EVIDENCE FOR SHALLOW GROUNDWATER SALTWATER INTRUSION: WORMSLOE STATE HISTORIC SITE, CHATHAM COUNTY, GEORGIA

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The Wormsloe State Historic Site lies in the southeastern portion of Chatham County, Georgia and is situated on the Isle of Hope, a marsh island that exists between Skidaway Island and the mainland of Georgia. The Wormsloe State Historic site has been occupied continuously since the initial colonization of Georgia in 1733. Elevations for this area are approximately 8' to 16' above mean sea level. Four monitoring wells, constructed from 1" diameter PVC pipe and extending approximately 18' below land surface (BLS) have been installed. The screened intervals of the wells are positioned at 8' to 18' BLS and the installation techniques included direct push technology (GeoprobeTM), and lithological cores were collected using a macrosampling device. Groundwater samples were collected using a low flow peristaltic pump attached to a flow cell that allowed a sonde (YSI 600 XL) to continuously read temperature, pH, oxidation-reduction potential and conductivity. Monitoring well purging and sampling was conducted in accordance with USEPA Region IV Science and Ecosystem Support Division Standard Operating Procedures. Discrete grab samples were collected at depth and conductivity readings were converted to salinity as per UNESCO (1983) methods to explore mixing between groundwater and tidal marsh surface water systems. Geochemical samples were collected from the wells and the tidal marsh and data were plotted on Piper diagrams to determine groundwater facies and the source of shallow aquifer saltwater intrusion. Precipitation and tide level data were compared to water level data to explore the timing and magnitude of recharge to the groundwater system and the influx of tidal marsh water into the groundwater system. The purpose of this research is to determine baseline conditions of the aquifer system to assess the potential impacts of sea level rise and also to support ecological restoration efforts at the site. Ecological conservation efforts at the site include the restoration of longleaf pine habitat and the reintroduction of the gopher tortoise. The ecological restoration projects have benefitted from the hydrological data in the selection of specific restoration areas and future monitoring efforts will evaluate the impacts of continued sea level rise on the shallow groundwater system.