

APPLICATION OF 2D HYDRAULIC MODEL TO KISSIMMEE RIVER RESTORATION PROJECT

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This study presents the application of a two-dimensional hydraulic model to assess the conveyance capacity of the S65A spillway and auxiliary structures in support of the Kissimmee River Restoration (KRR) Project, which was completed in 2022. The KRR project is intended to restore nearly 20,000 acres of wetlands and 44 miles of the historic river channel, creating an environmentally friendly meandering river-floodplain ecosystem. A key challenge within this endeavor is to strike an appropriate balance between river restoration and flood protection, particularly in relation to water control structures hydraulic performance along the Kissimmee River. This paper presents a comprehensive analysis using HECRAS 2D model, including calibration, validation, sensitivity analysis of key parameters, and an assessment of the impacts of different engineering measures to reduce head losses through multiple water control structures installed in parallel across the river, including a gated spillway, a navigation lock, a tieback levee with embedded weirs, and multiple culverts. The paper recommends the most effective engineering measure for minimizing overall energy loss across these combined multiple structures, termed herein the S65A complex.

This case study also highlights the practicality and cost-effectiveness of the 2D HEC-RAS model. It underscores that such modeling tools can serve as a robust alternative or complement to traditional laboratory and field studies typically employed in hydraulic engineering applications.

PRESENTER BIO: Dr. Ansar is the Section Chief of the Applied Hydraulics Section at the South Florida Water Management District. He has 26 years of experience designing and implementing water resources projects. He has extensive background in water resources engineering including laboratory experiments, flow computations and numerical modeling at water control structures.