

Evaluation of High-Resolution Digital Elevation Models for Creating Inundation Maps

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The Village of Pemberville, Ohio experiences frequent flooding. Accurate flood maps are needed to reduce damage caused by these floods. Photogrammetry software was used to create a high-resolution DEM using two overlapping USGS NAPP aerial photographs each with resolutions of 1:40,000 and scanned at 1800 DPI. The resulting DEM had a resolution of 0.57 m (1.87 ft) and a minimum detectable elevation of 0.95 m (3.1 ft). HEC-GeoRAS was used to produce cross-sections of the North Branch of the Portage River and an inundation map of a 100-year flood from the high-resolution DEM. The inundation map was compared to a 100-year flood inundation map produced with ground surveyed cross-sections provided by TMACOG and the FIRM for Pemberville. The datasets produced flood profile elevations of 196 m (643 ft) along the North Branch of the Portage River in the Village of Pemberville, which is the same as on the FIRM. When compared areally, the high-resolution DEM data produced larger flood extents than both the surveyed data and the FIRM of the village due to the length and distance of the cross-sections. Different lengths and large distances between cross-sections can cause large changes in the width of the bounding polygon, not accurately representing the floodplain, and limiting the extent of the estimated inundation.