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Usability and Functional Enhancements to an Online Interface for Predicting Post Fire Erosion (WEPP-PEP)

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There is an increased interest in the United States to use soil burn severity maps in watershed-scale hydrologic models to estimate post-fire sediment erosion from burned areas. This information is needed by stakeholders in order to concentrate their pre- or post-fire management efforts in ecologically sensitive areas to decrease the probability of post-fire sediment delivery. But these tools traditionally have been time consuming and difficult to use by managers because input datasets must be obtained and correctly processed for valid results. The Water Erosion Prediction Project (WEPP) has previously been developed as an online and easy-to-use interface to help land managers with running simulations without any knowledge of computer programming or hydrologic modeling. The interface automates the acquisition of DEM, climate, soils, and landcover data, and also automates channel and hillslope delineation for the users. The backend is built with Mapserver, GDAL, PHP, C++, Python while the front end uses OpenLayers, and, of course, JavaScript.

The existing WEPP online interface was enhanced to provide better usability to stakeholders in United States (Forest Service, BLM, USDA) as well as to provide enhanced functionality for managing both pre-fire and post-fire treatments. Previously, only site administrators could add burn severity maps. The interface now allows users to create accounts to upload and share FlamMap prediction maps, differenced Normalized Burned Ratio (dNBR), or Burned Area Reflectance Classification (BARC) maps. All maps are loaded into a sortable catalog so users can quickly find their area of interest.

Once loaded, the interface has been modified to support running comparisons between baseline condition with “no burn” and with a burn severity classification map. The interface has also been enhanced to allow users to conduct single storm analyses to examine, for example, how much soil loss would result after a 100-year storm. An OpenLayers map allows users to overlay the watershed hillslopes and channels, burn severity, and erosion. The interface provides flowpath results for each hillslope and at the outlet, as well as return period and frequency analysis reports. Once problematic areas have been identified, the interface allows users to export the watershed in a format that can be used by the Erosion Risk Management Tool (ERMiT) and Disturbed WEPP (post-disturbance modeling) for more detailed hillslope-level analyses.

Numerous other changes were made to improve the overall usability of the interface: allow simulations in both SI and English units, added immovable pop-up dialogs to guide the users, and removed extraneous information from the interface.

In upcoming months, a workshop will be conducted to demonstrate these new capabilities to stakeholders. Efforts are underway to use site-specific SSURGO soils to that are modified based on burn severity rather than using generic soil classes.