

Topic 4: Watershed Management Models/Tools for DoD Installation Applications

Objective

Demonstration projects are sought that can advance the management of land and water resources within a watershed context on Department of Defense (DoD) installations. The focus is on models and decision support tools associated with watershed hydrology, erosion, and impacts to receiving water bodies and their aquatic receptors. Numerous models and tools are available at various stages of development, regional specificity, and sensitivity to various watershed land use and management activities. To take advantage of the current state of model/tool development and management practices using such models/tools, ESTCP is seeking proposals that demonstrate innovative but technically mature technologies, along with associated methodological approaches, that are relevant to a military land use and management context. Application of such models/tools should facilitate the ability of DoD installations to sustain their training and testing missions while meeting compliance and stewardship responsibilities.

As a result, ESTCP is interested in demonstrating models/tools that:

- are broadly applicable across multiple DoD installations on at least a regional basis and can address a variety of military land use and associated management applications;
- incorporate mechanistic understanding, while taking advantage of empirical observations and numerical approaches, to address management questions within a scientifically robust conceptual framework in which key uncertainties are quantified;
- enable efficient tailoring of the amount, frequency, type, quality, and availability of input data needed (for calibration, validation, and long-term use), model/tool complexity (appropriate spatial and temporal scales), and cost of implementation to the nature of the land and water resource management decisions to be made;
- are already accepted, or can receive acceptance through the demonstration project, by the regulatory community for such practices as setting, monitoring, and meeting total maximum daily load standards or managing wetlands; and
- result in software, if developed or modified as part of the project, that is in the public domain, well documented, and reasonably enables future modifications and linkages to other appropriate models/tools.

Desired outcomes of successful demonstrations include validated capabilities to:

- transfer the model/tool to multiple installations in a cost-efficient manner (i.e., costs and user difficulties associated with initial implementation at a new installation are commensurate with the value gained by implementation) and target implementation by the most appropriate end-user community;
- conduct “systems-level” and scenario analyses that can address assessment, monitoring, and adaptive management (compliance, mission sustainability, and stewardship) needs and actions of interest to DoD resource managers across natural, semi-natural, heavily disturbed, and urbanized landscapes, both within and across an installation’s administrative boundary, as appropriate;
- operate in both hindcasting and forecasting modes, the latter of which can be used under

assumptions of climate non-stationarity; and

- communicate model outputs and uncertainties to end users and decision makers in a manner that is easily interpretable and directly relates to management actions and their effects.

Not included as part of this topic are those models/tools that explicitly address coastal processes associated with sea level change and storm surge.

Background

To accomplish its testing and training missions the DoD uses and in many cases directly manages approximately 30 million acres of land. Often such uses result in direct and indirect physical impacts to soil, vegetation, and water resources. Often these impacts are layered on top of legacy (e.g., prior agriculture) impacts to these land and water resources. Impacts that result in soil erosion and run-off (whether from rain or snowmelt) with subsequent changes in water flows and loading of sediment, nutrients, and pollutants to receiving water bodies can result in compliance, sustainability, and stewardship problems. Watersheds represent an important organizing principle for sustainable natural resource management on DoD lands. Advanced watershed analysis and management models/tools that can be applied and integrated at multiple scales are needed to sustainably manage installations at a systems level.

Proposed technologies and methodologies should have completed all appropriate proof-of-principle work as applicable. ***In particular, any individual or coupled model proposed for demonstration already must have been successfully calibrated and validated at a minimum of one location at relevant spatial and temporal scales.*** ESTCP supports demonstration at a scale sufficient to determine the operational performance of the technology or methodology and to estimate its expected full-scale implementation costs. Site-specific field work (e.g., if some initial local model calibration is required) may be allowed prior to the actual demonstration if it can be completed during the first year of the project. Specific DoD site(s) may be suggested in the pre-proposal but are not required to be identified until submittal of the full proposal.

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