MORPHOLOGY AND TIDAL EFFECTS ON SALINITY PROFILES IN THE SAVANNAH RIVER: PORT WENTWORTH TO I-95

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The Savannah Estuary is a unique system which sits at the termination point of the Savannah River and flows into the mouth of the Atlantic Ocean. The estuary is subject to semi-diurnal tides and has been classified as a well-mixed estuary. Additionally, the estuary is subject to low freshwater flow from the upper river basin measured at Clyo, Georgia, and its salinity is vertically uniform, gradually decreasing further up the estuary. The Savannah Harbor Expansion Project (SHEP) will deepen the lower portion of the estuary from its current depth of 42 to a new depth of 48 ft. below mean low lever water. This poses a potential risk to the fresh water intake of the city, located at Abercorn Creek, two miles from the confluence of Abercorn Creek and the Savannah River. Salinity-levels recorded daily at several USGS (USGS) gauging stations along the Savannah Estuary confirmed a gradual decrease in salinity throughout the entire study area as expected. However, a sharp non-gradual decrease in salinity of 188% parts per thousand was observed between Port Went Worth, located near GA 25, and the gauging station at the I-95 Bridge. A review of bathymetry data from the USACE suggested that deep horizontal channels located throughout that stretch of the estuary acted as a salinity trap preventing the advection of chlorides in the salt water further north. Observed changes in salinity profiles further suggested that this unique channel geometries affected the salinity mixing and distribution in this section of the estuary. From an engineering-management perspective this natural phenomenon presented an interesting natural way to control salinity transport, which may be exploited to prevent the advection of salinity further north into the municipal fresh water intake.

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