Hydrologic Analysis for Selection and Placement of Conservation Practices at the Watershed Scale

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When a total maximum daily load (TMDL) has been established for an impaired waterbody, conservation best management practices (BMPs) in that watershed may reduce point and non-point source (NPS) pollution to meet water quality standards. However, selection and placement of conservation BMPs can be challenging in un-gauged watersheds with little or no water quality monitoring data for the hydrological analysis. The objective of this research is to perform a hydrological analysis for mitigation of erosion and total phosphorus in mixed land use watersheds, and to select and place BMPs in the most hydrologically sensitive areas (HSAs). Using site-specific spatial information, a geographic information system (GIS) and physically-based hydrologic models, watershed scale analyses of HSAs and BMPs can help land and water resource managers to effectively mitigate NPS pollution for improvements in water quality. This hydrological analysis was completed with a simple web-based tool, the Hydrologic Characterization Tool (HCT), which runs the Water Erosion Prediction Project (WEPP) model for representative land types in the watersheds, where a land type is defined as a unique combination of soil type, slope configuration, land use, management, and climate. Model outputs include information on potential pollutant pathways (i.e. erosion, runoff, lateral flow, and percolation) as well as potential reductions for different tillage practices, buffer strips, streamside management, and conversion to the conservation reserve program in the watershed. The HCT was applied alongside the WEPP model to two northern Idaho/eastern Washington watersheds for validation of our methodology: an un-gauged watershed (Hangman Creek) was compared to one with long-term water quality monitoring and land use data (Paradise Creek). This application of a simple web-based tool, the HCT, illustrates how quantitative, spatial and temporal analysis of changes in pollutant loading and site-specific recommendations of conservation practices can be made in un-gauged watersheds.