

PROBLEM

- Complex water resource problems concerning hydrology, hydraulics, sediment transport, and surface water quality require process-based information, flow, particle and contaminant path information, and integrated feedback across the overland, soil, stream, and reservoir domains.

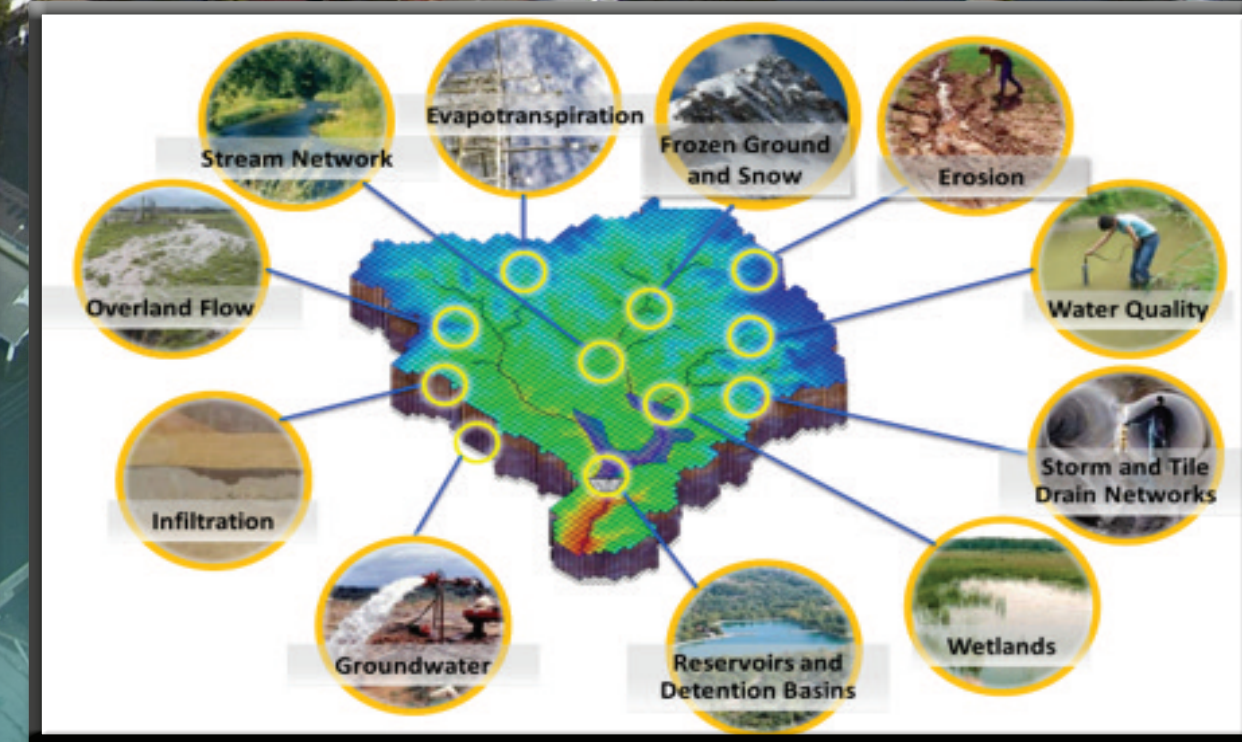
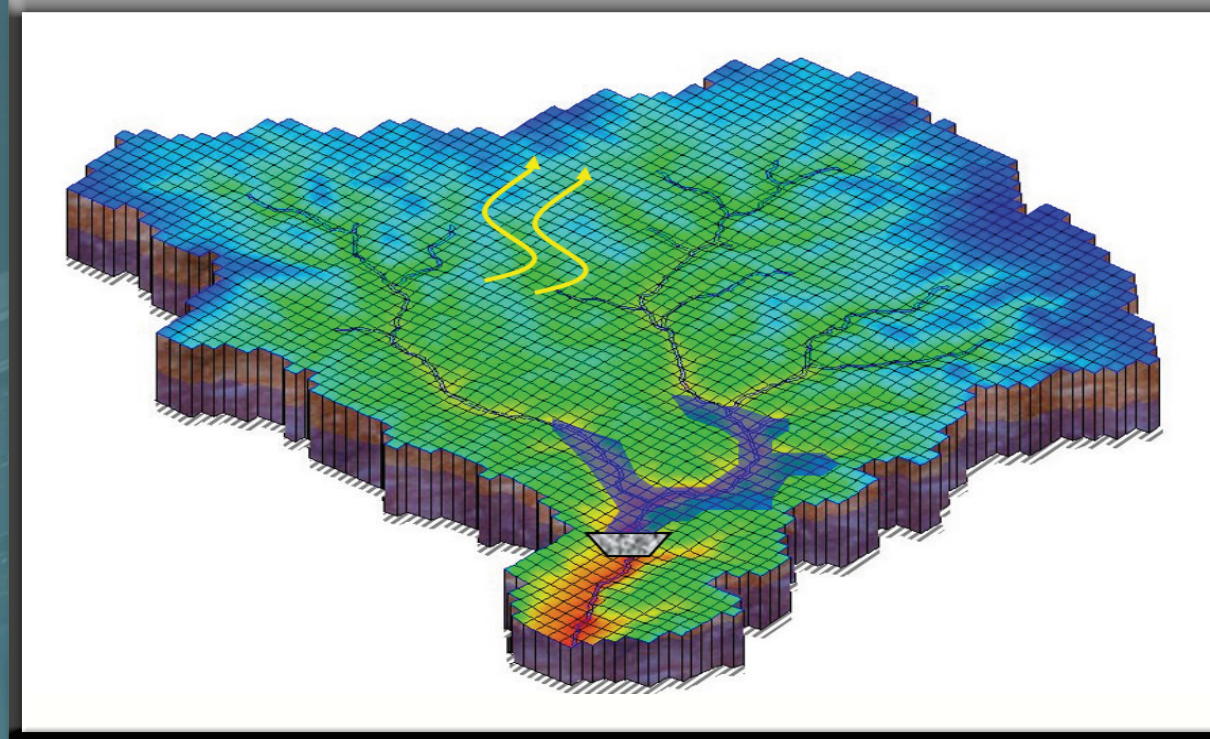
SOLUTION

- GSSHA is a fully distributed, process-based, hydrologic model that simulates overland, channel, and subsurface flow in an integrated fashion.
- GSSHA is a fully integrated hydrologic, hydraulic, sediment transport, and surface water quality model that allows complex hydrologic problems to be fully explored and optimal solutions to be developed.

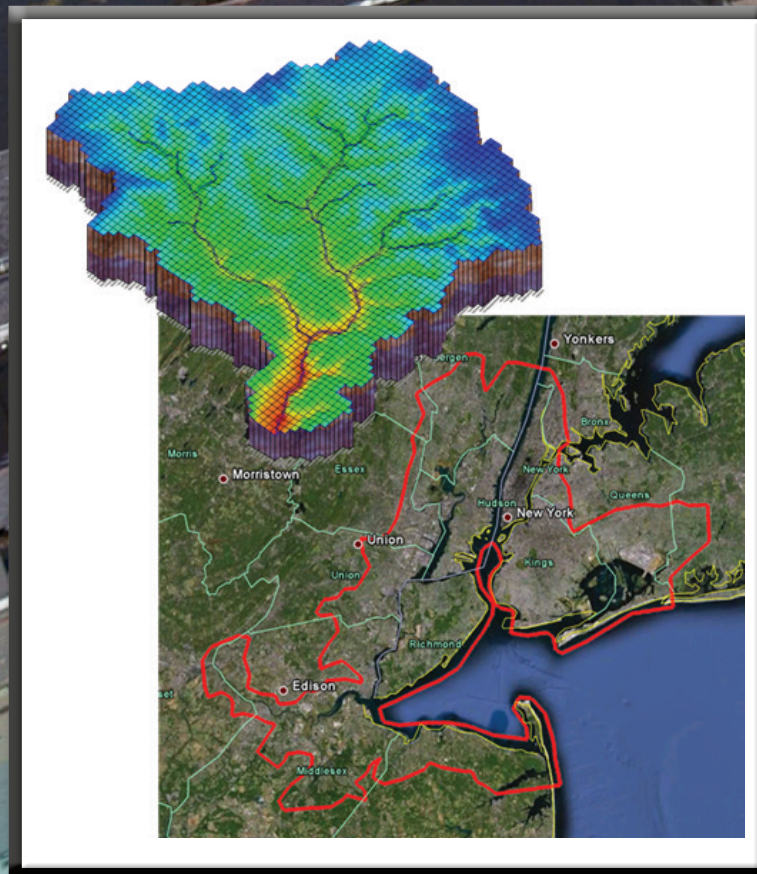
IMPACT

- One model that computes flow, sediment and contaminant fate and transport across the overland, stream and subsurface domains in an integrated fashion, replacing and improving the solution of multiple single domain models.
- Ability to bring outside influences into the problem domain, such as streamflow, groundwater, or overland flow from outside sources which makes it useful in coastal areas and areas influenced by large water bodies.
- Provides the ability to explicitly simulate important watershed features such as streams, hydraulic structures, embankments, and subsurface drainage systems as well as reservoirs, lakes, and detention basins that cannot be adequately represented in an implicit manner.

Gridded Surface Subsurface Hydrologic Analysis (GSSHA)



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APPLICATIONS

- Forecast/analyze flooding from multiple sources, such as excess rainfall, storm surge, stream overbank discharge, and reservoir expansion/backwater
- Analyze the effects of localized projects such as wetland restoration, the removal of storm/tile drains, channel modifications, and best management practices (BMPs) that cannot be explicitly simulated in traditional lumped parameter or semi-distributed models
- Estimate water, sediment, and contaminant loadings to locate source areas and help select management features
- Assess the influence of hydrologic processes, hydrologic modeling, and weather forecast products on the simulation of USACE reservoirs and operations
- Can be applied in a broad range of ecosystems from the tropics to the arctic
- Currently being used in the Forecast Informed Reservoir Operations (FIRO) project

STATUS

- Fully developed, documented, and maintained at ERDC. Executables, documentation, and training materials available at gsshawiki.com

BENEFITS

- Saves time and effort by only needing one model instead of multiple modelling packages
- Aids decision making which reduces flood damage and increases emergency response
- Helps refine engineering designs saving millions of dollars in construction, such as the Picayune Strand Restoration Project

WHAT'S NEXT?

- Currently being developed as a design model for Engineering with Nature (EWN) projects

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