

EVALUATION OF DRAINAGE INFRASTRUCTURE CAPACITY UNDER PROJECTED SEA LEVEL AND CLIMATE CONDITIONS, BROWARD COUNTY, FLORIDA

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In southeast Florida, a rising sea level has been observed over the last century. Broward County has low altitude and a flat topography. These factors coupled with higher sea level would likely result in decreased drainage potential and an increased likelihood of inundation during substantial precipitation events. The possibility of increased frequency and intensity of storms in the future amplifies these effects. County managers and planners need to identify locations of greatest concern, test management or adaptation actions, and plan timelines for project implementation.

The USGS, in cooperation with Broward County, is developing a surface-water/groundwater flow model to characterize the drainage capacity and the inundation potential in the urbanized areas of Broward County. This MODFLOW application uses the Surface-Water Routing (SWR) process to simulate the surface-water drainage system, surface-water flow through primary and secondary control structures, groundwater flow, and groundwater/surface-water interactions. The project relies on hydraulic parameter values derived in previous studies within the region and includes a dynamic representation of the surface-water system throughout the county. The simulated groundwater levels and surface-water stages are then used to evaluate the inundation potential throughout the County under various scenarios.

Future scenarios include projected sea-level rise and changes in precipitation. Sea-level rise estimates will be informed by the Southeast Florida Regional Climate Change Compact's unified projections, which currently sets a range of 14 to 34 inches for the 2060 timeframe and a range of 31 to 81 inches for the 2100 timeframe. Results from these future scenarios will be used to evaluate the effects of the loss of drainage capacity with sea-level rise and changes in climatic patterns. Simulated results could be used to evaluate possible needed adaptation or mitigation strategies resulting from sea-level rise.

PRESENTER BIO: Dr. Decker is a hydrologist with the US Geological Survey. Over the last 13 years, he has been involved in the development of surface-water/groundwater models for a number of study areas including the Florida Everglades, Miami-Dade County, Broward County, the Southwest Florida coast, and the Great Dismal Swamp.