

INTEGRATED LiDAR AND HISTORICAL MAPPING TO LOCATE CIVIL WAR ERA SALT PITS AT AVERY ISLAND, LOUISIANA

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Abstract

Avery Island, Louisiana, is the site of the first mining of underground salt deposits in the USA. The seminal discovery of shallow subsurface rock salt deposits at Avery Island occurred on May 4, 1862, while the American Civil War was in its second year. The Confederate government, individual southern states and municipalities, and private individuals combined to operate ten surface salt pits at Avery Island between May 1862 and April 1863. Approximately 11,000 tons of salt were mined and distributed during this time, but the precise locations of the ten salt pits had been lost to time.

Avery Island is situated in southern Louisiana. The general vicinity of the historical salt-pit operations is heavily vegetated, and surficial geologic processes on the Avery Island salt dome are quite dynamic. Fluvial erosion, redeposition of surficial sediments, and natural and mining-related surface subsidence are ongoing processes. Field reconnaissance was conducted in March 2016 to search for surface evidence of the salt pits and yielded only one possible salt pit.

Consequently, light detection and ranging (LiDAR) was considered to be a possible means to better map the locations of the Civil War salt pits. Cargill Deicing Technology (CDT), who currently operates a deep subsurface mine at Avery Island, collects LiDAR data annually to assist with monitoring the surface subsidence trends on the island. These data have been processed to produce a bare earth image that, when integrated with recently discovered, historical mapping by the American Bureau of Mines (ABM), permits high confidence in identifying the Civil War era, salt-pit locations, even when additional geophysical surveys or confirmatory penetrative investigations are required. This paper presents the bare earth imagery and documents the benefits of integrating LiDAR imagery and historical mapping to locate historical mine-related features in a dynamic, humid, heavily vegetated environment.