

CENTRAL AND SOUTHERN FLORIDA SECTION 216 FLOOD RESILIENCY STUDY: MODELING APPROACH

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The natural, agricultural, and highly dense urban areas in southeast Florida, served by the Central and Southern Florida (C&SF) Project are experiencing significant flooding now, which is expected to worsen in the future. The more than 70-year-old gravity driven C&SF water management infrastructure system was not designed to manage the current and future conditions of combined runoff, storm surge, high tides and high groundwater table, resulting in a reduction of the system efficiency. Continuous operation of this aging infrastructure is needed to provide flood protection and water supply to more than 9 million people. Flooding events result in property damage (residences, businesses, and critical infrastructure), health and life safety risks, saltwater intrusion into freshwater habitats and Biscayne Aquifer (main source of water supply in the region), and loss of habitats, and threatens economic and recreational activities in this area that are of national and international significance.

The C&SF Flood Resiliency Section 216 Study is a single purpose study focusing on flood risk management. The Study is a feasibility level planning analysis focused on increasing the resilience and function of vulnerable coastal structures and the conveyance of the primary inflow canals.

The Study requires the application of robust and tested technical tools to represent the C&SF system within the study area. The tools should be able to simulate system response to hydrologic, hydraulic, and hydrodynamic stressors that drive flood risk in the area. Due to the unique geology of the region, the tools must be able to incorporate the effect of groundwater induced flooding.

The C&SF system in the study area is heavily managed and the response of the system is significantly influenced by system operation and water management decisions. The ability to simulate the effects of operations is therefore a key requirement for all modeling tools applied for this study.

To date, event modeling has been done within the study area under the South Florida Water Management District (SFWMD) Flood Protection Level of Service (FPLOS) Program for the primary systems in Broward and Miami-Dade Counties. The FPLOS Program has developed hydrologic and hydraulic (H&H) integrated/coupled surface-groundwater models for all watersheds in the Project Study Area which will be utilized for this application. The coupled MIKE SHE/MIKE Hydro (2022) models will be used to simulate the event-based response of the hydrology and hydraulics for the C&SF FRS project area. This talk will present the modeling approach for the Section 216 study using the existing MIKE SHE/HYDRO models including model updates/refinements to the models to meet the goals of the C&SF study.

PRESENTER BIO: Carol Ballard, PE, CFM has over 20 years of experience in applying hydrologic and hydraulic modeling to restoration efforts, design of public works, and flood insurance studies. Ms. Ballard has expertise in developing, managing, and reviewing complex 1D, 2D, and surface/groundwater watershed models which includes managing three Flood Protection Level of Service (FPLOS) projects. Two of the projects, C111/Model Land/L31NS, and Eastern Palm Beach County, use MIKE SHE/Mike 1D modeling tools. Ms.