

Since 2003, the U.S. Environmental Protection Agency (USEPA) has been developing a decision support system for placement of best management practices (BMPs) to assist stormwater management professionals in planning for BMPs implementation at strategic locations in urban watersheds. This tool will help develop, evaluate, select, and place BMP options based on cost and effectiveness. The system was formerly called the Integrated Stormwater Management Decision Support Framework (<I>ISMDSF</I>), but will be called the System for Urban Stormwater Treatment and Analysis INtegration (<I>SUSTAIN</I>) henceforth. <I>SUSTAIN</I>, a generic public domain framework, will provide a means for objective analysis of management alternatives among multiple interacting and competing factors. The desired outcome from the system application is a thorough, practical, and informative assessment considering the economic, environmental, and engineering factors.

SUSTAIN has been designed to include seven key components: framework manager, ArcGIS interface, watershed model, BMP model, optimization model, post-processor, and Microsoft Access database. They are integrated under a common ArcGIS platform. SUSTAIN will support evaluation of BMP placement at multiple scales from a few city blocks to large watersheds.

SUSTAIN is to be developed in phases. The Phase 1 work, which will end shortly, includes a comprehensive design and framework with all major components in place. Although not all functions are enabled yet, the system provides a framework that allows continued expansion of BMP simulation options and flexible analyses. It includes stand-alone watershed, BMP, conduit, and stream routing modules, and linkage with external watershed simulation models. It can develop ArcGIS based watershed network, define stream buffers, delineate tributary drainage areas of each BMP, and provide linkage for multiple land areas, BMPs, and stream reaches. A preliminary post-processor, basic cost estimating routine, and an optimization module based on scatter search techniques are included.

The Phase 2 work, which will begin immediately following Phase 1, will expand the capabilities and functionalities of the system to better facilitate development and assessment of management options. Key enhancements include a pre-processor to facilitate selection of placement sites, more tightly integrated and flexible post-processors, expanded cost estimating functions, and additional BMP types and improved BMP simulation processes. The expanded optimization module will include additional solution techniques and provide a means to perform a multi-tier evaluation of individual watersheds and of multiple nested watersheds. The Phase 2 work will include case studies at several sites to demonstrate applications of a diversity of BMP types, soil/climate, and watershed development conditions. The paper will include BMP process formulations for implementation in Phase 2 and future versions of SUSTAIN.