Abstract

Flood protection systems are an important component of our society’s civil infrastructure. The failure of levees can have detrimental effects on human life and the economy of the flooded regions. Due to the large-scale physical extent of levee systems and the high cost of a comprehensive geotechnical investigation, soil data is available at best at scattered intervals along the span of the levee system. However, the spatial continuity of soil type and strength information is particularly critical in levee systems since failure of a levee at any location could result in the failure of the overall flood protection system. An approach that uses Geographic Information Systems (GIS) for the modeling and geostatistical analysis of spatial soil parameter information is presented. Borehole and CPT test data available at finite locations is combined with information about the underlying geology and regional hydrology to eventually provide a system-level risk assessment and identify high-risk levee segments for mitigation. A levee system in Northern California is used as a pilot study for the proposed approach. The study area encompasses the levee system protecting Sacramento City, situated at the northeastern limit of the San Joaquin-Sacramento delta region.