Watershed Model Development for the Indian River Lagoon Basin Management Action Plan (BMAP)

PROJECT DESCRIPTION

The Spatial Watershed Iterative Loading (SWIL) model was originally developed in 2011-2014 as part of the Indian River Lagoon (IRL) Total Maximum Daily Load refinement effort in response to waterbody impairments due to nutrient over-enrichment. The original goal of the model development was to create high-resolution spatial and temporal representations of volumes and nutrient loads derived from the IRL watershed.

The SWIL model was adopted in 2021 by the FDEP for estimating nutrient baseloads for stakeholders in the North IRL, Central IRL, and Banana River Lagoon. The nutrients estimated in the SWIL model include total nitrogen and total phosphorus, providing an ability to understand the contribution from direct stormwater runoff versus subsurface/groundwater flow sources.

At the request of the FDEP, AEI updated SWIL to Version 5.0, which included a full model revision, refinement and subsequent recalibration to incorporate new and updated data that had become available since initial model development. Updates included the use of recent use of land use, soils, and treatment areas, new rainfall and evapotranspiration time periods, as well as refinement of event mean concentrations for both runoff and subsurface flow components. Significant effort was expended in calibrating SWIL 5.0 for both hydrology and quality, to more accurately predict localized water quality conditions.

OUTCOMES

This effort greatly increased goodness of fit and output estimation for both hydrology and nutrient loading estimation. SWIL 5.0 will be used by FDEP to determine new nutrient loading allocations among the NIRL, CIRL, and BRL, guiding the Lagoon's restoration approach.

PROJECT DETAILS

PROJECT CLIENT:
Florida Department of Environmental Protection (FDEP) via Tetra Tech, Inc.

PROJECT LOCATION:
Brevard County, FL

SERVICE LINE AREAS:
- Engineering & Water Resources
- Geospatial Services

EXPERTISE:
- Watershed Model Development
- TMDL/BMAP Program Support
- Water Quality Statistical Analysis
- Hydrological Analysis
- GIS Layer Development, Database Design
- Custom Programming (python)
- GIS Tool Development, Training, and User Guide
- Stakeholder Engagement and Agency Coordination

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