

Engineering With Nature Project Fact Sheet



Guidance for Modeling EWN® Watershed Management Methods using GSSHA

Background

A core challenge of applying Engineering With Nature® (EWN®) principles and concepts to watershed management is determining appropriate spatial application of watershed management options. Planning and engineers need to incorporate landscape and process changes at a wide variety of scales. The spatial locations, heterogeneity of application, and the interaction of multiple water quantity and quality processes all strongly impact outcomes of watershed management options. Watershed engineering analysis tools of the past were designed to meet the computational capabilities and data availability of the day, and therefore needed to simplify the spatial representation of natural processes and watershed management options. Today, new approaches to watershed simulation, greatly improved computational capabilities, and greatly expanded data resources have created new capabilities for watershed management that USACE engineers can apply, but guidance to do so is still lacking.

As a fully discretized, physics-based simulator of water quantity and quality processes developed by ERDC, the Gridded Surface Subsurface Hydrologic Analysis (GSSHA) modeling tool is a key capability that can be leveraged by USACE engineers and planners to apply EWN® based watershed engineering concepts in a holistic watershed management paradigm. Because GSSHA can simulate local physical processes and integrate them into the larger watershed response, GSSHA is uniquely positioned to provide USACE engineers and planners with insight and understanding of the benefits provided by different watershed management options at various spatial scales.

GSSHA Capabilities



Objectives

The project has three primary objectives, including (1) Develop a web application on the USACE Model Interface Platform (<https://umip.ercd.dren.mil>) that can both showcase watershed models that use EWN® principles as part of a holistic watershed management plan as well as provide guidance on the implementation of EWN® practices in a watershed assessment, (2) Populate the web application with multiple models created by ERDC and USACE districts and demonstrate the EWN® watershed management practices available, how to incorporate them into the models, and the effects they have on the project objectives, and (3) Communicate the EWN® watershed assessment capabilities and guidance via publications, demonstrations, and webinars.

Outcomes

In the last few years, the Corps has transitioned paradigms to a holistic watershed planning approach. This project creates guidance and training materials to build capacity to apply EWN® principles in GSSHA as an integral part of a holistic watershed management plan. By demonstrating the techniques and approaches, and providing guidance on how to apply them, this project will enable engineers and planners to develop better watershed management plans that have a stronger positive impact in our communities. This proposal addresses three of USACE's Top Ten Research and Development (R&D) Priorities, including Modernize our Nation's Infrastructure, Ensure Environmental Sustainability and Resilience, and Revolutionize and Accelerate Decision-Making.

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