

ENVIRONMENT & ENERGY / ENVIRONMENTAL REMEDIATION

PROJECT: Environmental Remediation
Technologies: *Surface Water Modeling of
Tims Branch*

CLIENT: U.S. Department of Energy
PRINCIPAL INVESTIGATOR: Dr. Leonel Lagos
LOCATION: Savannah River Site, Aiken, SC

Description:

This task involves hydrological modeling related to water, sediment, mercury and tin in Tims Branch at Savannah River Site (SRS). This site is impacted by 60 years of anthropogenic events associated with discharges from process and laboratory facilities. Tims Branch provides a unique opportunity to study complex systems science in a full-scale ecosystem that experienced controlled step changes in boundary conditions.

The task will develop and test a full ecosystem model for a relatively well defined system in which all of the local mercury inputs were effectively eliminated via two remediation actions (2000 and 2007). Further, discharge of inorganic tin (as small micro particles and nanoparticles) was initiated in 2007 as a step function with high quality records on the quantity and timing of the release.

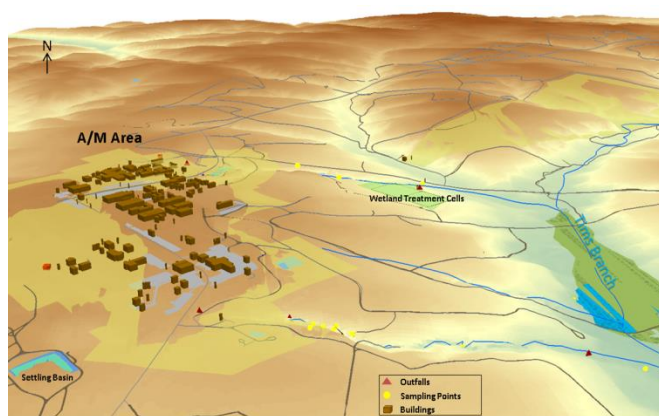


Fig 1. 3D Map of SRS A/M Area and Tims Branch

The principal objectives are to apply geographical information systems and stream/ecosystem modeling tools to the Tims Branch system to examine the response of the system to historical discharges and environmental management remediation actions.

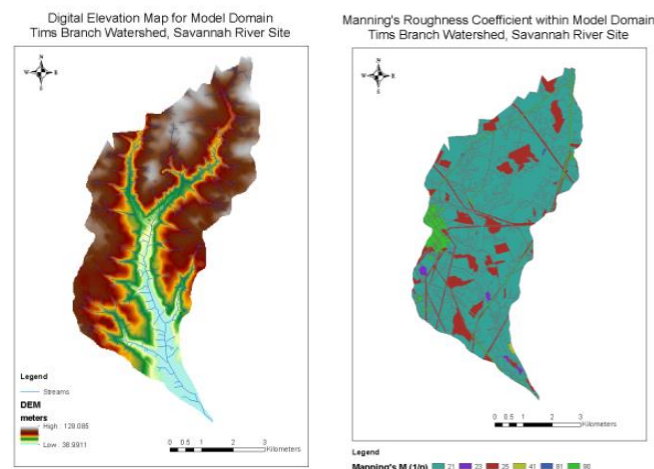


Fig 2. Digital elevation model and Manning's roughness coefficient grid files used for development of MIKE SHE model.

Benefits:

- Conceptualize the hydrology and transport mechanisms in SRS Tims Branch watershed
- Provide details of surface water/groundwater flow discharge and directions in Tims Branch Watershed
- Forecast fate and transport of tin and mercury in surface water under varying environmental conditions
- Evaluate the proximity of tin and mercury to main water body

Accomplishments:

- Developed a process-based conceptual model.
- Developed a data-driven conceptual model.
- Conducted preliminary data review and collection for model setup using MIKE SHE.
- Began preliminary development of a 1-D stream/river hydrology model using MIKE 11.

ABOUT

Since 1995, the Applied Research Center (ARC) at Florida International University (FIU) has provided critical support to the Department of Energy's Office of Environmental Management (DOE-EM) mission of accelerated risk reduction and cleanup of the environmental legacy of the nation's nuclear weapons program. ARC's applied research is performed under the DOE-FIU Cooperative Agreement (under Contract # DE-EM0000598) and provides technical support to DOE EM in the area of environmental remediation and STEM workforce development and training.

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