in which the sinkhole grew from a few metres in size to upwards of 40 metres in diameter and an unknown depth. Observations and measurements of propagation cracks encompassing the sinkhole demonstrate a progression to the northeast toward playground infrastructure and surrounding Salt Lake. Aerial surveillance of surrounding lakes and watercourses during the most active period of sinkhole development showed no unexpected turbidity, indicating a lack of mixing of sinkhole water with that in surrounding waterbodies. LiDAR imagery of the area shows numerous dry and ponded sinkhole activity in the vicinity of Salt Lake and area to the southwest. The underground extent of the collapsed cavern is presently unknown; however, the region is underlain by the Windsor Group, consisting of interstratified red beds, evaporites, and carbonate rocks that are prone to development of sinkholes. Gypsum and salt have been documented in the area, but no bedrock is visible at the sinkhole due to a thick deposit of sand. The sinkhole continues to slowly erode along its margins, although the rate of growth has significantly slowed. Ongoing monitoring and geophysical programs are planned to further investigate the sinkhole.

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