# Rapid Response Tools and Datasets for Hydrological Modeling

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We are building an online database (http://geodjango.mtri.org/geowepp/) for the continental United States that allows users to select an area of interest and then download spatial inputs and parameter files preformatted for hydrological modeling. The database is both operational and publicly available with datasets for seventeen western US states currently online. Comprehensive support is provided for GeoWEPP, the Geo-spatial interface for the Water Erosion Prediction Project (WEPP) (Renschler, 2003). The WEPP model is a physically-based hydrology and soil erosion model (Laflen et al., 1997). Spatially-explicit process-based models like GeoWEPP are difficult to set up and require spatially-explicit inputs that include a digital elevation model (DEM), soil, climate and land cover. Our rapid response online database (Figure 1) delivers a 30-m resolution USGS DEM (Gesch, 2007), land cover data derived from Landfire Existing Vegetation Type data (LANDFIRE, 2011), and soil data derived from STATSGO and SSURGO datasets (U.S. Department of Agriculture, 1991; Soil Survey Staff, 2016). The spatial layers are projected into UTM coordinates and pre-registered for modeling. WEPP soil parameter files are created along with linkage files to match both spatial land cover and soils data with appropriate WEPP parameter files. Our goal is to make process-based models more accessible by automating the creation of spatial inputs so that modelers can focus on addressing scenarios of concern rather than assembling datasets.
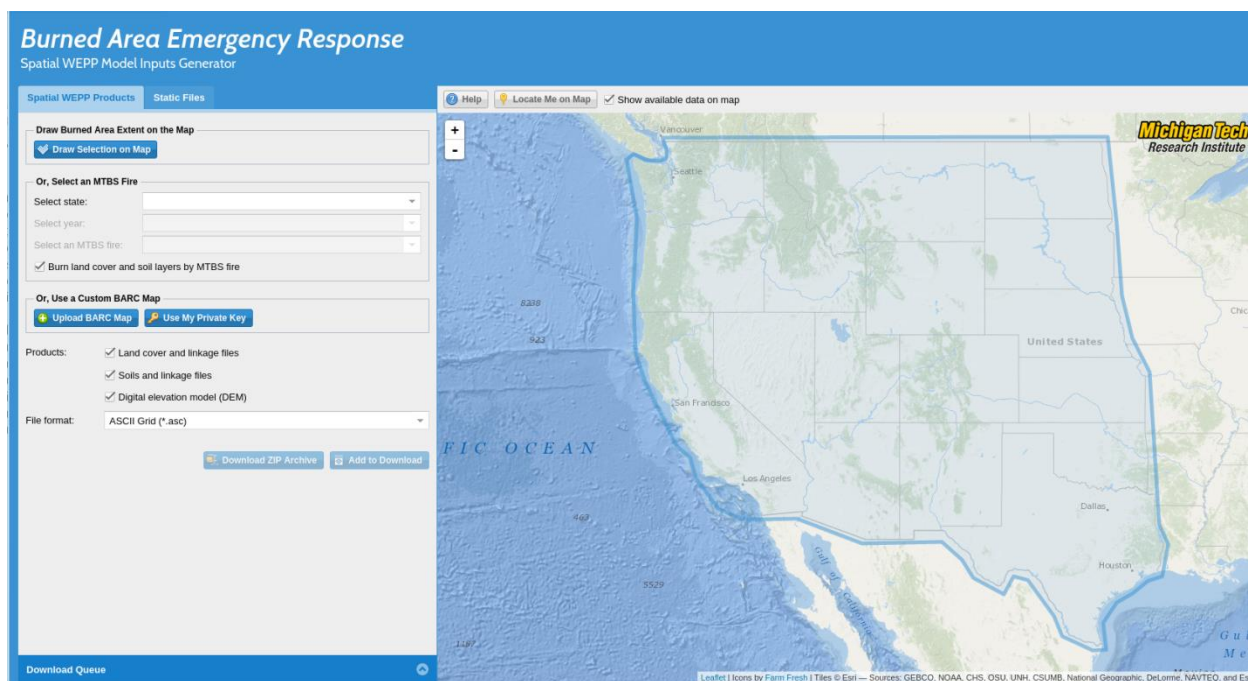
Figure 1. An online database for generating spatial WEPP model inputs for both not burned and recently burned watersheds.

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The database was designed to rapidly generate inputs for post-fire hydrological modeling. Users upload a burn severity map into the database where it is used to modify spatial land cover and soils data needed to predict post-fire erosion and runoff. Spatial inputs are created for both burned and not burned conditions (Figure 1); therefore the datasets can easily be used for other applications including agriculture. Future modifications could include allowing users to upload recent crop cover maps or management practices into the database and then have the database deliver updated model inputs. By eliminating the time consuming data preparation step the database increases accessibility of spatial WEPP models and allows land managers to spend more time considering different management and climate scenarios.

References

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