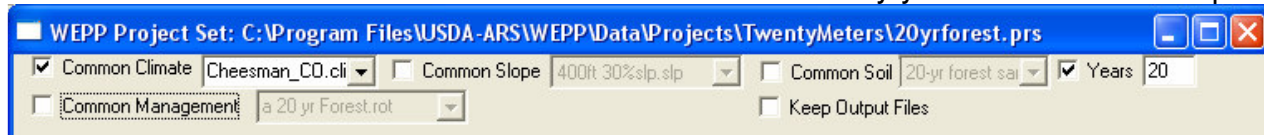


Using the Water Erosion Prediction Project (WEPP) Model to Calculate Percent Sediment Delivered

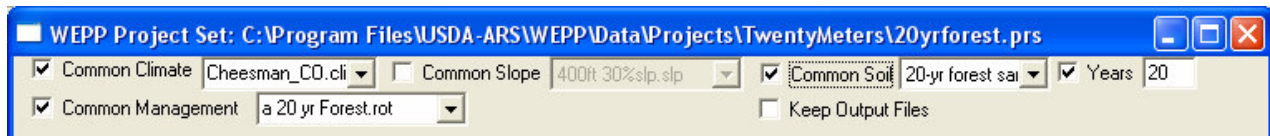
The [WEPP](http://topsoil.nserl.purdue.edu/nserlweb/weppmain/) model (<http://topsoil.nserl.purdue.edu/nserlweb/weppmain/>) was used to calculate percent sediment delivery from upslope to downslope cells for different slopes, land covers, climates, and soil types. Since most DEMs are 10 meter resolution we created a series of 20 meter long hillslopes to represent each possible combination of land covers for a given hillslope gradient, soil type, and climate. Hillslope gradients were specified as 1%, 10%, 20%, 30%, 40%, and 50%. The seven land cover types included high severity fire, low severity fire, short grass, tall grass, shrub, 5-year old forest, and 20-year old forest. The order of the other land cover types reflects the order of recovery from disturbance as described in the [Disturbed WEPP](http://forest.moscowfsl.wsu.edu/fswepp/docs/distweppdoc.html) documentation (<http://forest.moscowfsl.wsu.edu/fswepp/docs/distweppdoc.html>). We generated 100 years of climate data for seven representative climates using Cligen. All simulations were run for twenty years of climate data and percent sediment delivered results are based on averages over this time period. A look up table for each climate was created based on these runs. The climates used were Alturas, CA; Cheeseman, CO; Fenn, ID; Forest Glen, CA; Sandpoint, ID; Truckee, CA; and Wallace, ID. Soils used in the simulations were clay loam and sandy loam. WEPP delivers sediment in five classes - 100% clay, 100% silt, 100% sand, large and small aggregates. FOREST simplifies the five classes into 2 classes of coarse and fine particles where the coarse class includes sand and sandy loam, and the fine class includes clay, silt, clay loam and silt loam.

Instructions for creating and processing sediment delivery files for use with FOREST

1. The user must generate local climate data to be able to create a new percent sediment delivery table. The WEPP documentation leads the user through this process and it will not be repeated here. It is recommended that the user generates 100 years of climate data and runs the WEPP model simulations for twenty years (Laflen, J., WEPP Training, March 2005).
2. WEPP hillslope files used to generate percent sediment delivered are available to the user on the WEPP data link on the FOREST website:
(<http://www.warnercnr.colostate.edu/frws/people/faculty/macdonald/model.htm>). There are 432 hillslope files and 7 project set files, i.e. one for each upslope land cover type. Users can open the WEPP for Windows interface, click on File\Open Project Set to open one project set containing 72 hillslopes.
3. The user must select a common climate and indicate twenty years to run the hillslopes.



Each project set file contains hillslopes for all combinations of upslope and downslope land cover except for the case where the upslope is the same as the downslope land cover. To include results for this case in model simulations, check Common Management and indicate which land cover type WEPP should use - e.g. 20 yr forest and check Common Soil. The common soil will be either clay or sand for the management option.



Click on Run selected projects.

4. Create a spreadsheet to store your data. (We use MS Excel because it will save the data to a .csv, comma delimited text file). Open the file: sd_climate_template.xls; using Save As, this file can be used as a template for your percent sediment delivery table. The table will initially have nine columns: upslope land cover type, downslope land cover type, slope gradient, soil type, soil loss, sediment yield and three columns for percent sediment delivered. The columns must contain exact text without spaces in any of the fields. Cover types must be one of the following choices: 20yearforest, 5yearforest, shrub, shortgrass, tallgrass, lowseverityfire, or highseverityfire. Slopes must be 1, 10, 20, 30, 40, or 50. Soil type must be clay (clay, silt, clay loam and silt loam) or sand (sand and sandy loam).

5. Copy and paste the WEPP results under soil loss and sediment yield into the correct rows of your spreadsheet. Use a separate named worksheet for each climate.

6. Percent sediment delivered is calculated in two steps: 1) Percent sediment delivered is zero if sediment production equals zero or percent sediment delivered is sediment yield (sediment delivered) divided by (soil loss * 10). The factor of ten is a conversion factor used to convert kilograms per meter square to mega grams per hectare. 2) If percent sediment delivered is greater than one, it is made equal to one. The user must copy and paste the resulting values only from %sd2 into the column headed %sd. Formulae must not be included since several of the previous columns will be deleted.

7. When percent sediment delivered is calculated, the sediment loss, yield, %sd1, and %sd2 columns (4 columns) must be deleted from the percent sediment delivery table.

8. The order of columns for the final file to input into FOREST must be changed to give: upslope land cover type, downslope land cover type, slope gradient, soil type and percent sediment delivered. The final edited percent sediment delivery table will have five columns.

9. Delete the column headings on the top line so that only data remain. Save each percent sediment delivery table worksheet as a separate comma delimited text file (*yourclimate.csv*) in c:\FOREST\textfiles\climates. Look at one of the existing climate files to compare the format of your new file.

Note: If you get an error message when running the hillslope sediment delivery in FOREST that says “Real value expected. Input file has an error for xxxxxx on line xx...” it means there are spaces in your text data. You need to edit them out before the sediment delivery module will run.