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Sinkhole mapping in urbanized Pinellas County, Florida, USA.

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Mapping sinkholes in highly urbanized regions of the United States is challenging. Landscapes are typically altered such that natural sinkholes are filled and new depressions are created. Pinellas County, Florida, in the USA, is the most densely populated county in the Florida karst plain and regularly experiences subsidence related phenomena, including dramatic sinkhole collapses. However, little is known about the location of paleosinks, which are important sources of groundwater flow and pollution, and which can reactivate to cause damage to structures. In order to map the sinkholes present prior to urbanization, we analyzed air photos from 1926. Though of low quality, these images provided a good base from which to delineate depressions within a GIS system. In this process, hundreds of sinkholes and probable sinkholes were identified that are no longer present on the landscape. These results suggest that sinkholes were once much more densely distributed than thought. In addition, we analyzed airborne laser swath mapping (ALSM) data to assess the presence of sinkholes in areas where sinkholes are not discernable on standard U.S. Geological Survey contour maps. While the technique was not particularly useful in highly urbanized areas of Pinellas County, ALSM did identify numerous previously unknown depressions in more undeveloped areas.