WEPPCloud Beyond the Horizon

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The Water Erosion Prediction Project (WEPP) model has been modified for the assessment of forestry and rangeland management applications for predicting surface runoff, water yield, soil erosion, and sediment delivery over the last 30 years. WEPP is a complex process-based hydrology and erosion model that utilize large climatic and soils databases. During the past decade, hillslope-based decision support tools were developed with streamlined user input requirements and simple, clear output (https://forest.moscowfsl.wsu.edu/fswepp/). These simplified hillslope scale tools include road erosion estimation (WEPP:Road), the post-fire Erosion Risk Management Tool (ERMiT), pre-fire Fuel Management Erosion (FuME), and timber harvest impacts with Disturbed WEPP. These tools have been widely applied to single hillslopes and in batch model runs to evaluate large networks. The ERMiT tool has been used over 138,000 times in 2018 alone. Recent improvements to subsurface lateral flow, baseflow, and elevation-variable climate allowed for small watershed modeling with reliable agreement with observed streamflow and sediment load using online and GIS versions of the WEPP model. One watershed-scale decision support tool for Post-fire Erosion Prediction is called WEPP-PEP (http://129.101.152.143/baer/) which provides both hillslope and watershed outlet predictions based on actual soil burn severity maps uploaded to the interface by users. This tool allows managers to assess the impact of targeted post-fire mitigation efforts (e.g. mulching) on hillslope erosion and watershed response.

Over the last two years considerable efforts have been invested in developing a broader online platform (WEPPCloud; https://wepp1.nkn.uidaho.edu/weppcloud/) to house a wide range of decision support tools including a watershed-scale applications of WEPP. WEPPCloud automates the acquisition and processing of climate, soil, management, and topographic inputs for WEPP from publically available datasets with national coverage (USGS National Elevation Dataset, the NRCS Soil Survey Geographic Database (SSURGO), USGS National Landcover, PRISM, DAYMET) and allows users to delineate and perform a watershed analysis within a user-friendly mapping interface. WEPPCloud allows users tremendous flexibility in climatic input files ranging from historic daily climate input files dating back to 1980 using NASA DAYMET gridded data products, long-term stochastically generated climate inputs using spatially-explicit PRISM corrected CLIGEN products, or future downscaled climate projections. The ability to apply a process-based spatially-distributed hydrology and erosion model online using daily observed climate and current soil burn severity maps make this a unique and powerful tool for watershed assessment and management. Demonstrations and applications for various forest management scenarios will be taught.