GeoWEPP ArcX 2004.3 Tutorial

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Prepared for use at the WEPP/GeoWEPP Workshop 23-26 March 2004 at the
Bureau of Land Management National Training Center, Phoenix, AZ

Introduction

The Geo-spatial interface for the WEPP model (GeoWEPP) ArcX 2004.3 uses the Geographic Information System (GIS) ArcView software and its Spatial Analyst Extension - both developed by the Environmental Systems Research Institute (ESRI) - as a platform to apply the erosion prediction model (WEPP) and the Windows interface (WEPPWIN) with geospatial datasets for topography, land use and soils.

The interface accesses databases, organizes WEPP simulations, creates all necessary input files for WEPP including the climate files. The current version of GeoWEPP allows delineation of larger watersheds beyond the recommended watershed size for WEPP watershed simulations (<500 hectare). Note that only the dominant land use and soil is delineated for each representative hillslope of a contributing area (subcatchment) to a channel.

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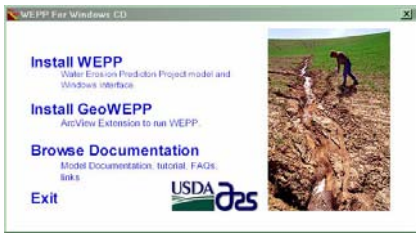
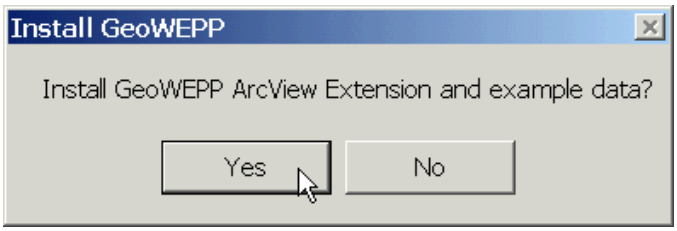
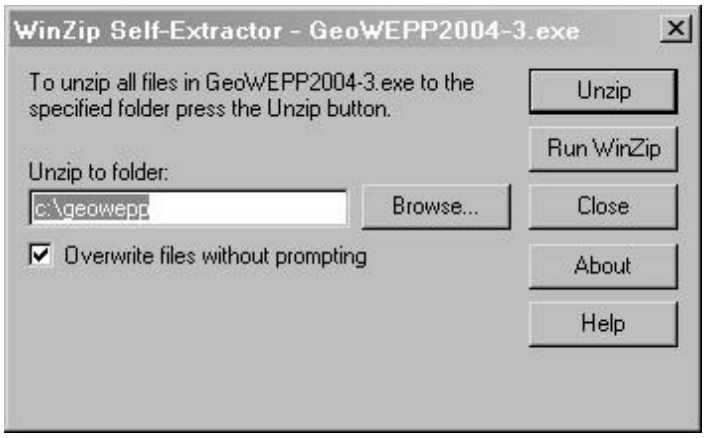
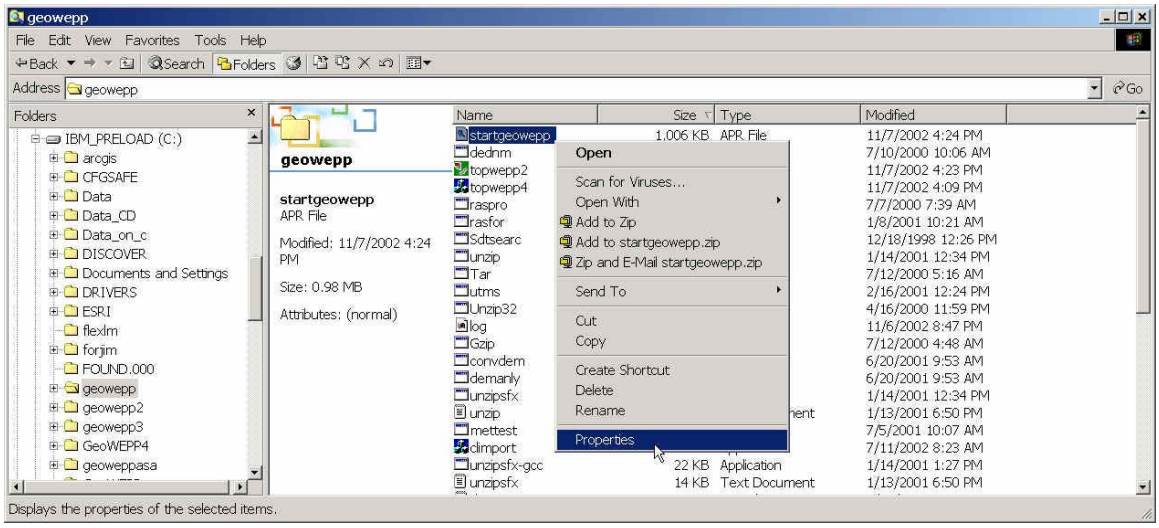
Section 1: Installing GeoWEPP ArcX

In case you do not get the automatic start up after inserting the most recent WEPP CD-ROM, you have to use your Windows Explorer to locate the zipped installation file GeoWEPP2004-3.ZIP either on the CD-ROM drive or in the directory in which you downloaded it from the GeoWEPP Web site (address is given at the last page of this document). Use the mouse to double-click on this file and it will start to extract the program files in a directory specified, e.g. C:\GeoWEPP.

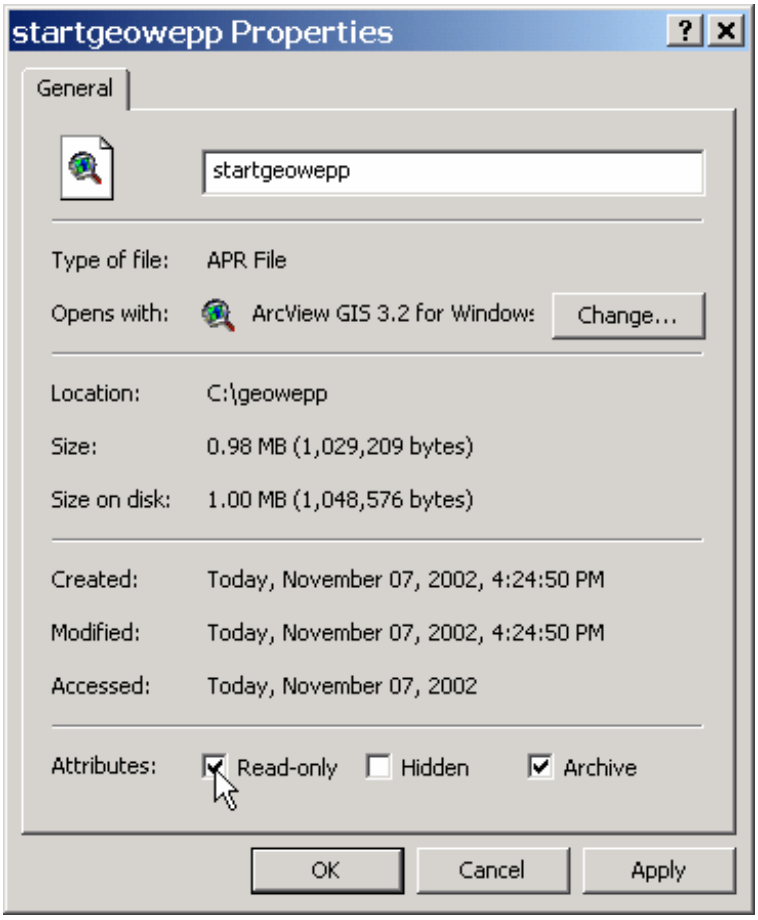








Press the right mouse button and select "Properties" of the "startgeowepp.apr" file. Change the Attribute setting of this file to "read-only" and press OK.



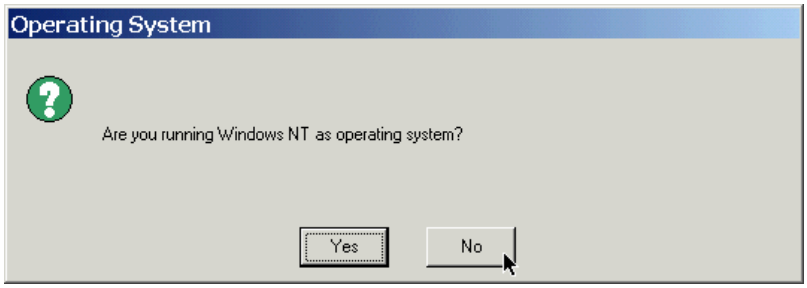
As in the previous step right-click the mouse button and select "Create Shortcut". The cut the newly created file and paste it on your computer desk top. This way you can start the GeoWEPP software always from your desktop.

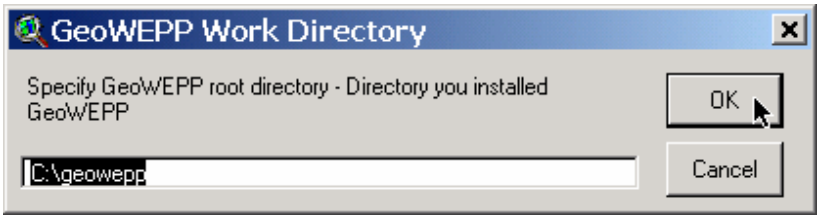
Section 2: Starting GeoWEPP ArcX and running the example data

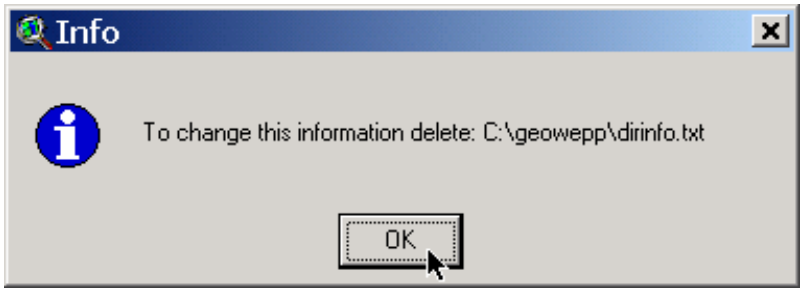
Start the GeoWEPP program by clicking the button "shortcut to startgeowepp" on your computer desktop.

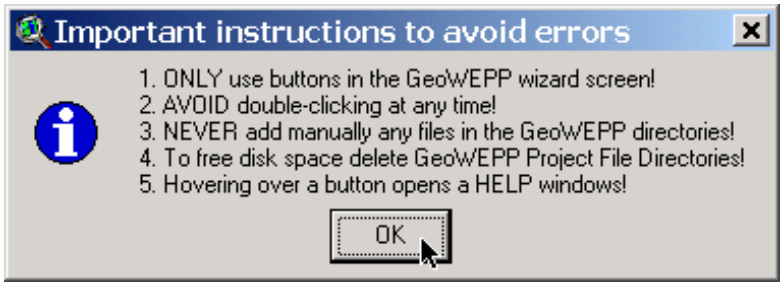
The ArcView GIS main program startup screen will build up and displays a disclaimer before displaying the GeoWEPP wizard.

If you use GeoWEPP for the first time you have to specify some important information, such as the operating system, the directory you installed WEPP (default directory is suggested), and the GeoWEPP directory (default directory is suggested). This information is stored in the file "dirinfo.txt" in your GeoWEPP directory.

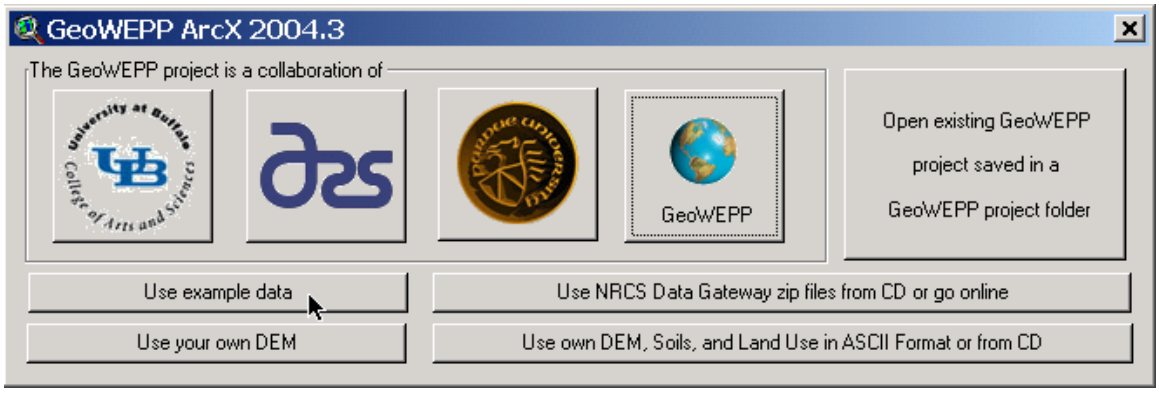








The GeoWEPP wizard opening screen provides several options to choose from:



The GeoWEPP Wizard allows you to use

- an already existing GeoWEPP project for a delineated watershed that you saved previously, or

delineate a new watershed by

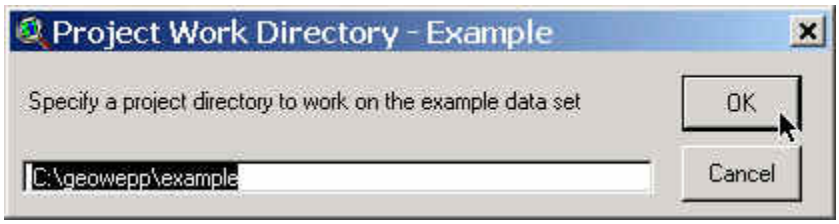
- using the example data sets (already provided in install),
- using NRCS Data Gateway zip files from a CD (offline - see GeoWEPP folder "NRCSzip", GeoWEPPdata directory on your WEPP CD, or previously downloaded data files) (online - connection to the internet is required),
- using your own DEM data (requires ArcInfo Grid data set in UTM coordinates), or
- using GIS data sets of your own Digital Elevation Model (DEM), Soils and Land Use (requires ASCII grid files and attribute tables in the same format as in the directory such as in the GeoWEPP folder "GISascii" (and analog named ones) - a GIS expert in your organization will be able to create such files easily if you give him/her the ones in this directory; Note: the "GISascii" folder also includes USGS Digital Raster Graphs (DRG) that may be imported).

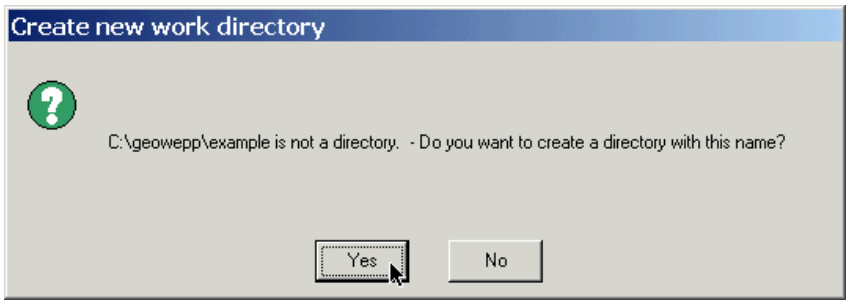
For this tutorial we chose the example data option.

Section 3: Viewing topographical data and delineate channels with TOPAZ

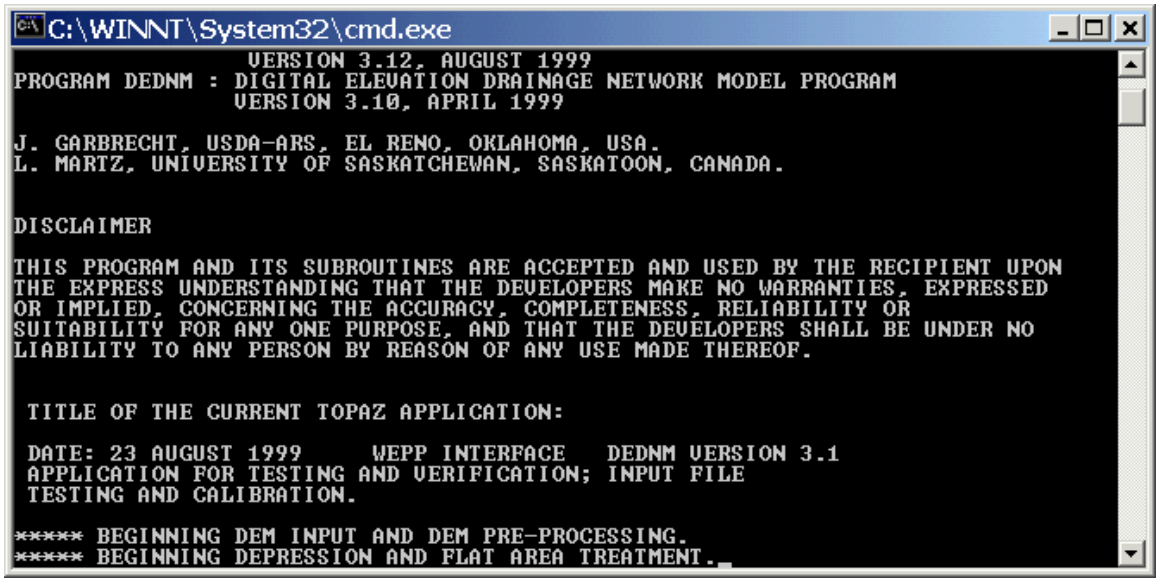
The GeoWEPP install already provides the example data set. Therefore it automatically imports the Digital Elevation Model (DEM) for West Lafayette, Indiana.

However, you have to specify a subdirectory in which all the files will be stored in your GeoWEPP main directory. In case you want to delete these data sets later you just use your file manager to delete this subdirectory.



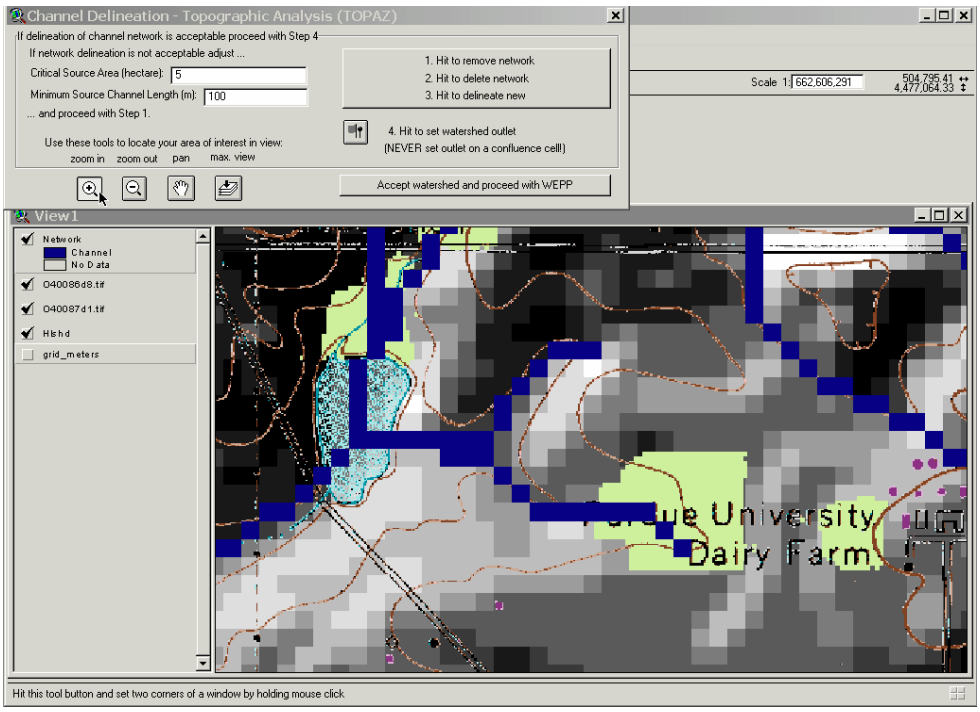


After displaying several messages for your information - the data sets required for the example are extracted and the topographic analysis for delineating the drainage network starts automatically. Please be patient and wait until each of the DOS windows disappear (or close them if they have a message in their window header that they are finished).



The final screen after processing the example data is the digital topographical map as a transparent overlay over the hillshade display of the DEM. Now you choose the different tools located in the upper part of the GeoWEPP wizard to locate the area of interest. The coordinates displayed in the upper right corner of your ArcView screen shows you the location of the cursor in your map view.

When you zoom in to the coordinates specified in the image below you will find the "Purdue University Dairy Farm" and the small pond that is the target for our soil and water conservation analysis. As you will see in this zoomed view, GeoWEPP already delineated a default drainage pattern based on the terrain analysis of the DEM using the topographical parameterization software TOPAZ.



In case the delineated drainage pattern does not match the outline based on the information provided by the topographical map or based on your own observations in the filed you have to change the CSA and MSCL parameters to outline a new drainage network.

To remove, delete and outline a new network you have to hit the big button in the upper right corner of the wizard three times in a row (please note to leave at least a second in between each hit). After the third hit TOPAZ will run again to delineate a new drainage network. You may repeat this step until you get a satisfying result. For our example we leave the parameters at the default setting: CSA = 5 ha and MSCL = 100m.

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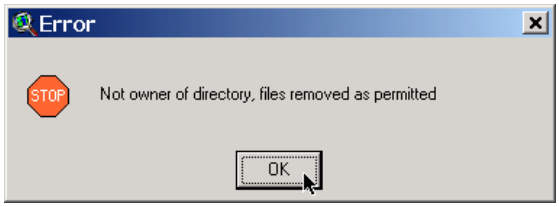
Please note: Some of you may experience an error message such as this one below:



I tried changing the code in a way that this error message does not appear, but it seems an internal error of ArcView 3.x that I can not influence. Therefore I included prior to the potential appearance of this error message, a message which should encourage you to continue you using GeoWEPP. The error does not have any impact on the results and can be therefore safely ignored.

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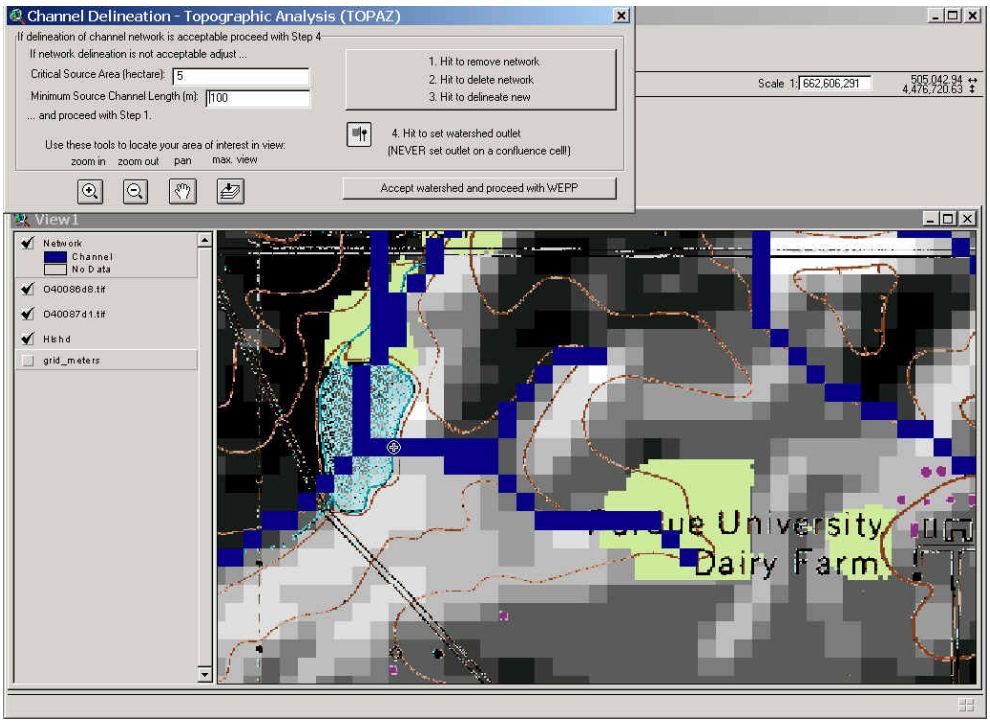
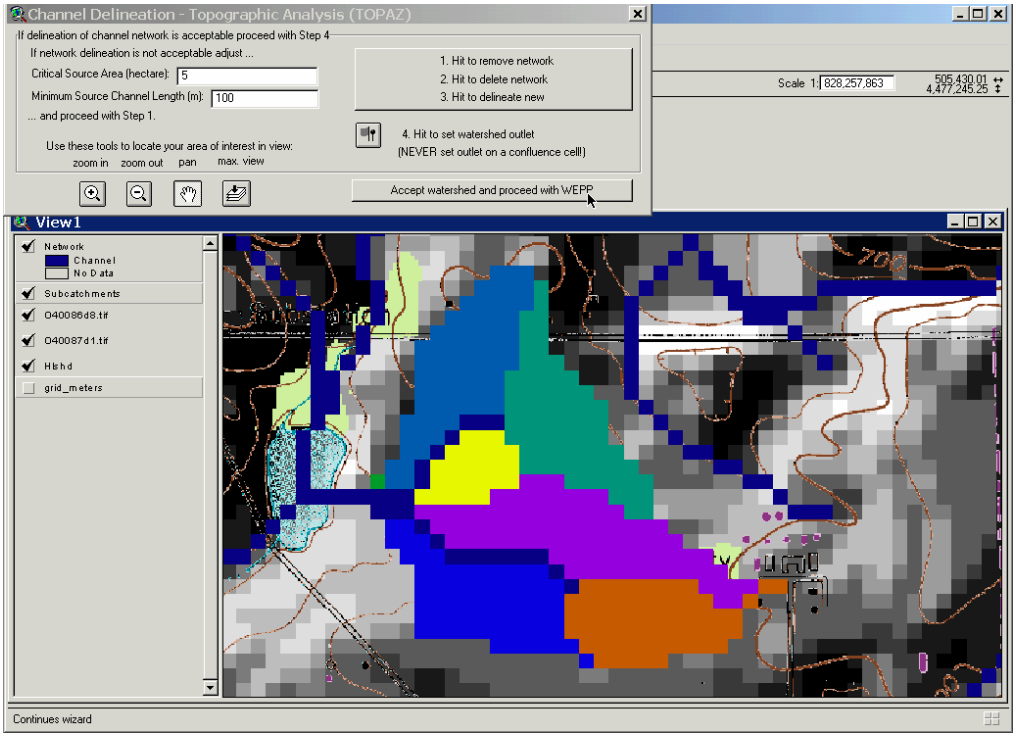
After accepting the drainage network you have to set the watershed outlet by clicking on the watershed outlet tool (the tool is now active and you have a cross hair symbol for your cursor when you move over the map view). To specify the outlet you click on your outlet of interest (please do not mark confluence cells/pixels!). For our example you hit the cell that is at the channel segment just before entering the small pond.



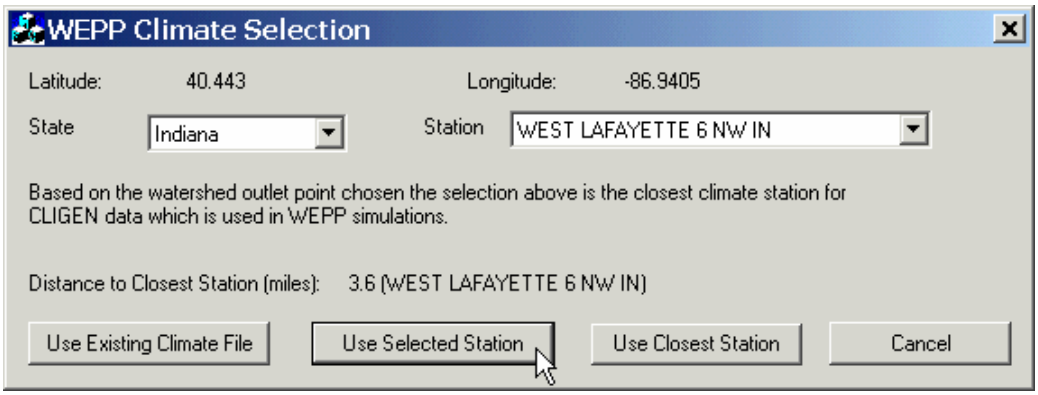
GeoWEPP will run TOPAZ (popping up DOS screens) again to delineate the watershed boundary and the subcatchment areas. In case you want to change the outline you have to click again on an outlet which causes the previously delineated watershed to disappear from the screen and deleted. To run WEPP for the watershed delineation you have to proceed by accepting the watershed.



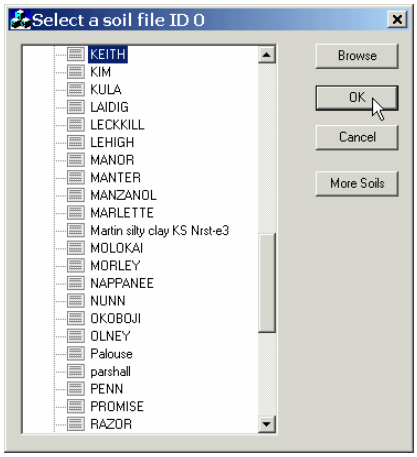
Section 4. Setting the main watershed properties

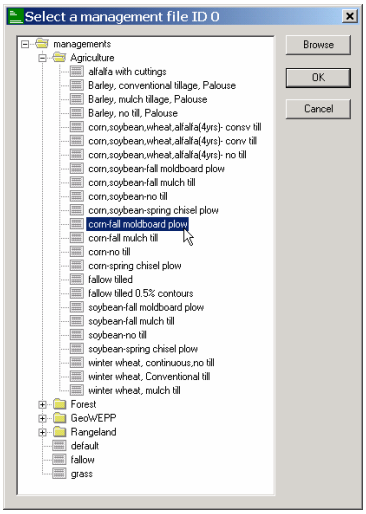
To avoid specifying the input parameters of climate, soil, land use and channels for each of the subcatchments, the GeoWEPP wizard allows you to specify the main watershed input parameters.

GeoWEPP automatically chooses the closest CLIGEN weather station to the outlet you specified for outlining the watershed of interest. CLIGEN generates a 100 year climate file that allows you to simulate time periods of up to a 100 years in the following WEPP simulation.

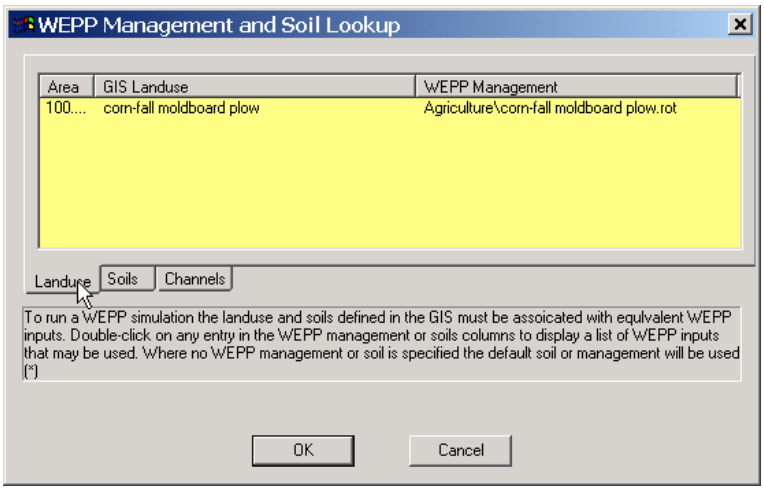


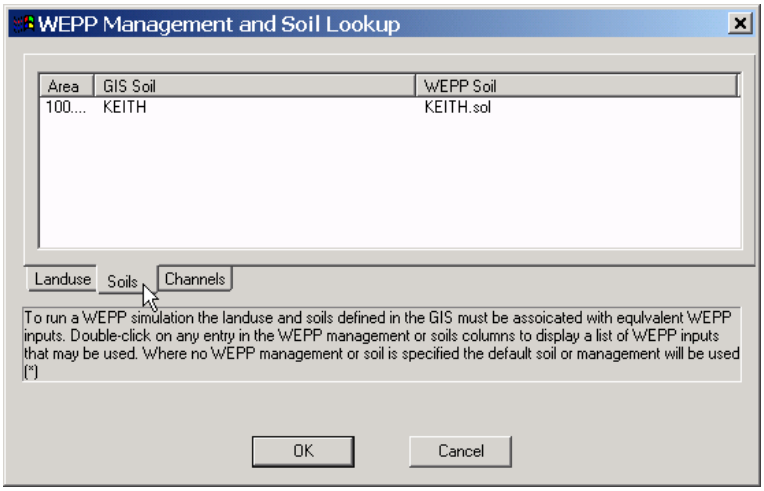
The access to the WEPP model parameter database lets you chose from existing soils and management.

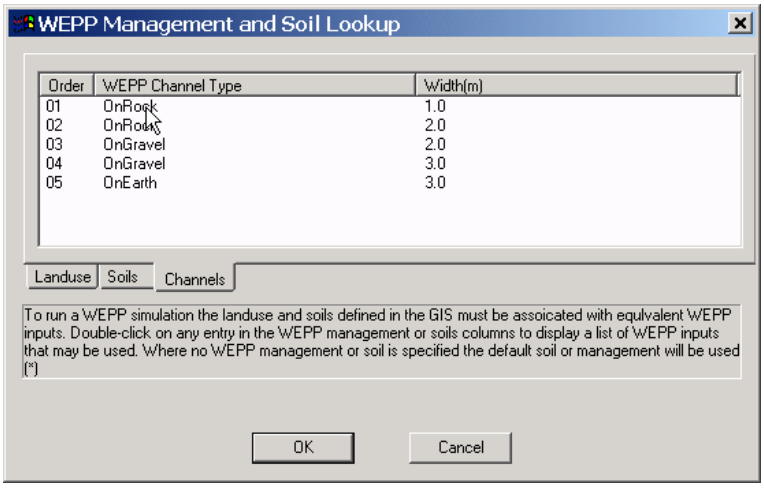




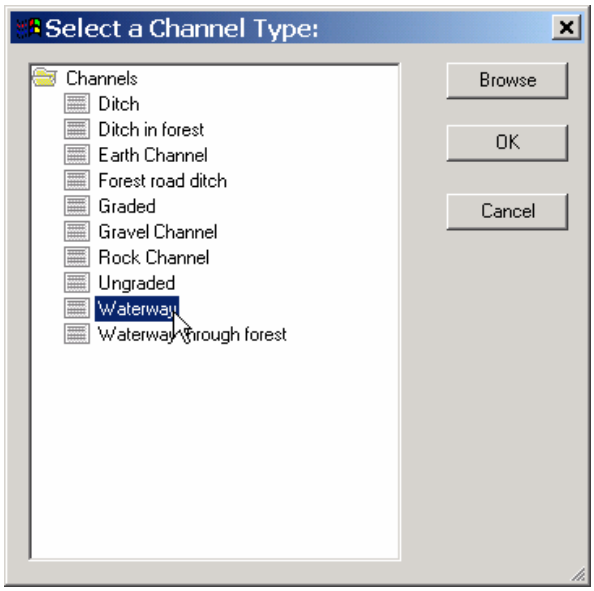
This is followed by the WEPP Management and Soil Lookup window that visualizes your choice and lets you change these settings (follow the instructions given in the screen and look for appropriate files in the GeoWEPP folders for the management and soil files). This also includes setting the channel parameters - channels are listed according to Strahler's Channel Order - by using the menu tab "Channels".

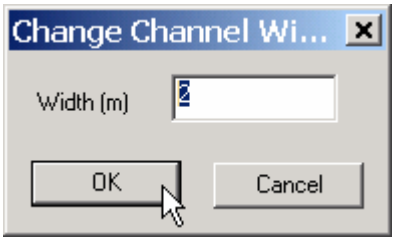


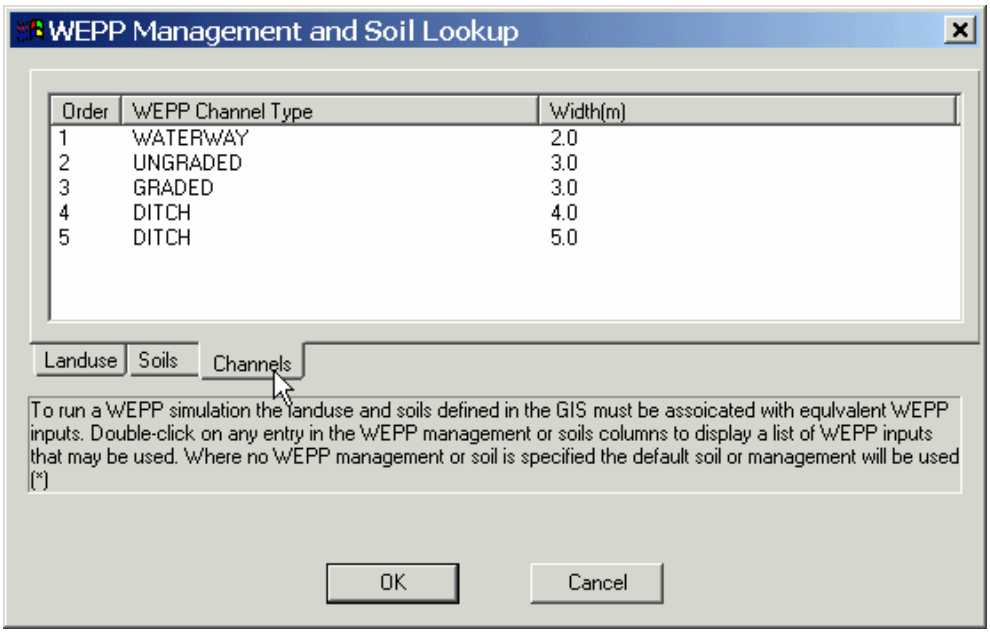




Change the WEPP Channel Type and the Width by double-clicking the different types and widths entries in the example. By using the popup screens you can then alter the channel settings (you can develop and chose the ones you created yourself in the WEPP Windows interface) until you changed the channel settings as given below.

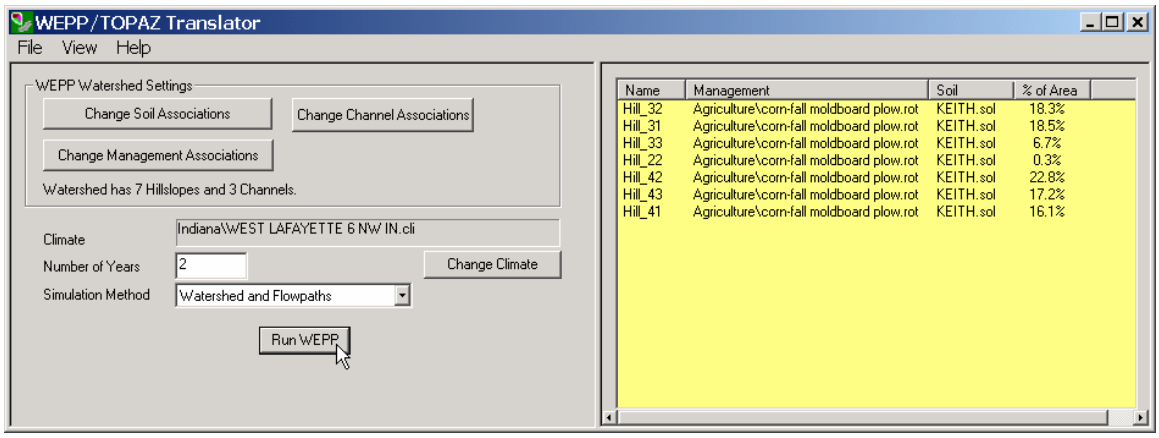






Section 5: Running the WEPP/TOPAZ Translator

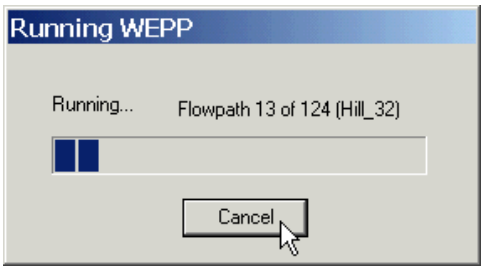
After this the WEPP/TOPAZ translator will allow you to set the final parameters for the WEPP simulation.



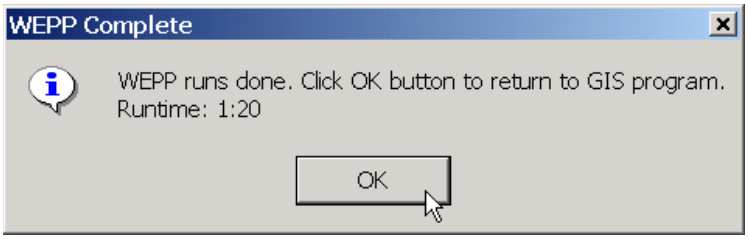
The WEPP/TOPAZ Translator is a tool that summarizes the input parameters for the hillslopes and channels in your watershed of interest. The simulation time in the example is set to 2 years (due to time constraints; one should always simulate at least 30 to 100 years) and to run both simulation methods:

- the **conventional WEPP watershed method** to simulate for representative hillslopes and channels (watershed method) that assesses the off-site impact of these hillslopes and channels within a watershed, and
- the **flowpath method** to simulate and all flowpaths individually and merge them for spatial analysis by weighing the simulation results for each raster cell by their contributing area and length of each flowpath.

Then you start the WEPP model by pressing the “Run WEPP” button.

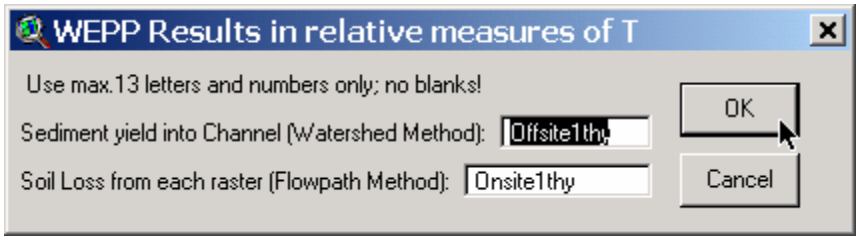


After the WEPP model runs there will be a message to return to the GIS ArcView.

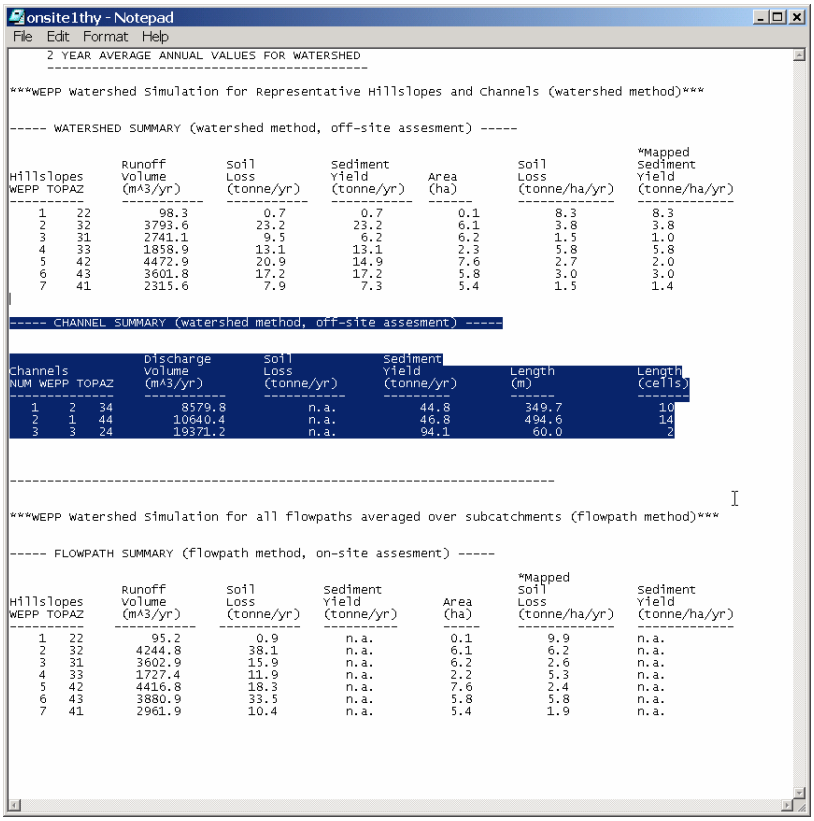


Immediately after the watershed was simulated the results will be displayed as maps (names are given with the T value 4 metric tons per hectare (one hectare is 100m by 100m) per year.

The offsite assessment (simulated by the watershed method) maps visualize the sediment yields from each subcatchment into the channels and from each channel into the next ones until they reach the watershed outlet.



The summary of the watershed simulation is given in a text file that will be saved in your project directory under the name of the on-site assessment map.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2 YEAR AVERAGE ANNUAL VALUES FOR WATERSHED

"""WEPP Watershed Simulation for Representative Hillslopes and Channels (watershed method)"""

----- WATERSHED SUMMARY (watershed method, off-site assesment) -----

Hillslopes WEPP	TOPAZ	Runoff Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	Soil Loss (tonne/ha/yr)	*Mapped Sediment Yield (tonne/ha/yr)
1	22	98.3	0.7	0.7	0.1	8.3	8.3
2	32	3793.6	23.2	23.2	6.1	3.8	3.8
3	31	2741.1	9.5	6.2	6.2	1.5	1.0
4	33	1858.9	13.1	13.1	2.3	5.8	5.8
5	42	4472.9	20.9	14.9	7.6	2.7	2.0
6	43	3601.8	17.2	17.2	5.8	3.0	3.0
7	41	2315.6	7.9	7.3	5.4	1.5	1.4

----- CHANNEL SUMMARY (watershed method, off-site assesment) -----

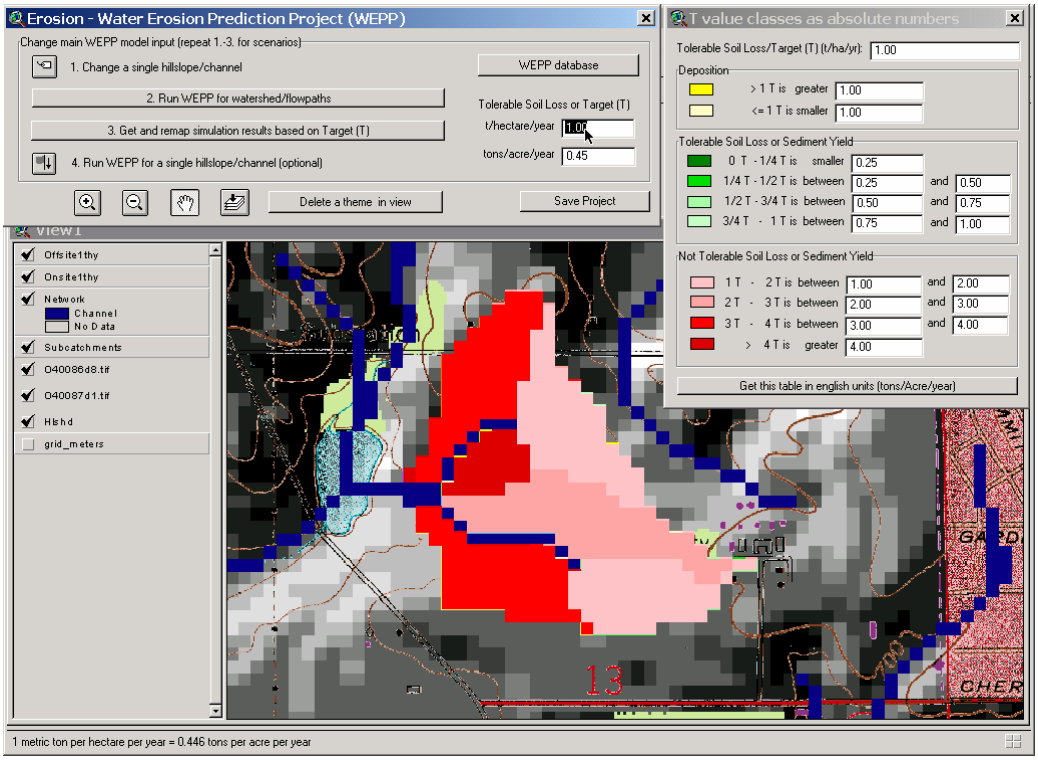
Channels NUM	WEPP	TOPAZ	Discharge Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Length (m)	Length (cells)
1	2	34	8579.8	n.a.	44.8	349.7	10
2	1	44	10640.4	n.a.	46.8	494.6	14
3	3	24	19371.2	n.a.	94.1	60.0	2

"""WEPP Watershed Simulation for all flowpaths averaged over subcatchments (flowpath method)"""

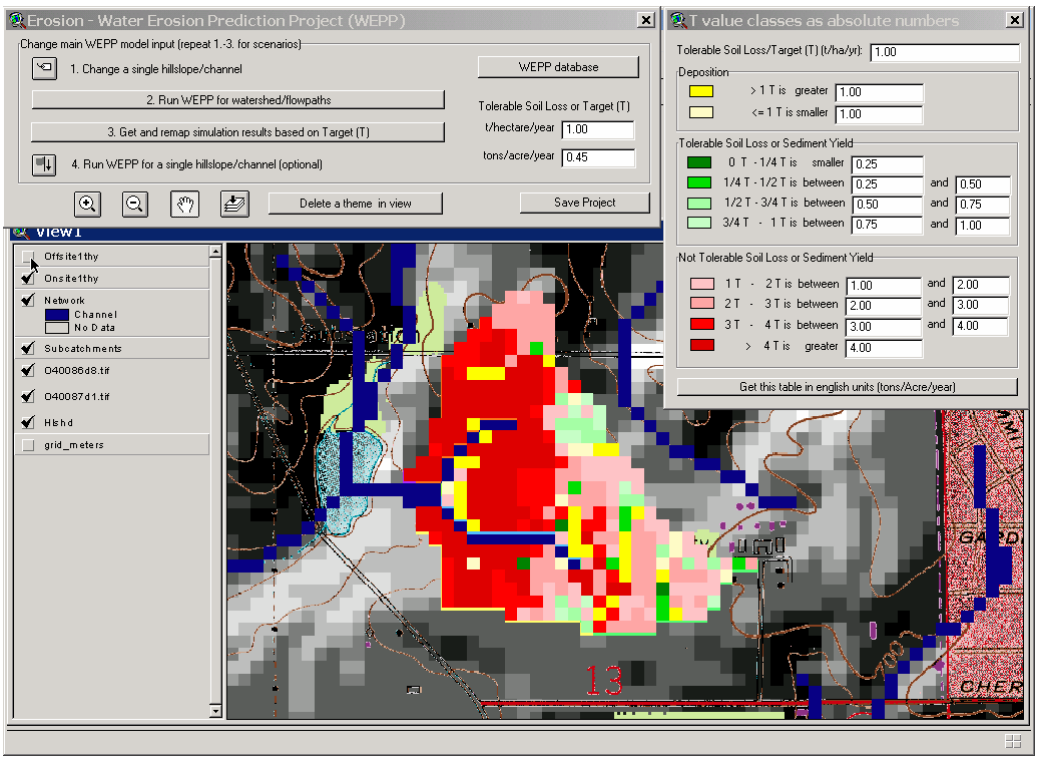
----- FLOWPATH SUMMARY (flowpath method, on-site assesment) -----

Hillslopes WEPP	TOPAZ	Runoff Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	*Mapped Soil Loss (tonne/ha/yr)	Sediment Yield (tonne/ha/yr)
1	22	95.2	0.9	n.a.	0.1	9.9	n.a.
2	32	4244.8	38.1	n.a.	6.1	6.2	n.a.
3	31	3602.9	15.9	n.a.	6.2	2.6	n.a.
4	33	1727.4	11.9	n.a.	2.2	5.3	n.a.
5	42	4416.8	18.3	n.a.	7.6	2.4	n.a.
6	43	3880.9	33.5	n.a.	5.8	5.8	n.a.
7	41	2961.9	10.4	n.a.	5.4	1.9	n.a.

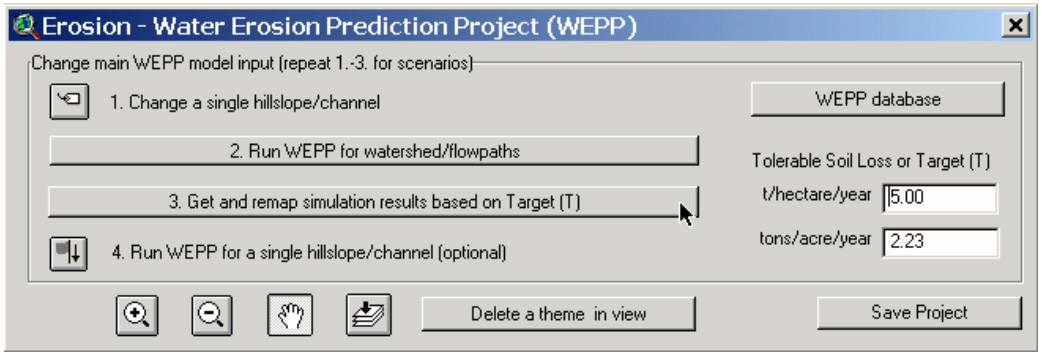
The legend of the map is dynamically set to a tolerable soil loss value or Target value T. This allows you to set the tolerable limit and create a map displaying areas with tolerable T values (greens), not tolerable T values (reds) and deposition areas (yellows). The map shows the sediment yields entering the channels from each hillslope relative to the T value.

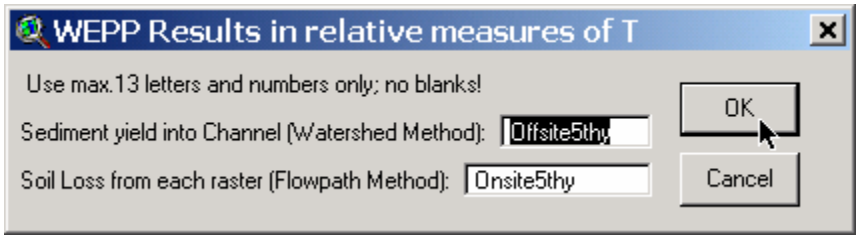


A click on the soil loss theme in the view allows you to remove the sediment yield (per subcatchment/contributing area) map temporarily from the view and show the underlying soil loss (per pixel) map. The map below shows the results of the flowpath method for assessing on-site soil loss within the watershed boundaries per raster cell.

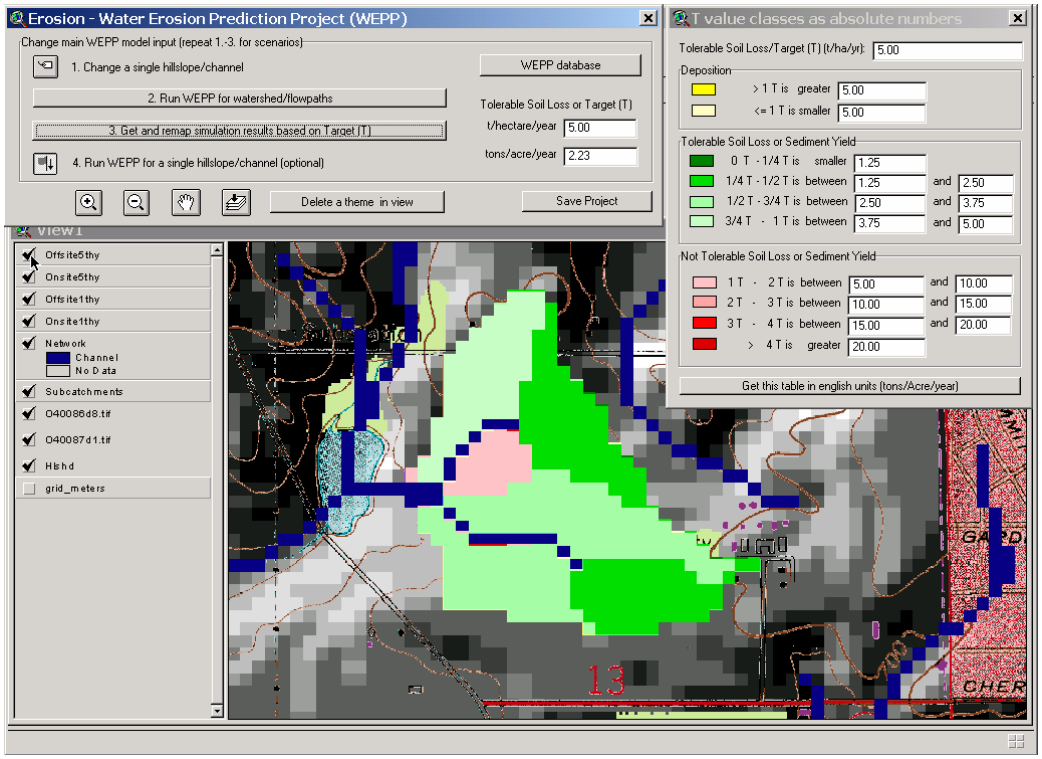


In step number three one can alter the tolerable soil loss or target value. In this case we change the value to 5 tons per hectare per year and click on the bar for step number three.

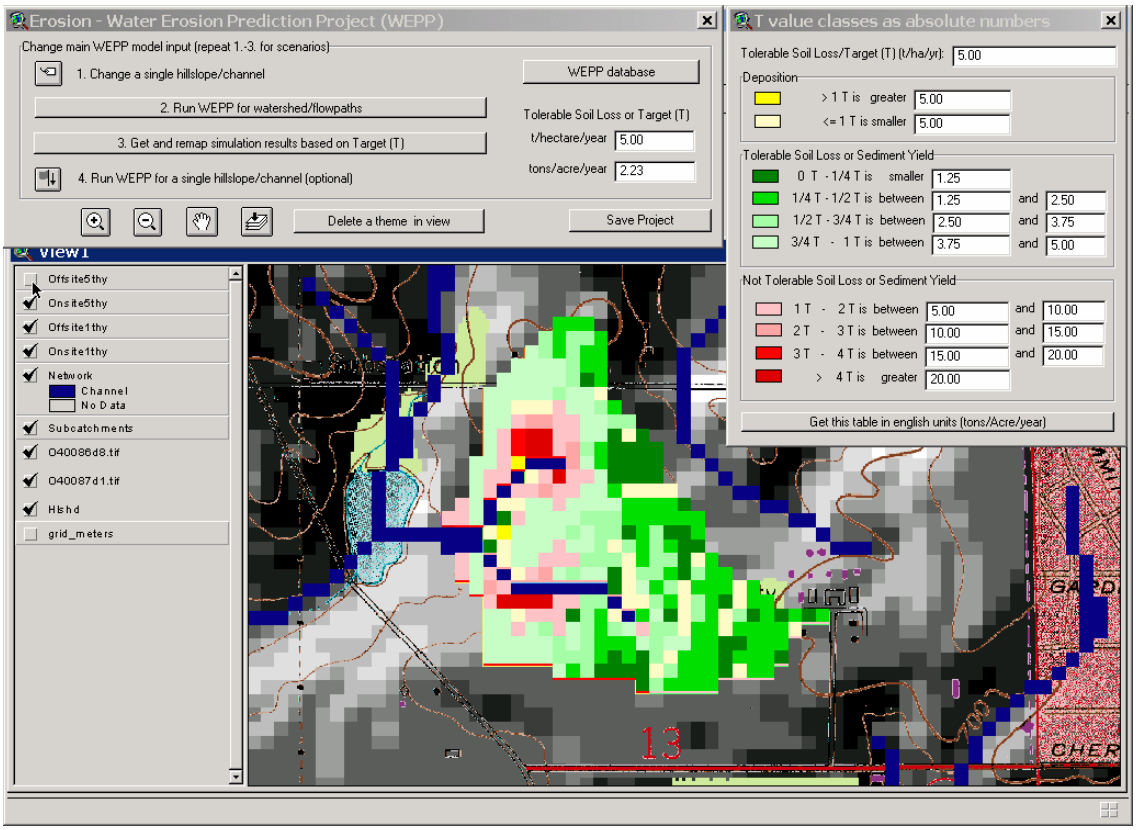




With this setting for the legend we get a map with distinct tolerable and non-tolerable mapping units for sediment yields (simulated by the **conventional WEPP watershed method**) and …



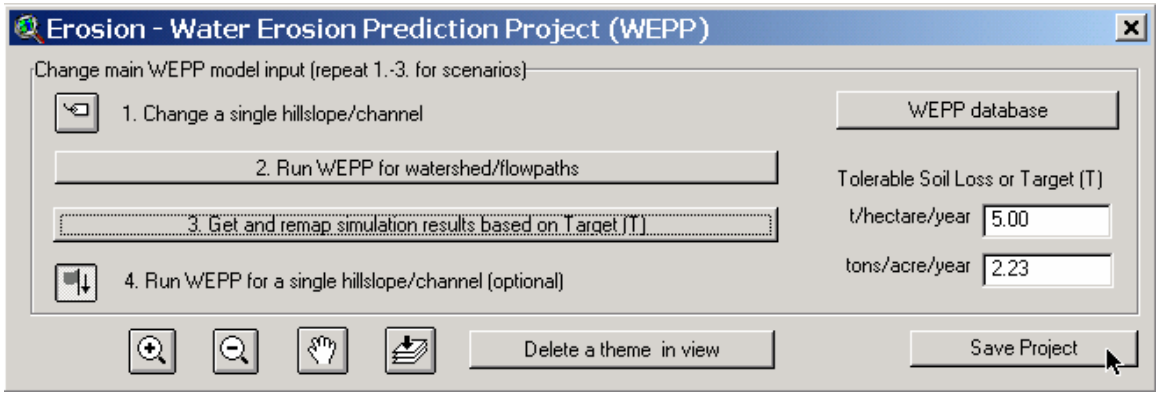
… soil losses (generated based on separate WEPP hillslope simulations of all flowpaths: the flowpath method). One should always remember that these are two different simulation methods and there maybe differences between both methods.

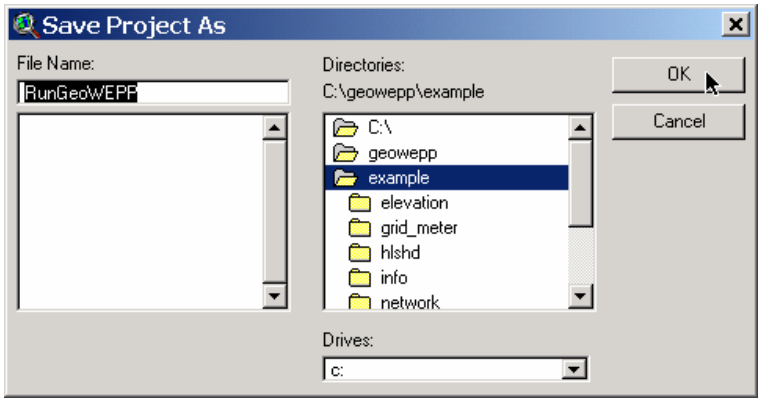


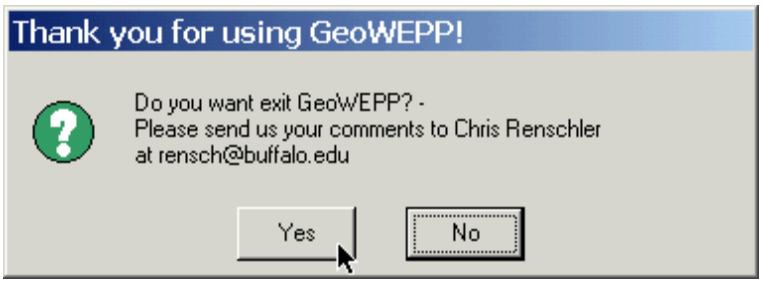
Now one can go ahead and use the view of contributing areas (sediment yield map) to change the land use, soils and other parameters for a contributing area, rerun the simulation to see their impact. One may just remap the current simulation with different T values.

Section 6: Save a GeoWEPP project

If you want to continue working later on this watershed you can save it and opening the project file you specified in the wizard will allow you to return to the current view of the watershed.



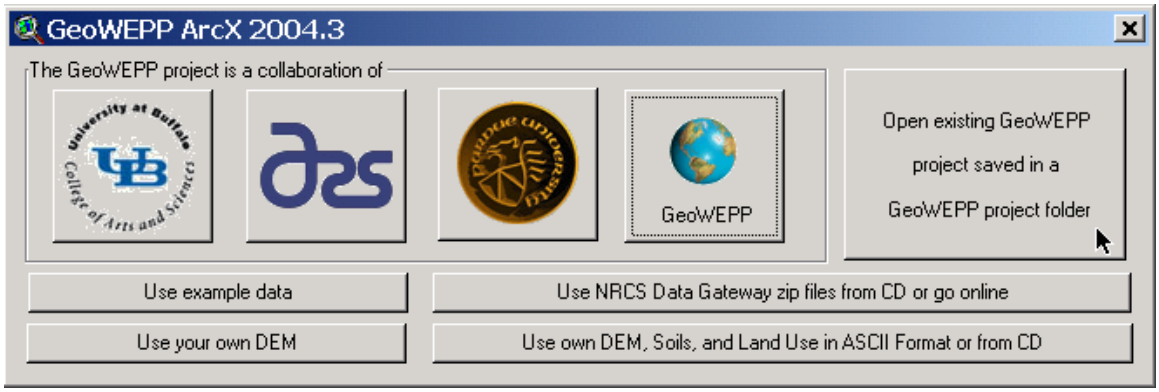




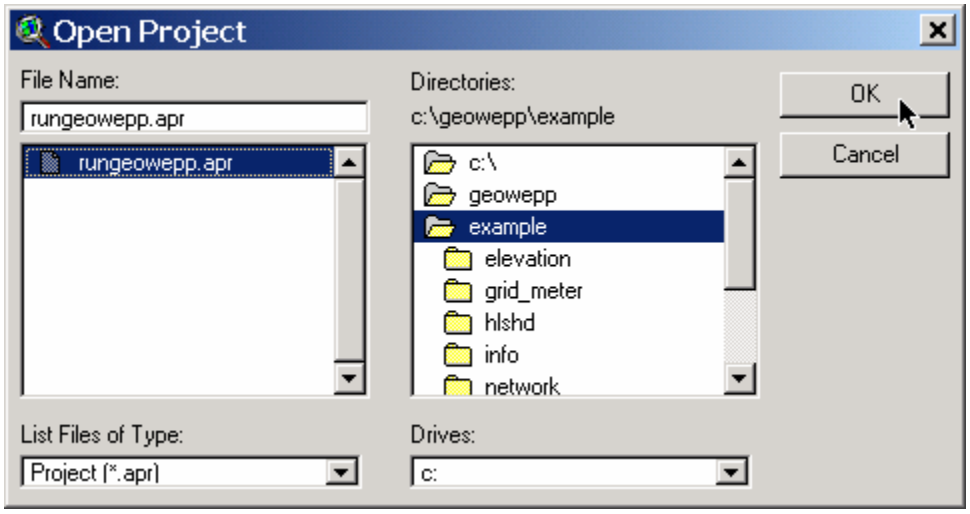
Section 7: Start up an existing GeoWEPP project

Start the GeoWEPP software from your desktop.

Then choose the button for an existing GeoWEPP project.

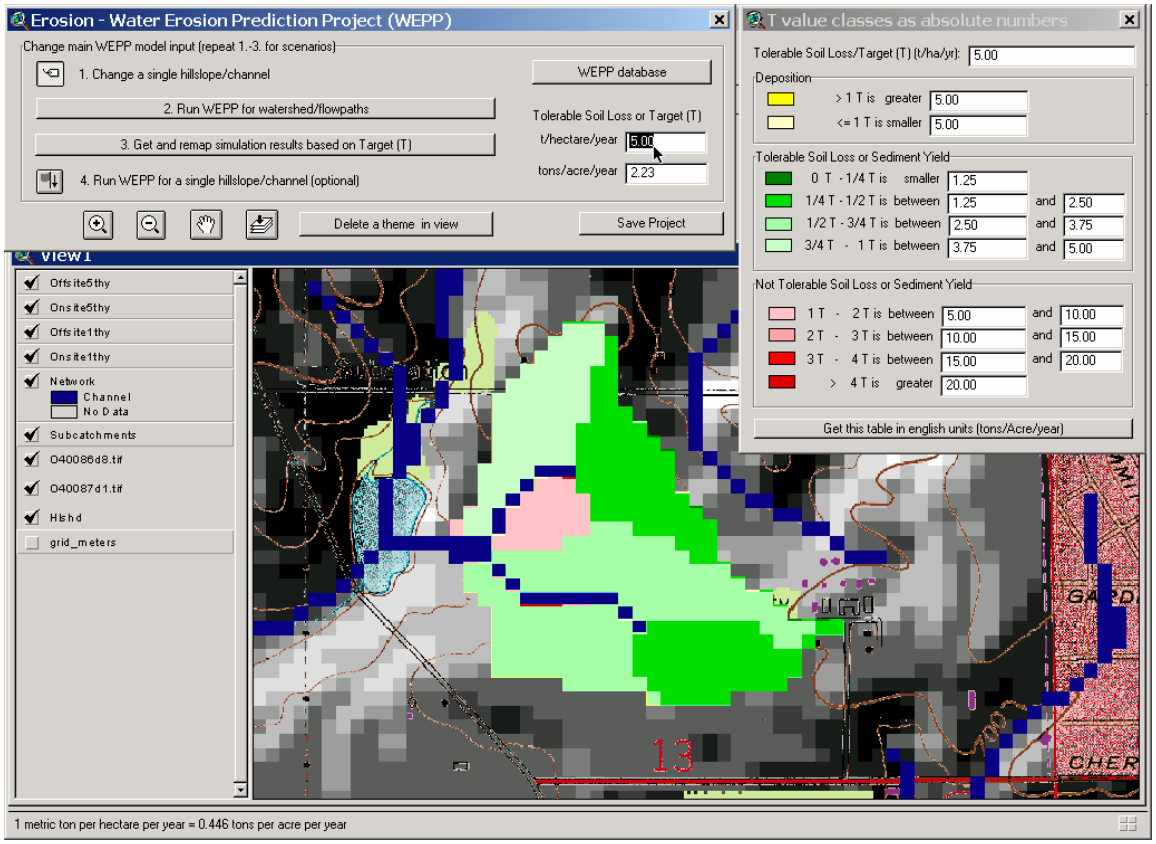


Open your previous project directory, e.g. “C:\GeoWEPP\example”, and start your previously saved ArcView project file, e.g. “rungeowepp.apr”.



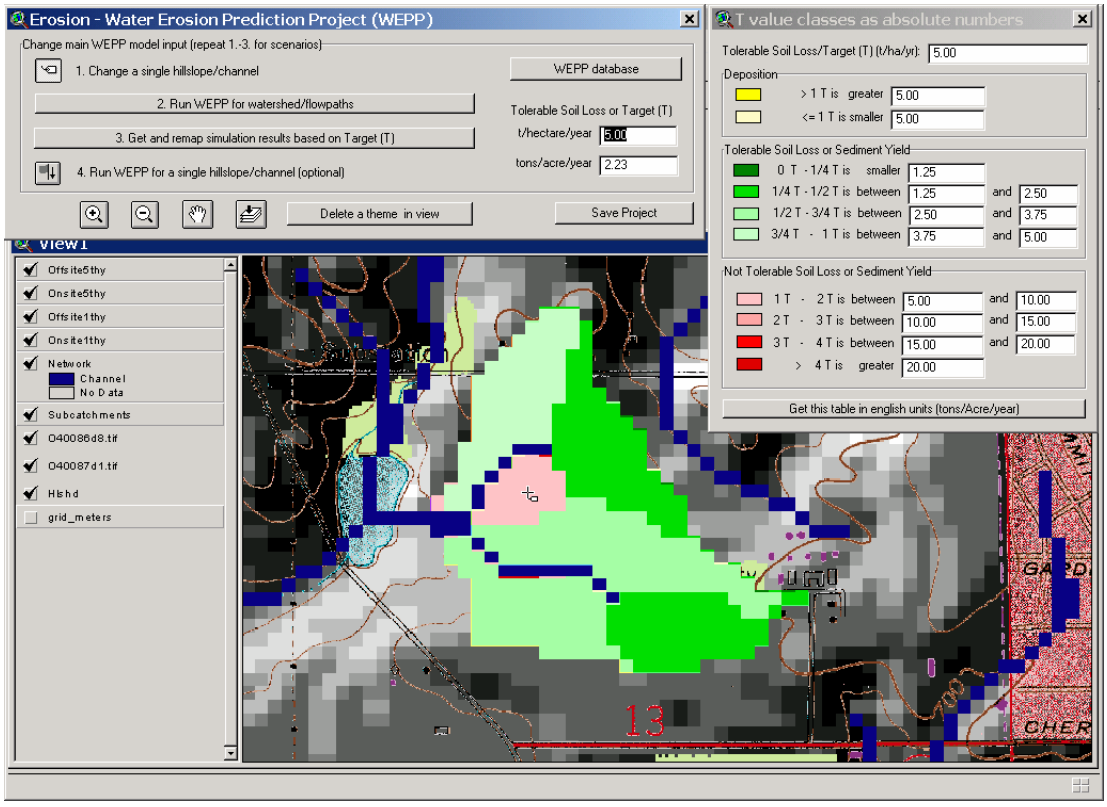
The project will start up as the screen was when you left (except for the text file on the simulation output – that you have to open up with notepad in your project folder, e.g. “C:\GeoWEPP\example\Onsite5thy.txt”.

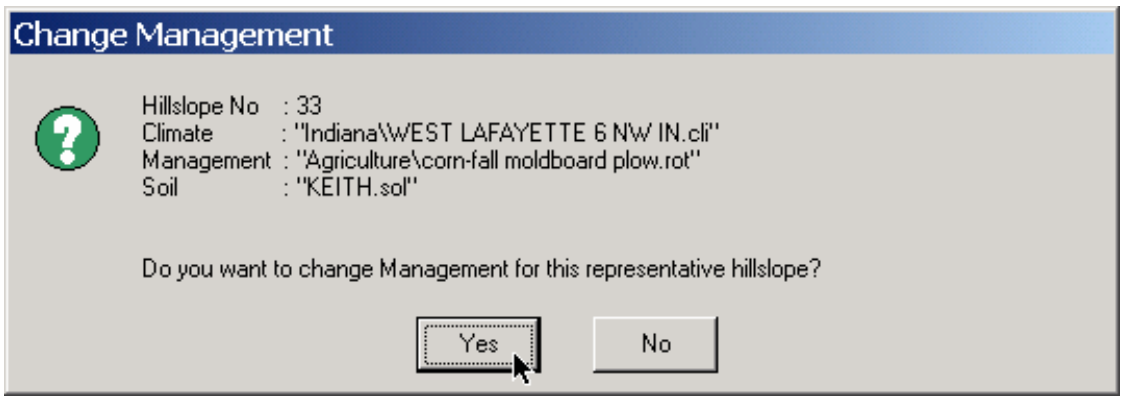
Please remember to change the default setting for the target value T to the appropriate level so that future GeoWEPP results will be automatically mapped with that tolerable level.



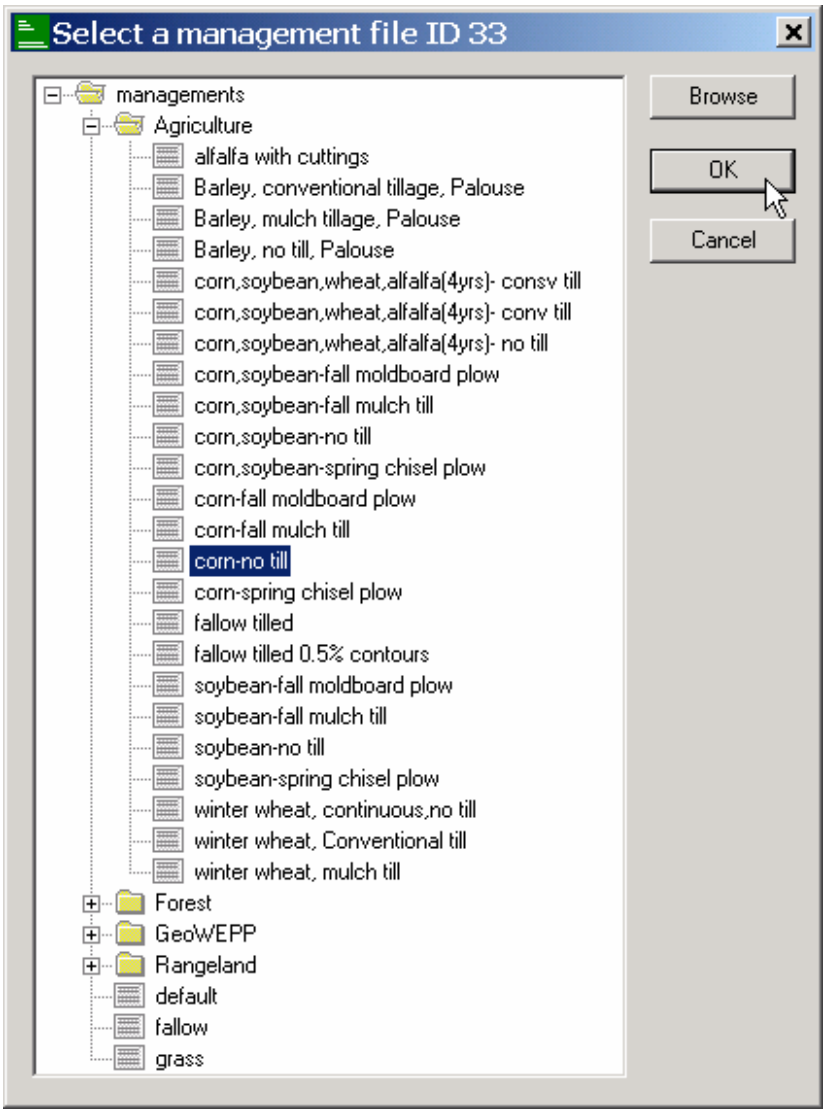
Section 8: Change land use, soils or channel parameters

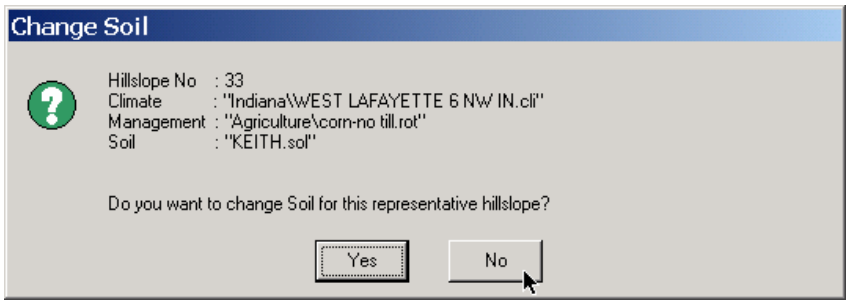
To change the land use in the areas that produce non tolerable soil loss on the subcatchments (onsite) or sediment yield in to the channel network (offsite), we will now change the land use. Activate the button in the first step in the GeoWEPP wizard and set the curser on an area in which you would like to change the land use (or soil).





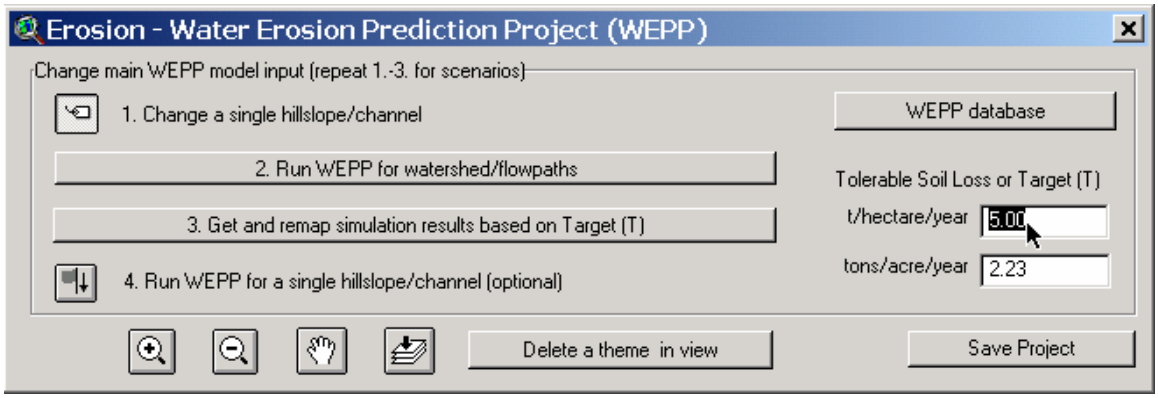
Change the land use to corn-no till and keep the previous soil type setting.

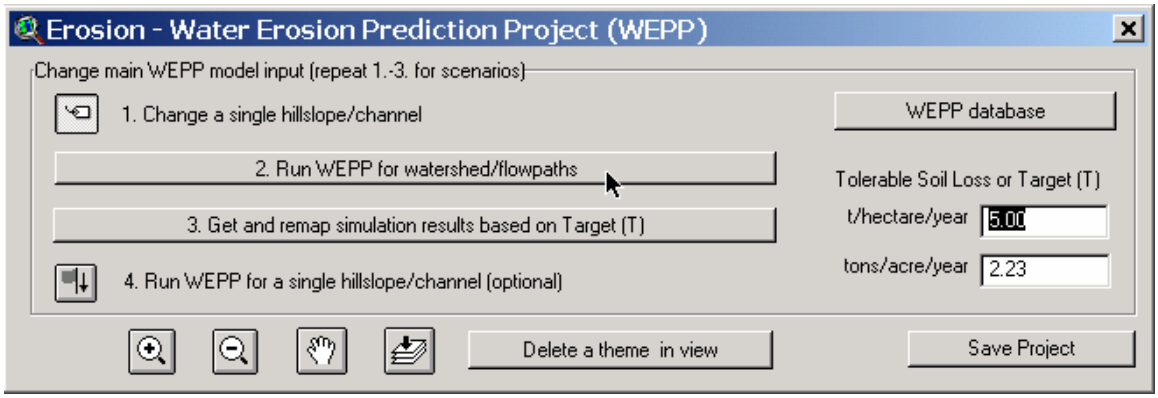


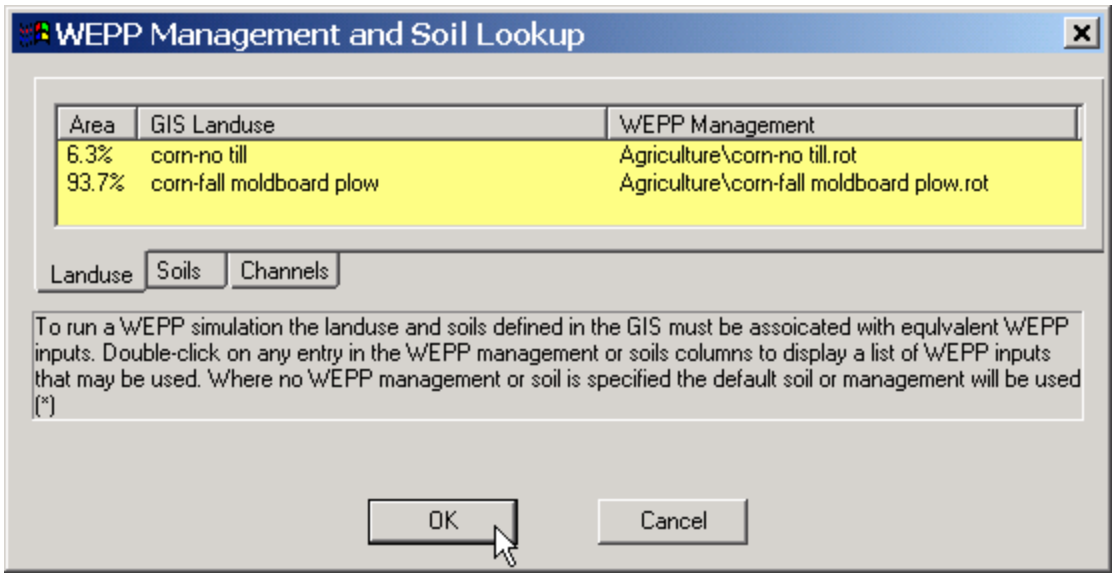


Do this also for the other non tolerable areas.

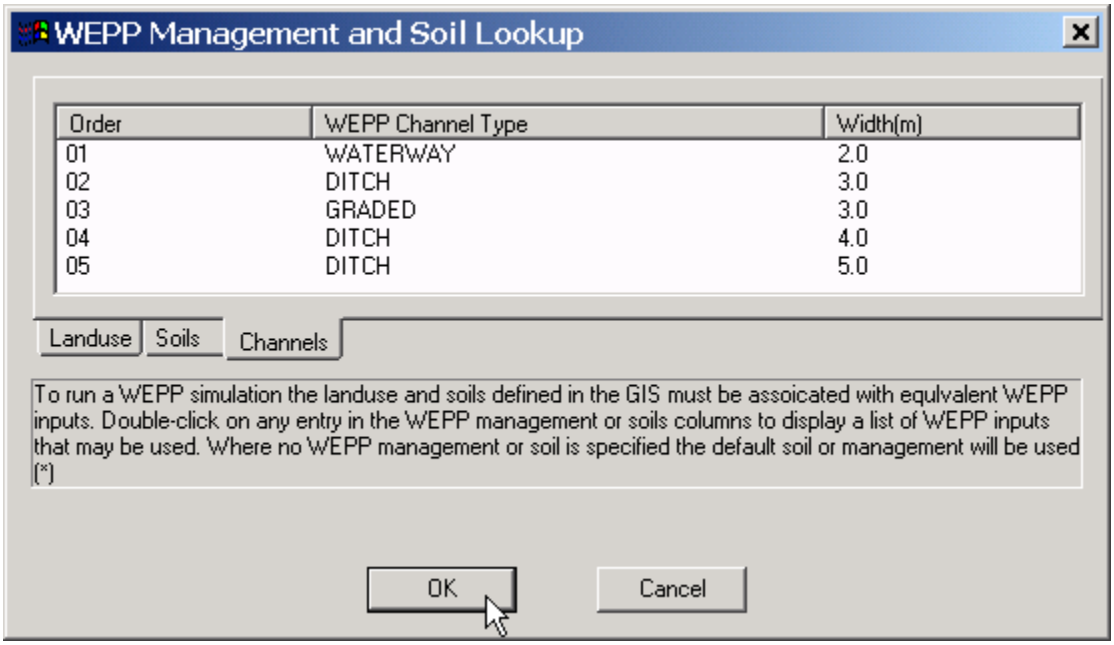
Insert the target value T of your choice, e.g. 5.00 t/ha/yr, and hit enter. Then go to step 2 to run the WEPP/TOPAZ translator to review and further adjust the model input.



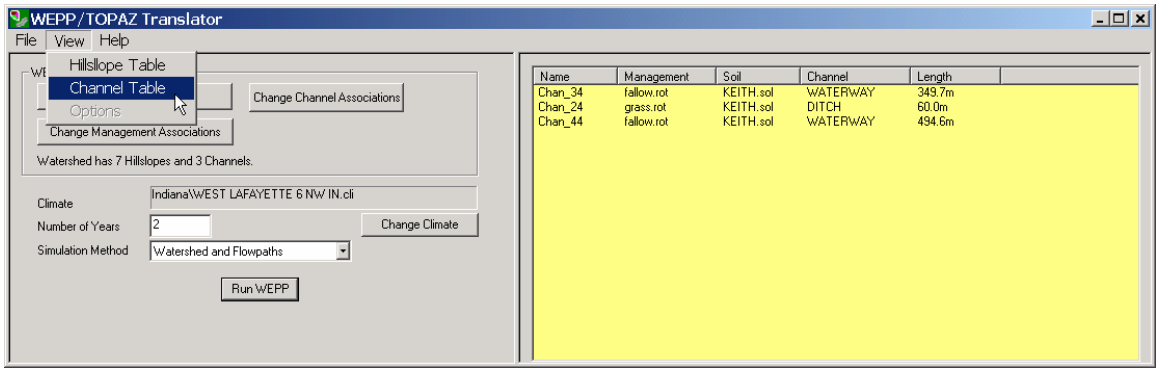




Use the Channel tab to change the second order channel to a ditch (click on UNGRADED).

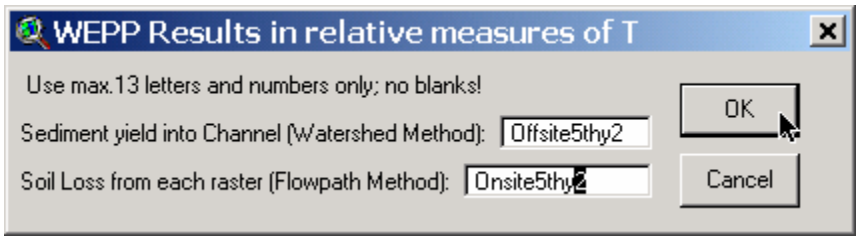


A review of the WEPP input setting shows you that the hillslope settings for land use have changed (to see the channel settings change the view to “channel table”.

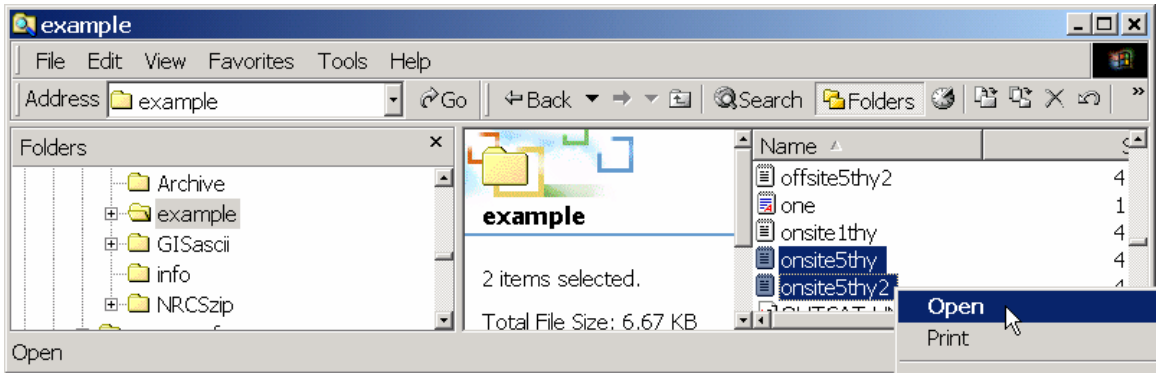


[If you want to change the channel settings for the waterways, e.g to represents the conservation method grassed waterways, one has to change the channel parameter settings in the WEPP Windows interface].

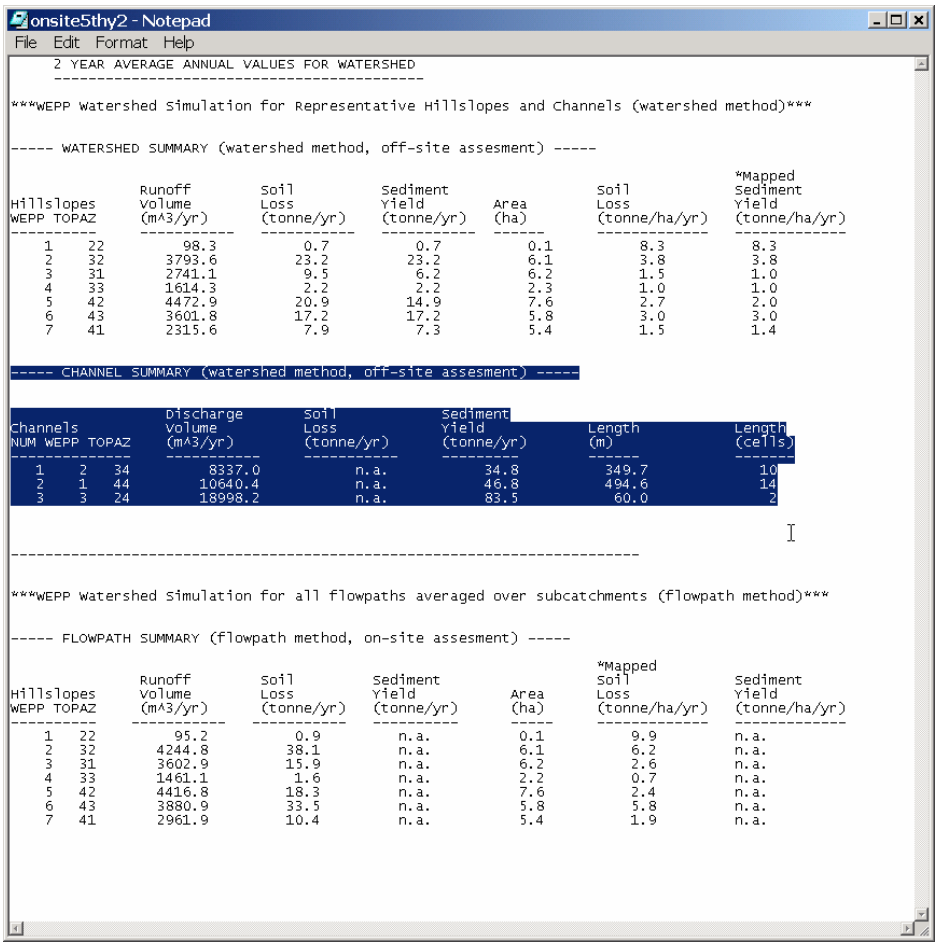
Then run the WEPP model, and change the output names to indicate the second land use scenario, e.g. by ending the new map names with a “2”.



To open your model text file summary from your initial simulation, the file “onsite5thy.txt” with the notepad or a simple double-clicking on the file in your file manager.



A comparison of the model output for the on-site and off-site assessment of Hillslopes 22, 32 and 33 reveals a soil loss reduction as well as the sediment yield in the channel network.



onsite5thy2 - Notepad

File Edit Format Help

2 YEAR AVERAGE ANNUAL VALUES FOR WATERSHED

WEPP Watershed Simulation for Representative Hillslopes and Channels (watershed method)

----- WATERSHED SUMMARY (watershed method, off-site assesment) -----

Hillslopes WEPP	TOPAZ	Runoff Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	Soil Loss (tonne/ha/yr)	*Mapped Sediment Yield (tonne/ha/yr)
1	22	98.3	0.7	0.7	0.1	8.3	8.3
2	32	3793.6	23.2	23.2	6.1	3.8	3.8
3	31	2741.1	9.5	6.2	6.2	1.5	1.0
4	33	1614.3	2.2	2.2	2.3	1.0	1.0
5	42	4472.9	20.9	14.9	7.6	2.7	2.0
6	43	3601.8	17.2	17.2	5.8	3.0	3.0
7	41	2315.6	7.9	7.3	5.4	1.5	1.4

----- CHANNEL SUMMARY (watershed method, off-site assesment) -----

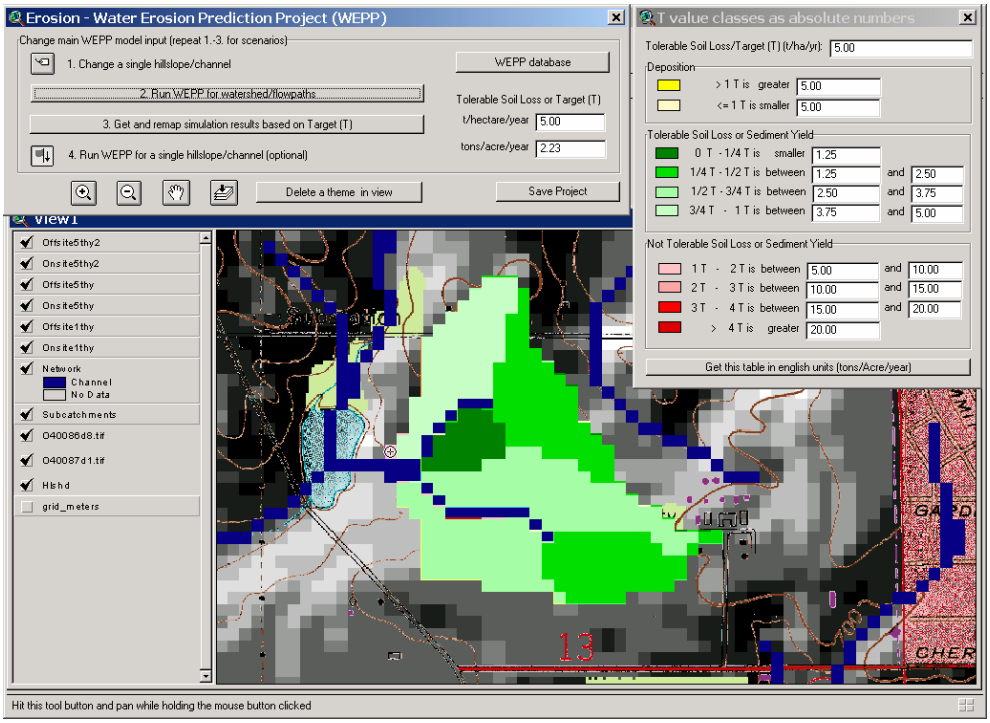
Channels NUM	WEPP	TOPAZ	Discharge Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Length (m)	Length (cells)
1	2	34	8337.0	n.a.	34.8	349.7	10
2	1	44	10640.4	n.a.	46.8	494.6	14
3	3	24	18998.2	n.a.	83.5	60.0	2

WEPP Watershed Simulation for all flowpaths averaged over subcatchments (flowpath method)

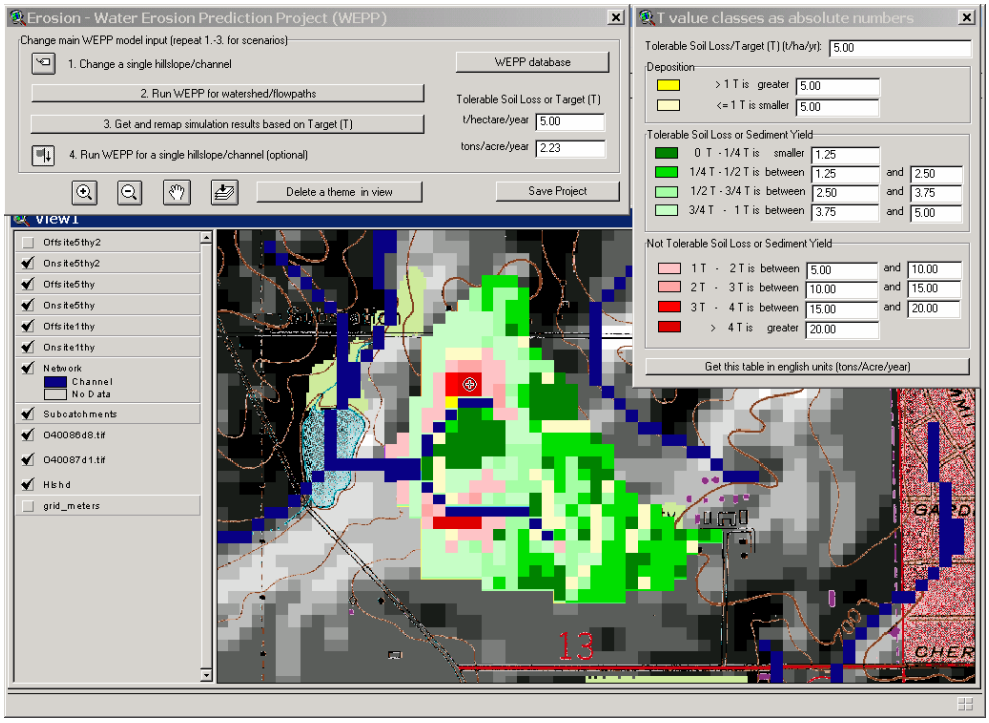
----- FLOWPATH SUMMARY (flowpath method, on-site assesment) -----

Hillslopes WEPP	TOPAZ	Runoff Volume (mA3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	*Mapped Soil Loss (tonne/ha/yr)	Sediment Yield (tonne/ha/yr)
1	22	95.2	0.9	n.a.	0.1	9.9	n.a.
2	32	4244.8	38.1	n.a.	6.1	6.2	n.a.
3	31	3602.9	15.9	n.a.	6.2	2.6	n.a.
4	33	1461.1	1.6	n.a.	2.2	0.7	n.a.
5	42	4416.8	18.3	n.a.	7.6	2.4	n.a.
6	43	3880.9	33.5	n.a.	5.8	5.8	n.a.
7	41	2961.9	10.4	n.a.	5.4	1.9	n.a.

A view on the map reveals that according to the sediment yield (off-site assessment) all subcatchments are now colored in “green” and therefore in the tolerable limit.



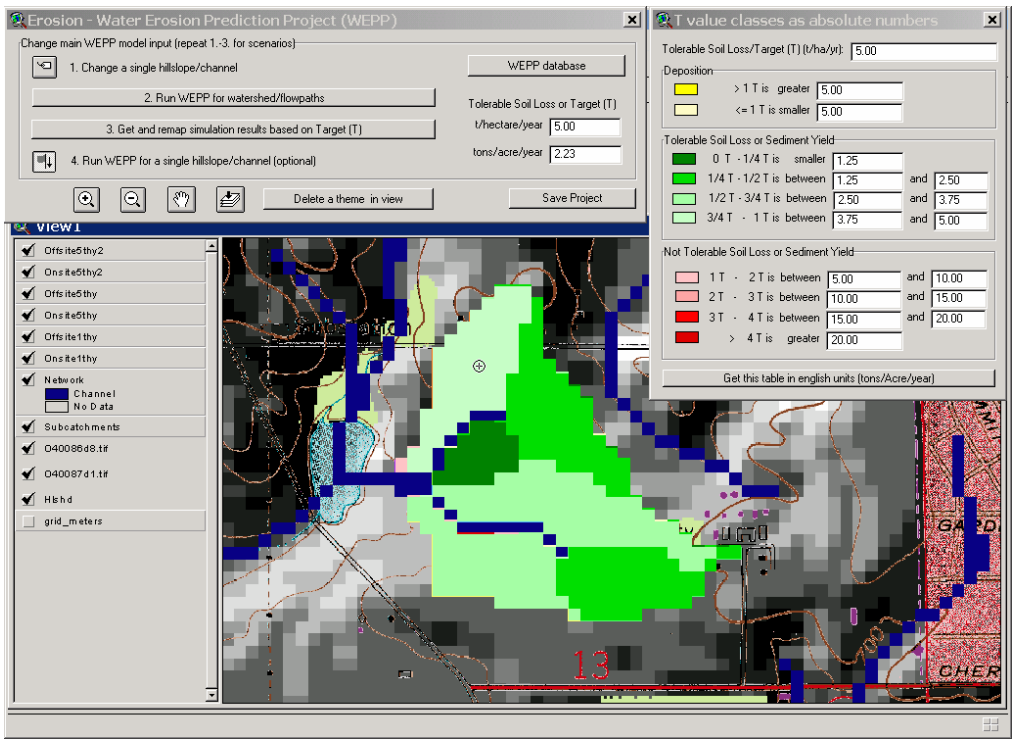
However, a click on the latest off-site map, reveals the on-site assessment results which indicate that there are still some soil loss hotspots particularly in the southern part of the watershed.



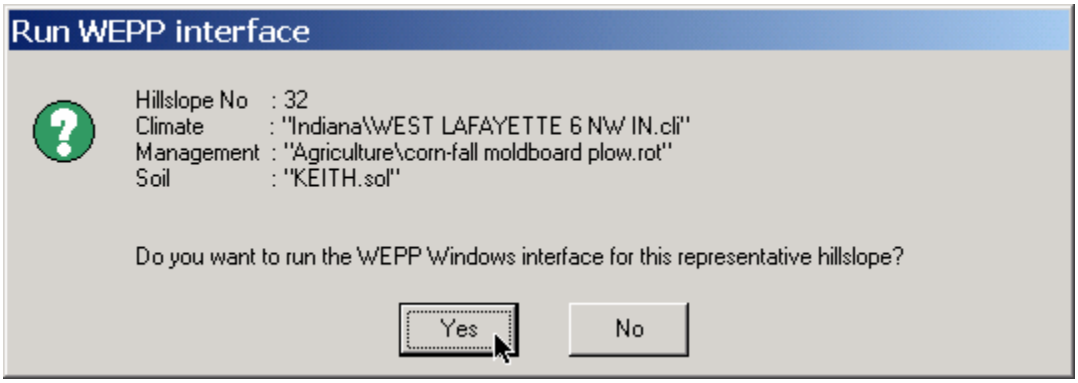
Now you can continue to change the land use until you achieve tolerable soil loss areas only. Save the project after you have finished.

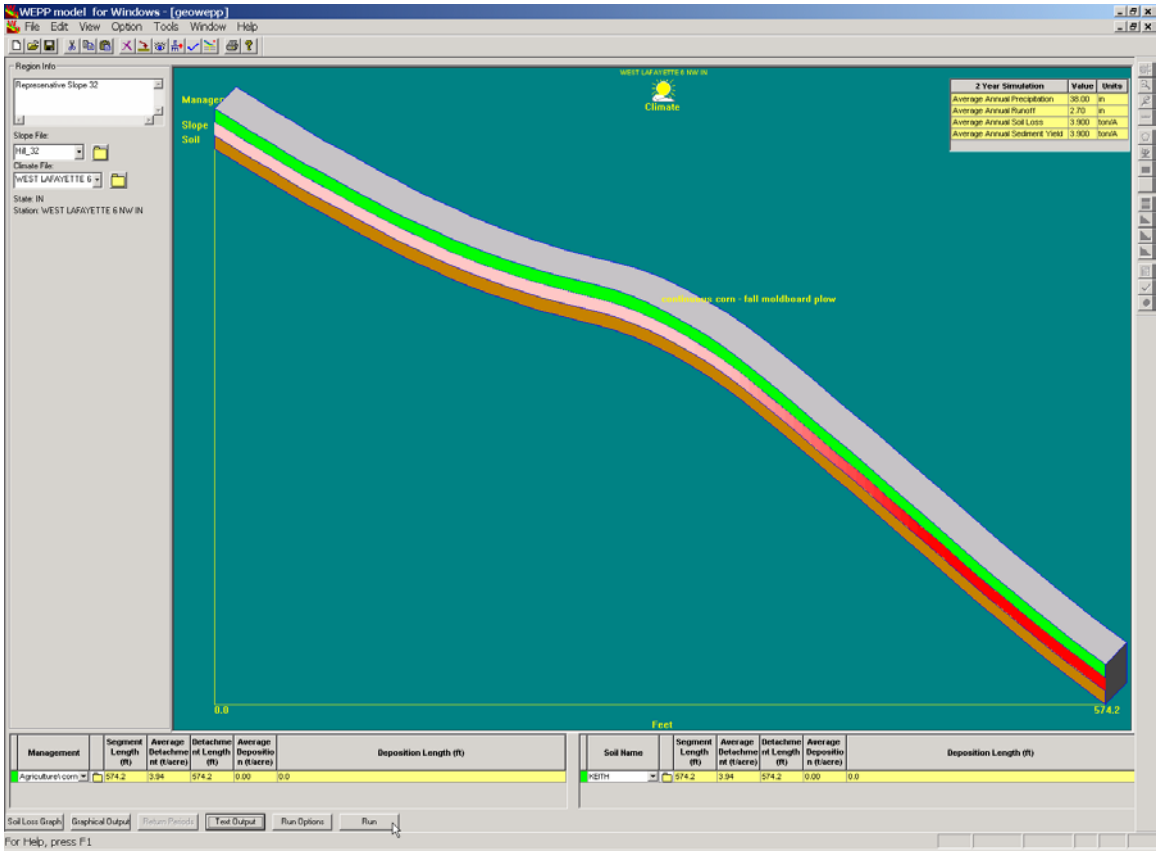
Section 9: Run WEPP Windows Interface for selected subcatchments

One way to look at the way WEPP simulates the representative hillslopes of subcatchments is to select the button in step 4 of the GeoWEPP wizard and click with the crosshair curser on one of the subcatchments.



A window will show all the inputs to the WEPP model for this hillslope. You have the option to run the WEPP model for this hillslope by clicking “Yes”.



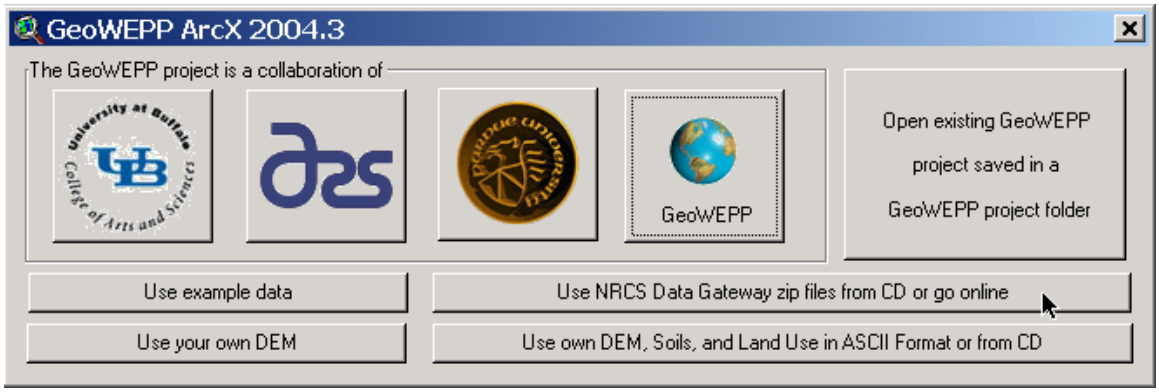


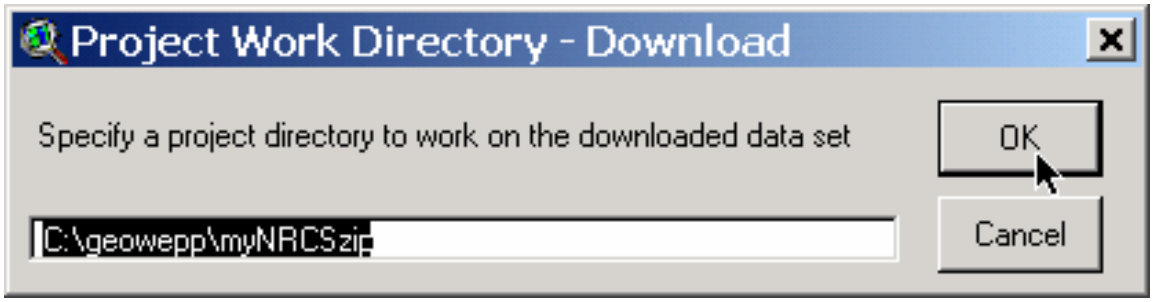
You can now design a particular management or soil series along this hillslope with multiple overland flow elements (OFE). It is currently not possible to delineate multiple OFE hillslopes, save them in the Windows interface and bring the information back to the GeoWEPP.

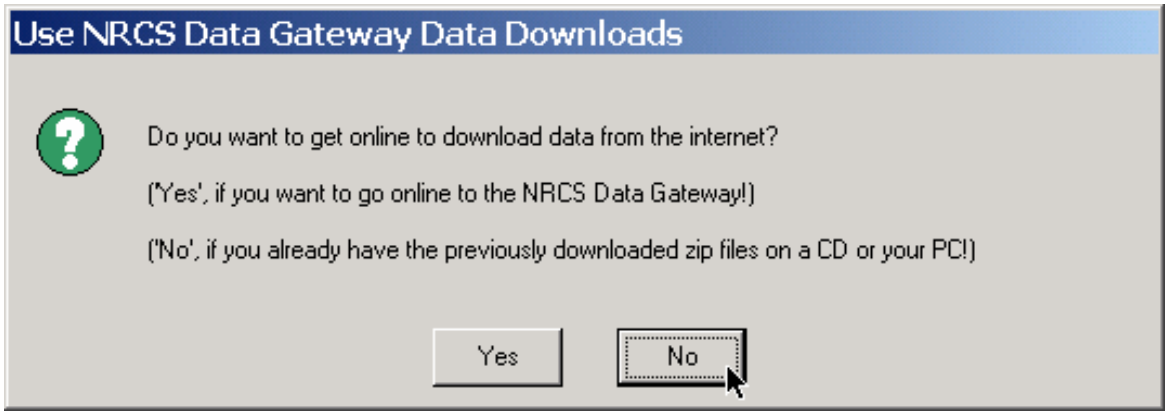
Section 10: Select a watershed of your interest (within the U.S.)

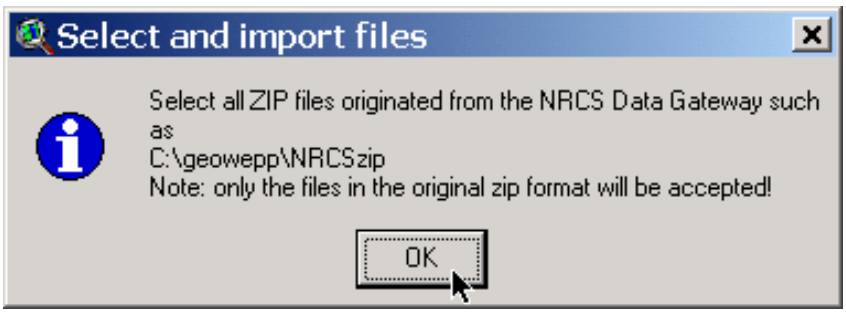
Start the GeoWEPP software from your desktop.

Then choose the button to use NRCS data gateway datasets of your area of interest.

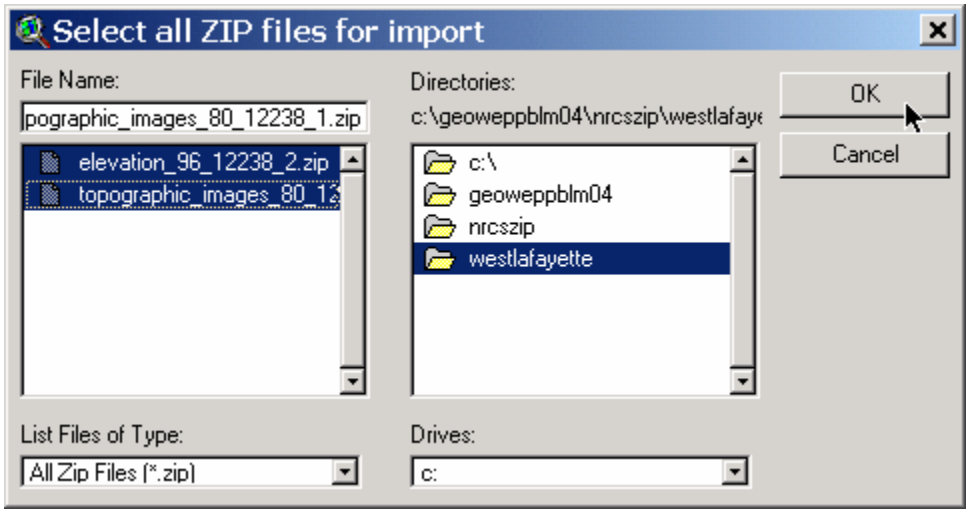


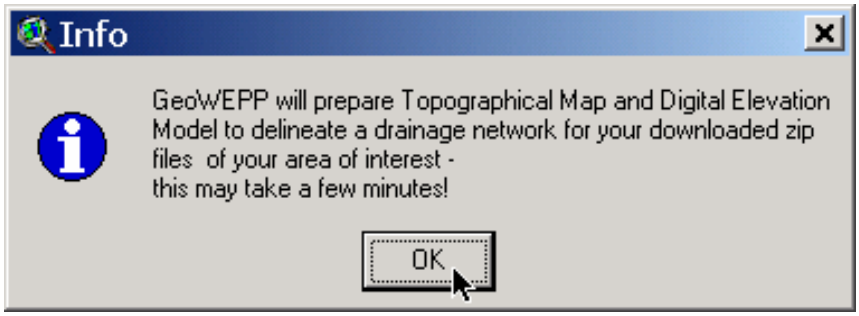






Use the browser to select your drive, e.g. d for the CD-ROM in you computer, change to the files as in the figure below and look for your name. Then select all the zip files, by clicking on the name and holding the shift button on your keyboard (in the same way you use this files when you downloaded them from the internet in a directory of your choice).





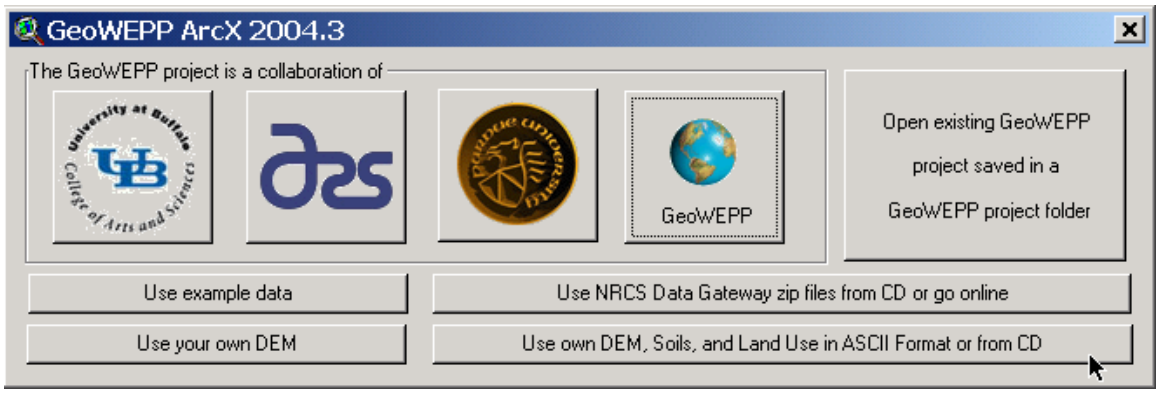
The files are then automatically copied, unzipped and imported in the current view. The watershed delineation takes place and you proceed as described on page 6.

Please note: the NRCS data gateway offers the original UTM projected USGS DEM only in NAD27. If you want to combine the analysis results with a NAD83 projected dataset then it would be better to have the GIS data sets converted in NAD83, converted in ASCII raster data format, and proceed as described in the next section.

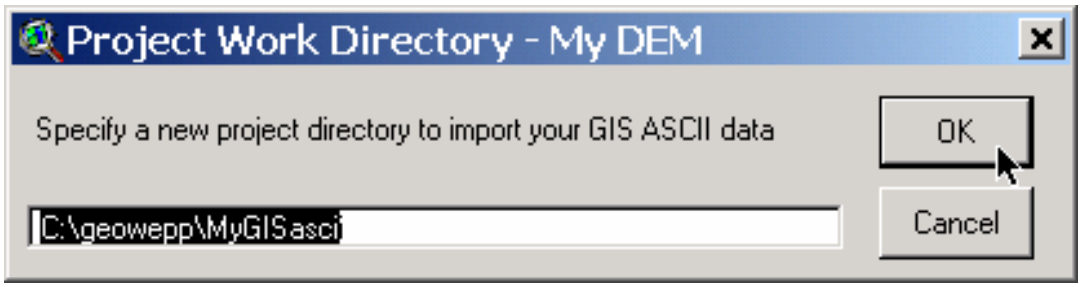
Section 11: Use your own GIS data sets for topography, soils and land use

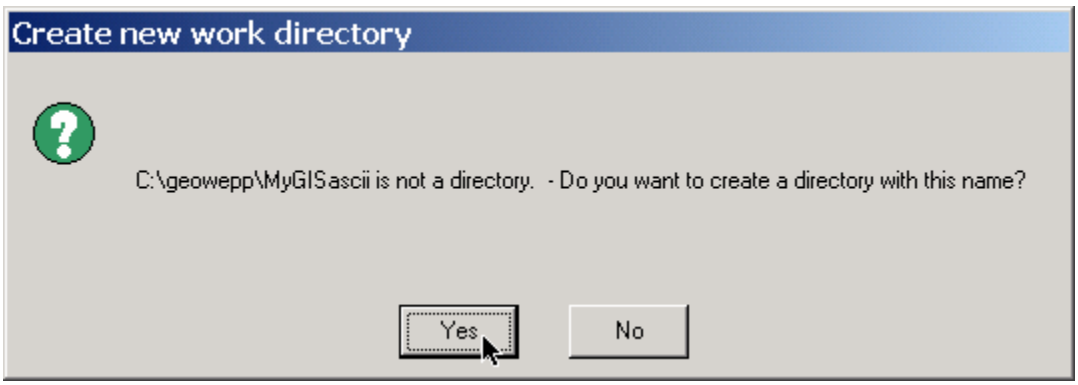
Start the GeoWEPP software from your desktop.

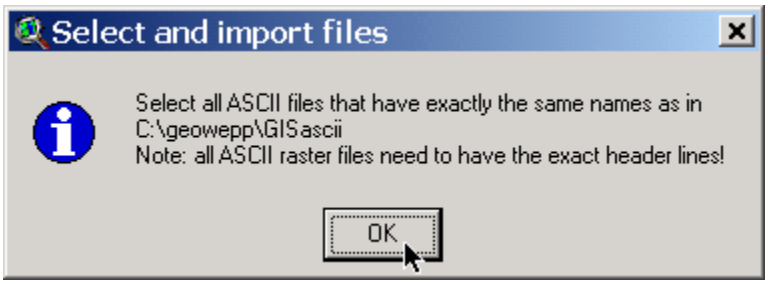
Then choose the button to use NRCS data gateway datasets of your area of interest.



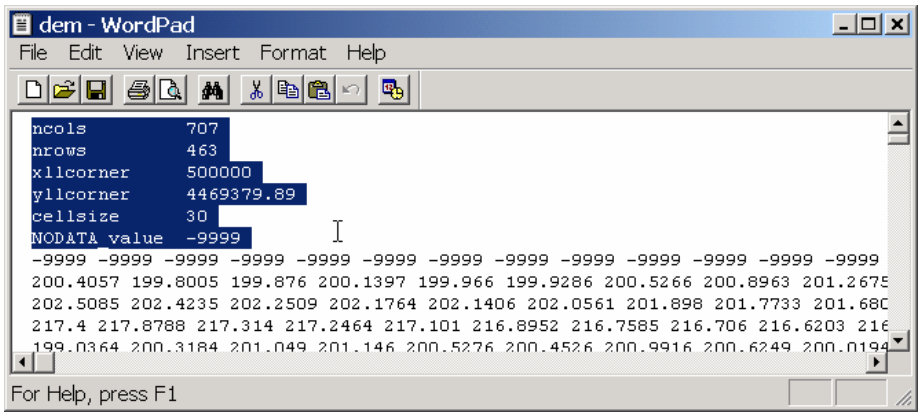
Create a new directory for your project, e.g. C:\geowepp\myGISascii.





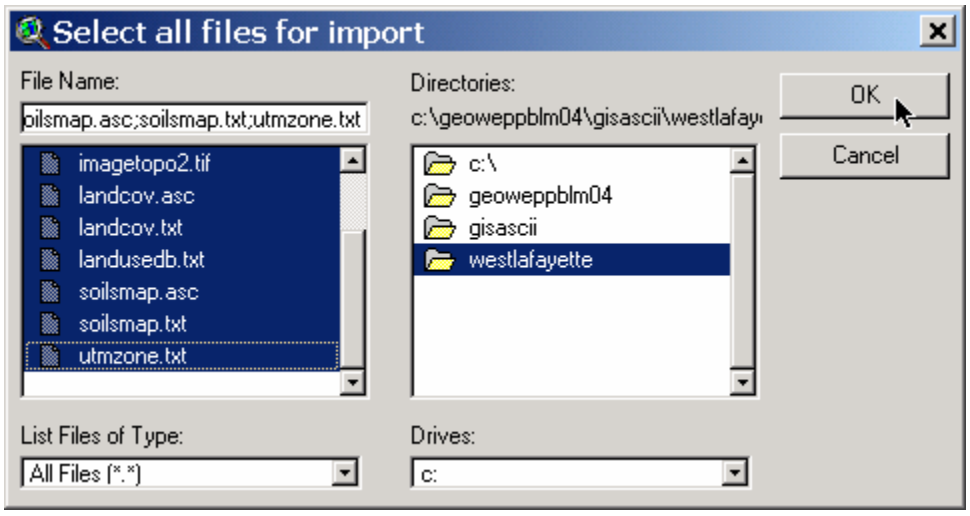


Important: Note that all the GIS ASCII raster files have to have exactly the same header lines and raster size for the DEM, soils and land use map (see example of the file "dem.asc" in "C:\geowepp\GISascii" below).

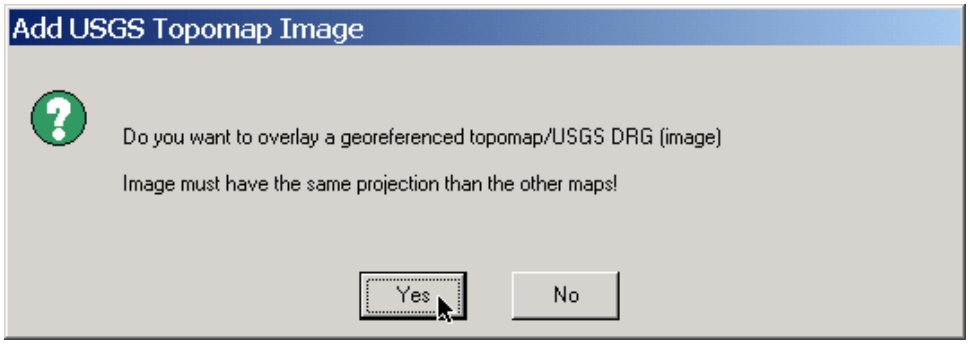


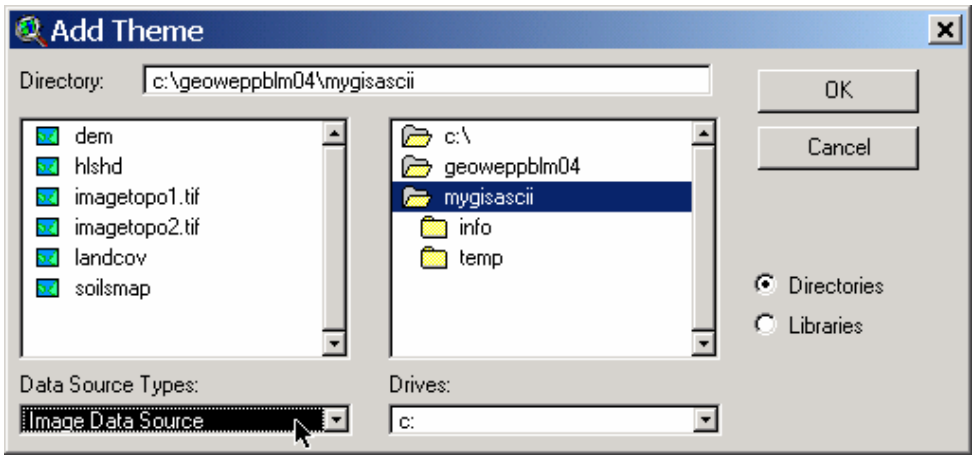
You may want to request these files from your GIS specialist (we are currently working on a routine that allows importing these files without the need of a GIS specialist preparing them for you).

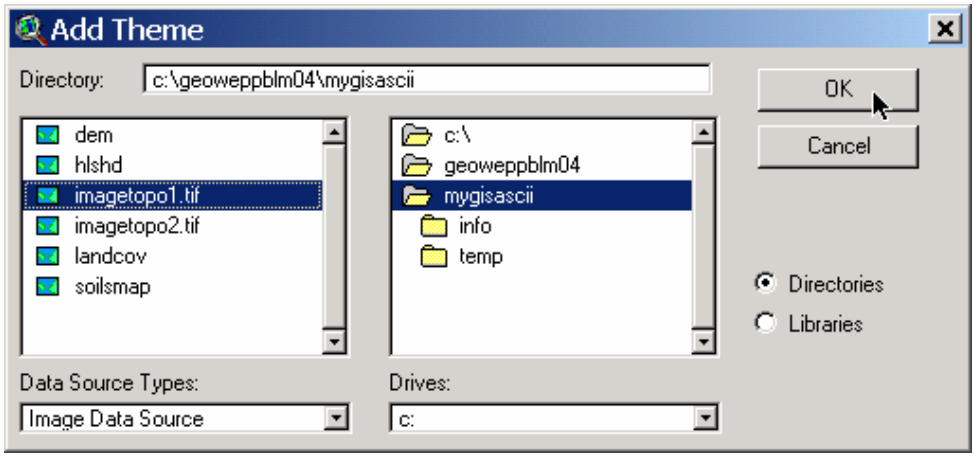
It is an absolute necessity to select all files with clicking on each of these files to be able to import all these files.

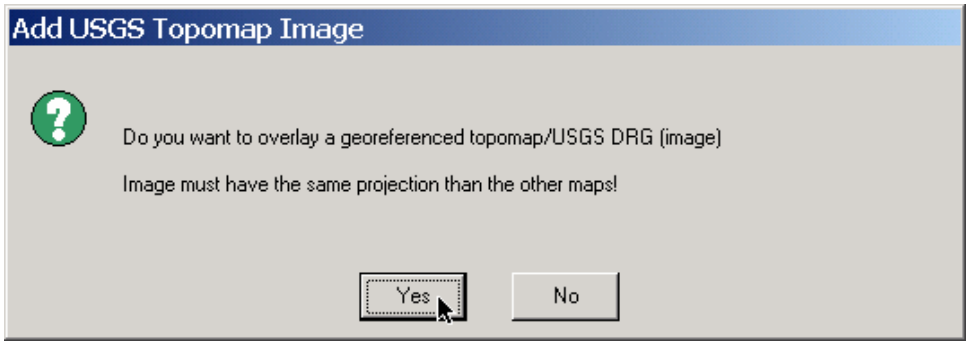


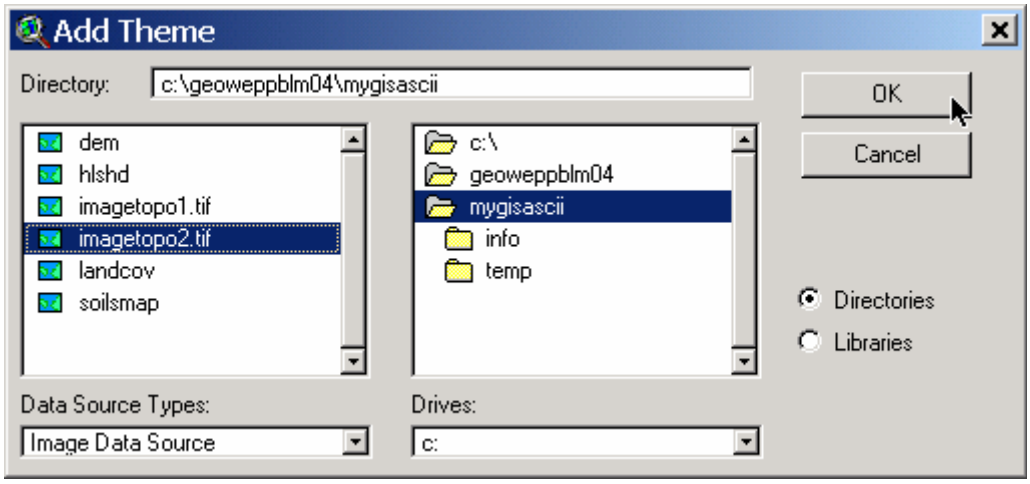
To import USGS DRG (tif files) the following sequence of steps are required (note that you have to import *.tif images one by one!):

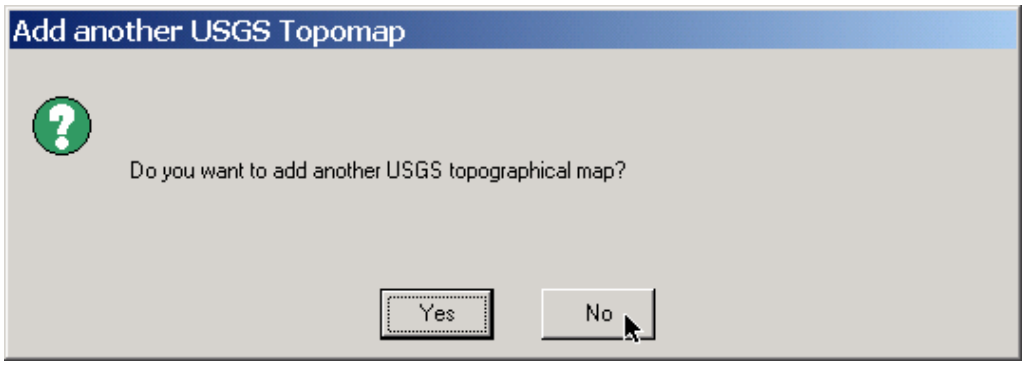

Add USGS Topomap Image
Do you want to overlay a georeferenced topomap/USGS DRG (image)
Image must have the same projection than the other maps!
Yes
No

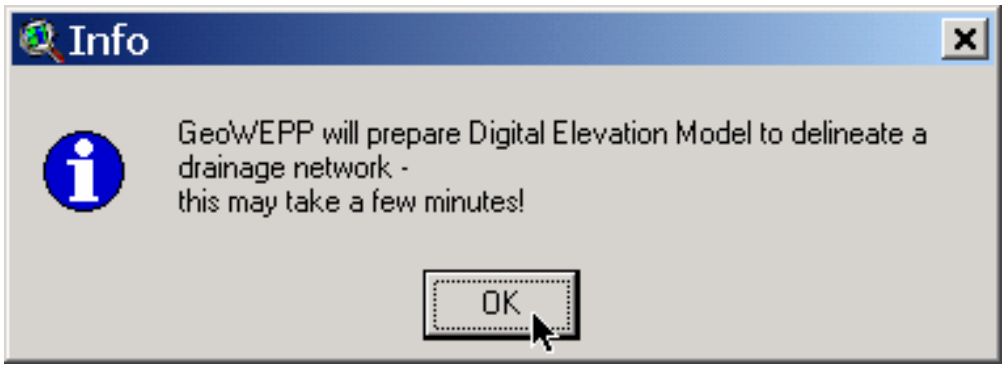

Add Theme
Directory:
c:\geoweppblm04\mygisascii
OK
Cancel
dem
hlshd
imagetopo1.tif
imagetopo2.tif
landcov
soilsmap
c:\
geoweppblm04
mygisascii
info
temp
Directories
Libraries
Data Source Types:
Image Data Source
Drives:
c:


Add Theme
Directory:
c:\geoweppblm04\mygisascii
OK
Cancel
dem
hlshd
imagetopo1.tif
imagetopo2.tif
landcov
soilsmap
c:\
geoweppblm04
mygisascii
info
temp
Directories
Libraries
Data Source Types:
Image Data Source
Drives:
c:

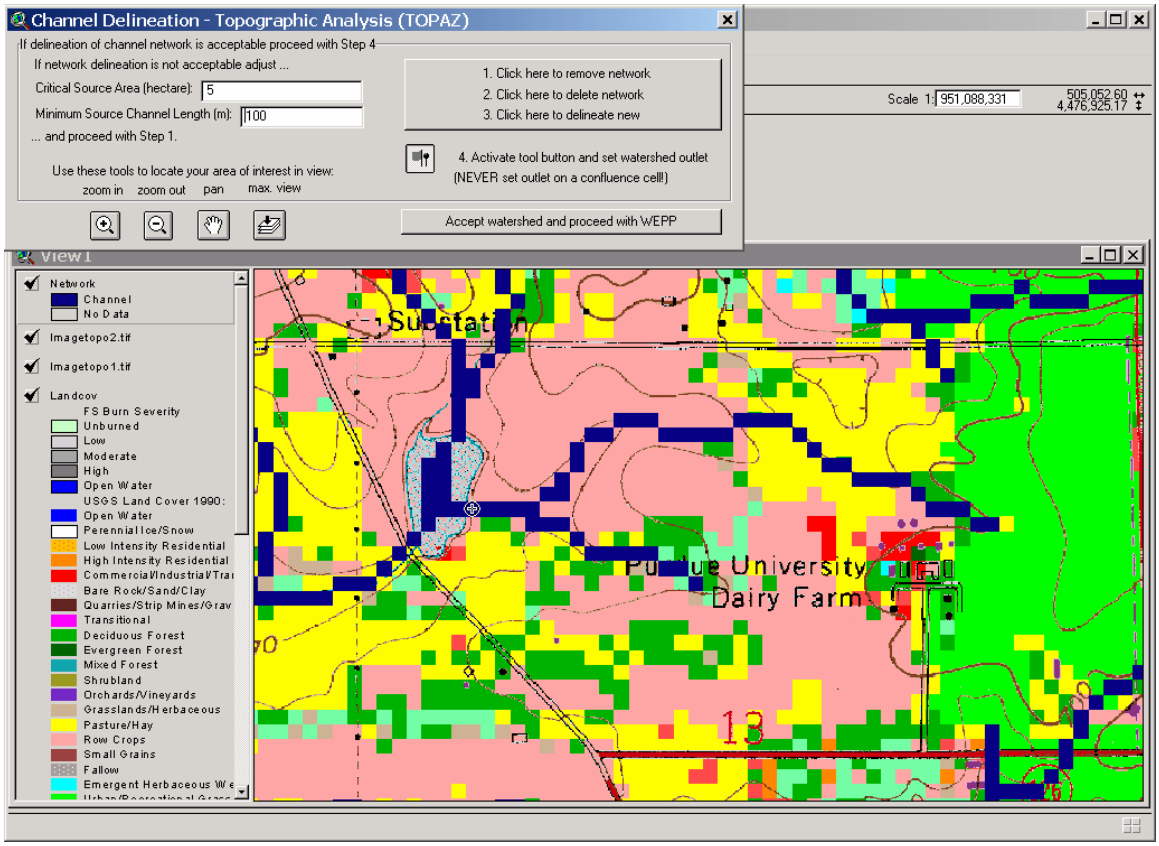

Add USGS Topomap Image
Do you want to overlay a georeferenced topomap/USGS DRG (image)
Image must have the same projection than the other maps!
Yes
No







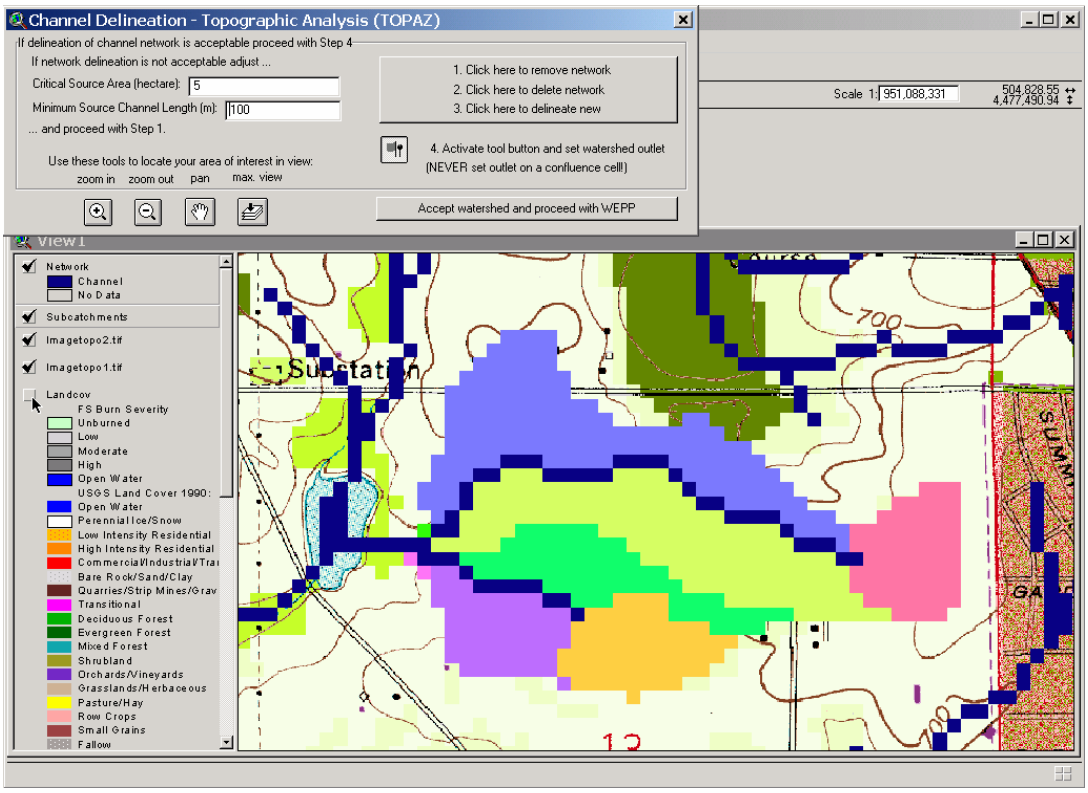
After the import of all maps you get a view of the land use. Then zoom in to the coordinates given in the upper right corner and select the outlet as described on page 8.

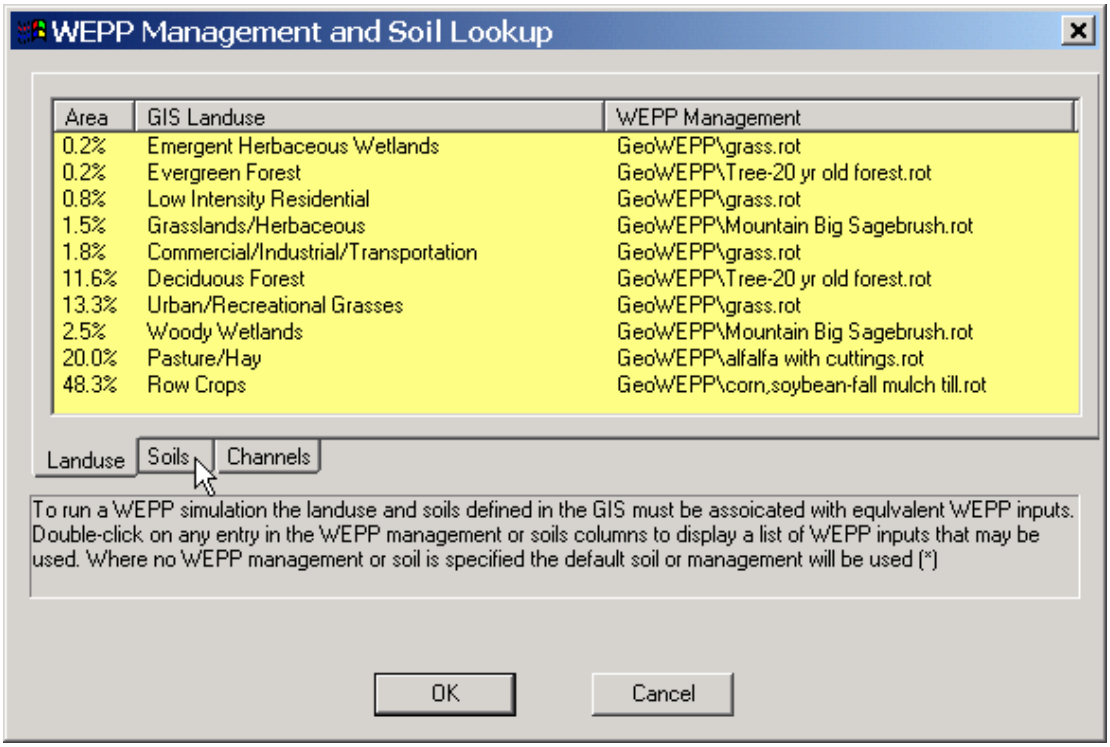


You may notice that the channel delineation and consequently the watershed outline is quite different from the one outlined previously (the upper fork of the watershed is much longer!). The reason for this is that instead of the previous USGS DEM this DEM is based on the National Elevation Dataset (NED) which is a revised version of the USGS DEM.

(Important note: Your delineation and slopes are always as good as your DEM is!).

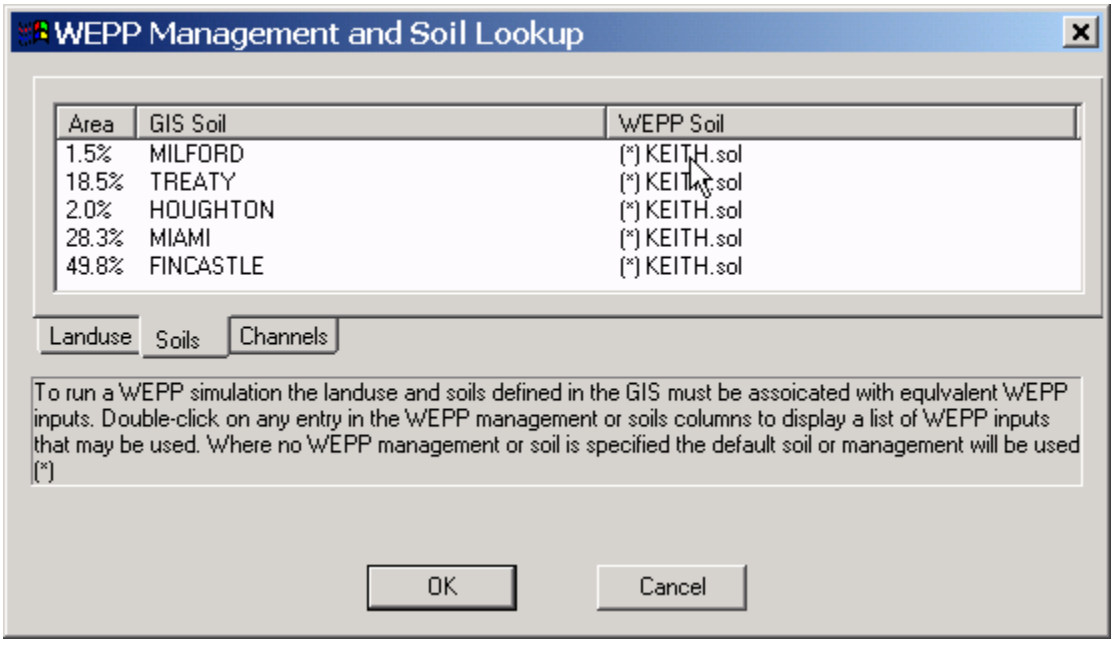
To have a better view on the outlined watershed, you may want to tick off the land use map. The pattern in the back is the soil mapping unit pattern you just imported. After you accept the watershed the defaults of your watershed need to be set: choose the climate and then the defaults for the land use and soils.



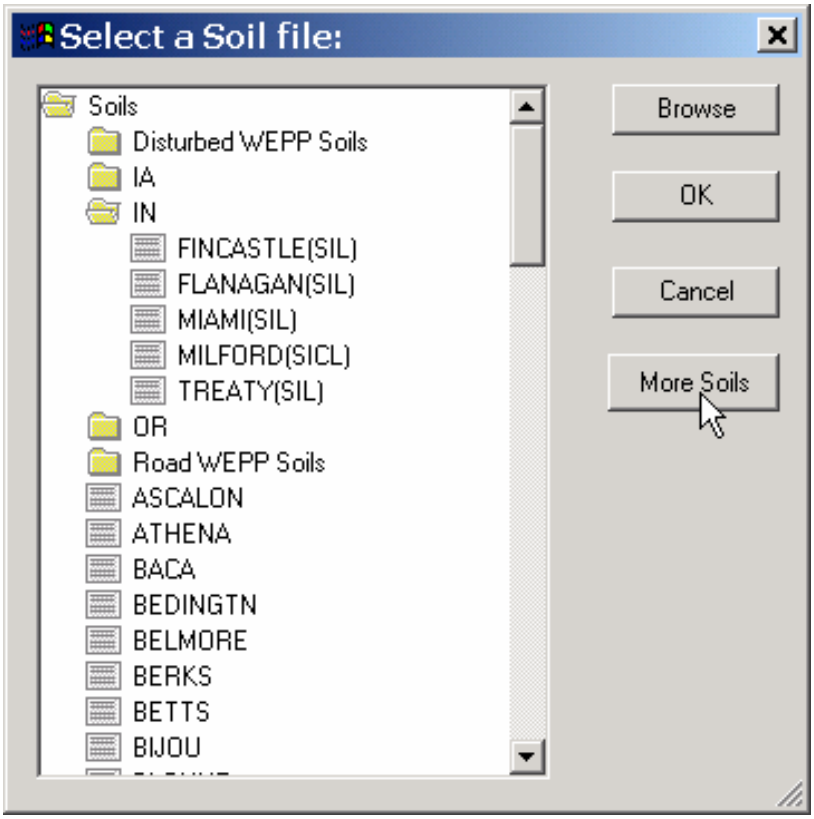


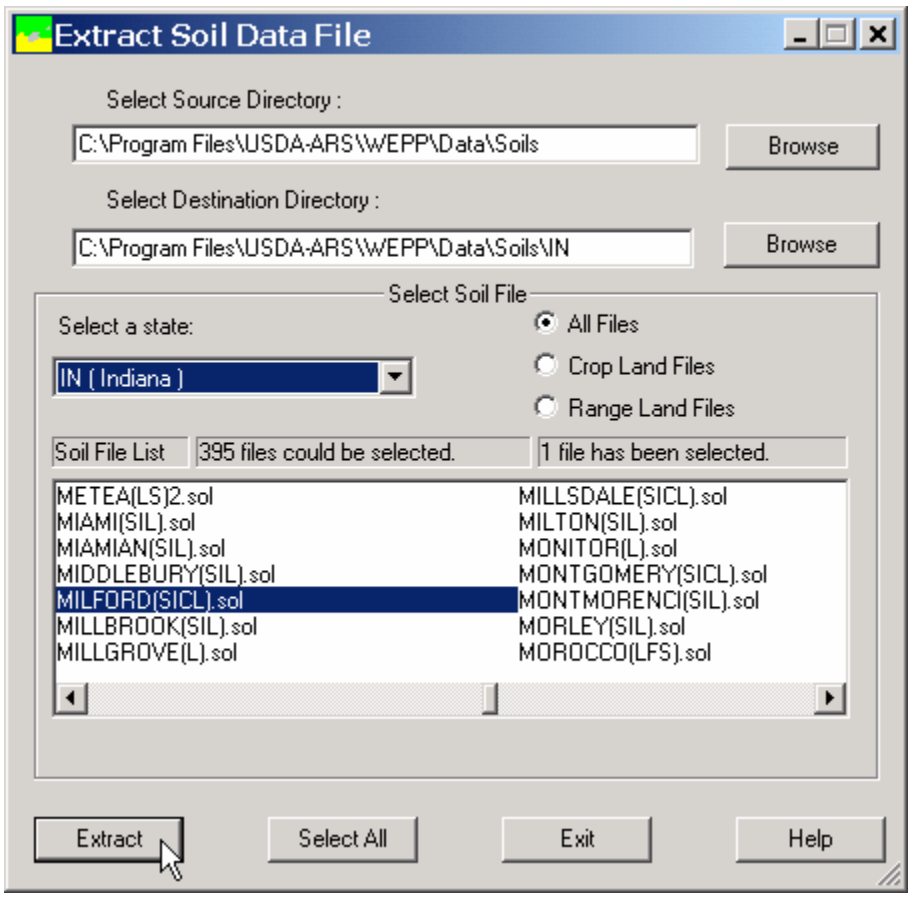
By clicking on the file names you can select a different land use WEPP parameter setting for that particular land use class. However, we are going to take the selection listed above.

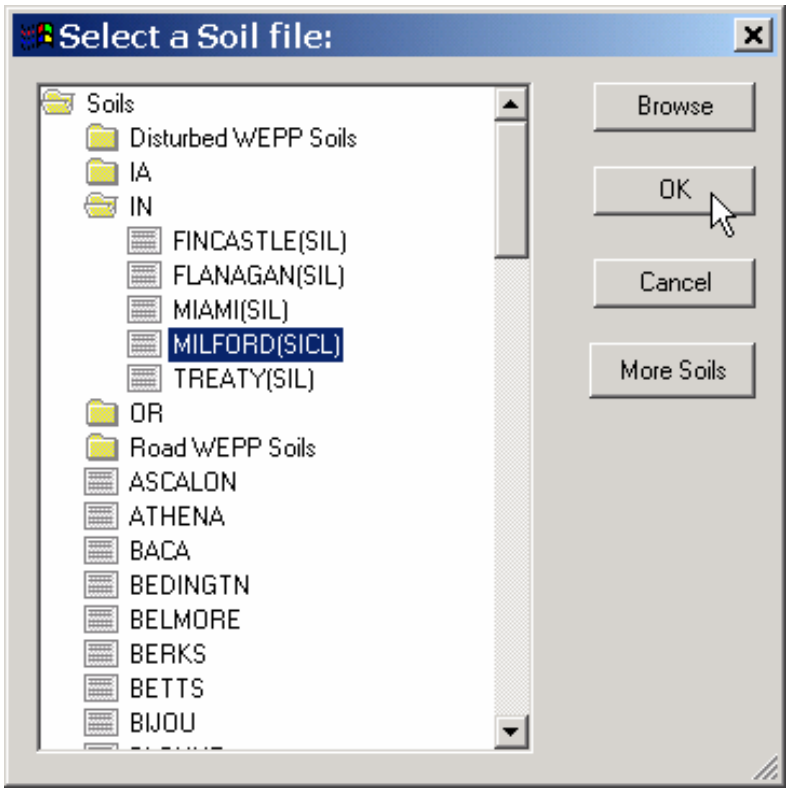
To change the default setting (KEITH soil) for the WEPP soil parameter sets click on the name in the table.

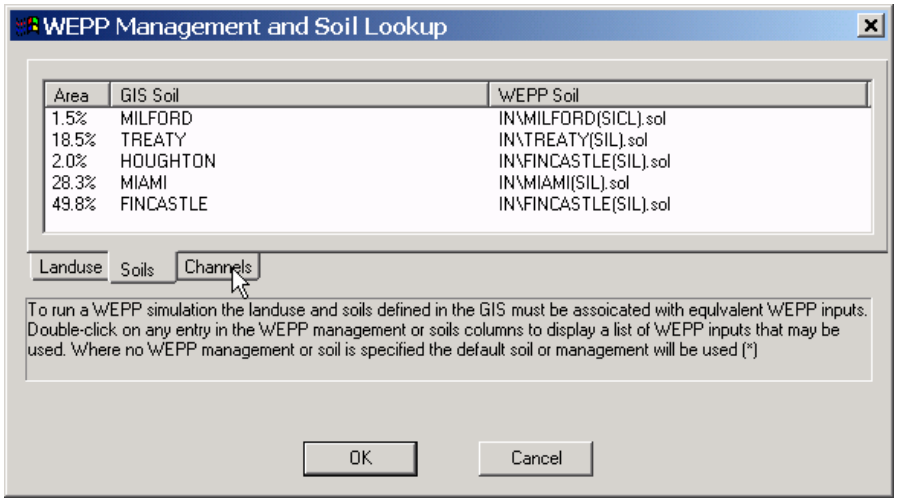


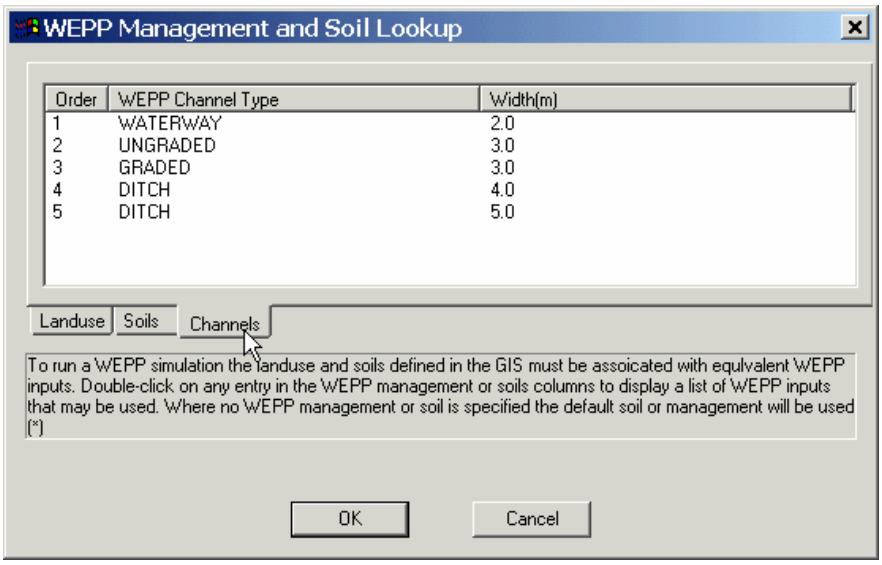
If you need more soils you can access the WEPP database to extract more soils from the state zip files as shown in the next couple of figures.



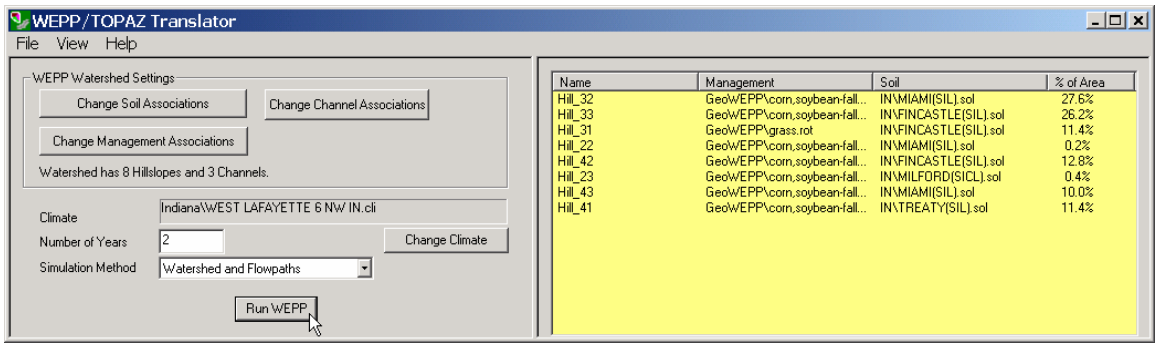

Extract Soil Data File
Select Source Directory :
C:\Program Files\USDA-ARS\WEPP\Data\Soils
Browse
Select Destination Directory :
C:\Program Files\USDA-ARS\WEPP\Data\Soils\IN
Browse
Select Soil File
Select a state:
IN (Indiana)
All Files
Crop Land Files
Range Land Files
Soil File List
395 files could be selected.
1 file has been selected.
METEA(LS)2.sol
MIAMI(SIL).sol
MIAMIAN(SIL).sol
MIDDLEBURY(SIL).sol
MILFORD(SICL).sol
MILLBROOK(SIL).sol
MILLGROVE(L).sol
MILLSDALE(SICL).sol
MILTON(SIL).sol
MONITOR(L).sol
MONTGOMERY(SICL).sol
MONTMORENCI(SIL).sol
MORLEY(SIL).sol
MOROCCO(LFS).sol
Extract
Select All
Exit
Help


Select a Soil file:
Soils
Disturbed WEPP Soils
IA
IN
FINCASTLE(SIL)
FLANAGAN(SIL)
MIAMI(SIL)
MILFORD(SICL)
TREATY(SIL)
OR
Road WEPP Soils
ASCALON
ATHENA
BACA
BEDINGTN
BELMORE
BERKS
BETTS
BIJOU
Browse
OK
Cancel
More Soils

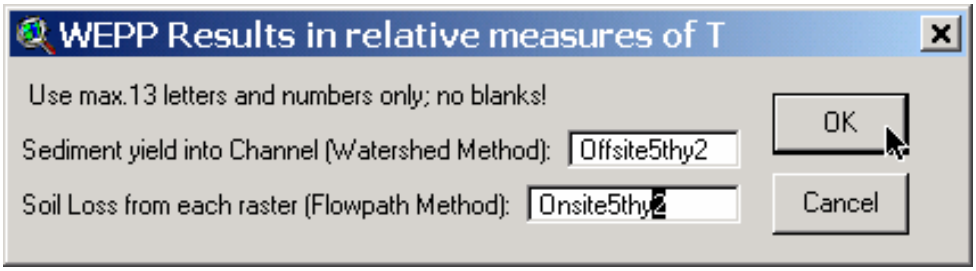




After you are done you can review the settings in the hillslope and channel tables. In case you need to make changes use the buttons in the upper left corner. Then run the WEPP model.



Then map the simulation results with a target value of 5 t/ha/yr (Note that the number of flowpaths is now 185 due to the much larger watershed then in the example dataset).



As you can see from the previous results both the subcatchment areas and the simulation results show differences.

onsite5thy - Notepad

File Edit Format Help

2 YEAR AVERAGE ANNUAL VALUES FOR WATERSHED

WEPP Watershed Simulation for Representative Hillslopes and Channels (watershed method)

----- WATERSHED SUMMARY (watershed method, off-site assesment) -----

Hillslopes WEPP	TOPAZ	Runoff Volume (m^3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	Soil Loss (tonne/ha/yr)	*Mapped Sediment Yield (tonne/ha/yr)
1	22	78.7	0.6	0.6	0.1	6.3	6.3
2	23	213.4	0.9	0.9	0.2	4.8	4.8
3	32	6349.2	42.3	42.3	13.9	3.0	3.0
4	33	6023.5	36.0	35.9	13.2	2.7	2.7
5	31	626.8	0.4	0.4	5.8	0.1	0.1
6	42	2773.8	17.1	14.8	6.5	2.6	2.3
7	43	2404.4	16.2	16.2	5.0	3.2	3.2
8	41	2558.4	9.8	5.7	5.8	1.7	1.0

----- CHANNEL SUMMARY (watershed method, off-site assesment) -----

Channels NUM	WEPP	TOPAZ	Discharge Volume (m^3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Length (m)	Length (cells)
1	2	34	13269.7	n.a.	88.9	1181.5	34
2	1	44	7896.3	n.a.	41.2	422.1	12
3	3	24	21329.3	n.a.	134.6	120.0	4

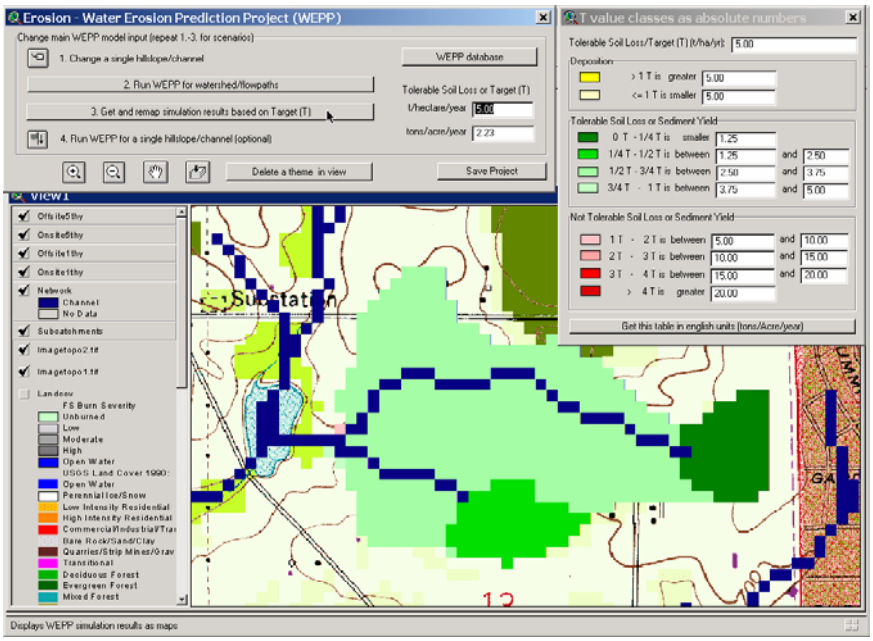
WEPP Watershed Simulation for all flowpaths averaged over subcatchments (flowpath method)

----- FLOWPATH SUMMARY (flowpath method, on-site assesment) -----

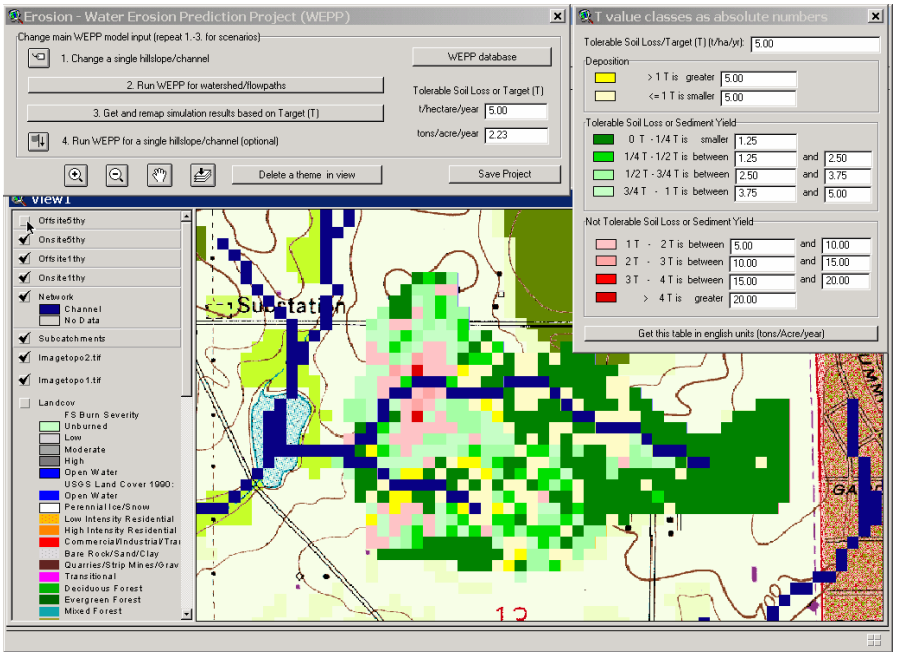
Hillslopes WEPP	TOPAZ	Runoff Volume (m^3/yr)	Soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	*Mapped Soil Loss (tonne/ha/yr)	Sediment Yield (tonne/ha/yr)
1	22	68.8	0.5	n.a.	0.1	5.5	n.a.
2	23	154.1	0.8	n.a.	0.2	4.3	n.a.
3	32	5072.7	34.4	n.a.	13.9	2.5	n.a.
4	33	3820.6	25.4	n.a.	13.2	1.9	n.a.
5	31	1292.6	0.7	n.a.	5.8	0.1	n.a.
6	42	1607.1	10.2	n.a.	6.5	1.6	n.a.
7	43	1685.6	11.9	n.a.	5.0	2.4	n.a.
8	41	2592.4	9.5	n.a.	5.8	1.7	n.a.

Section 12: GIS analysis of spatial variability of assessment results

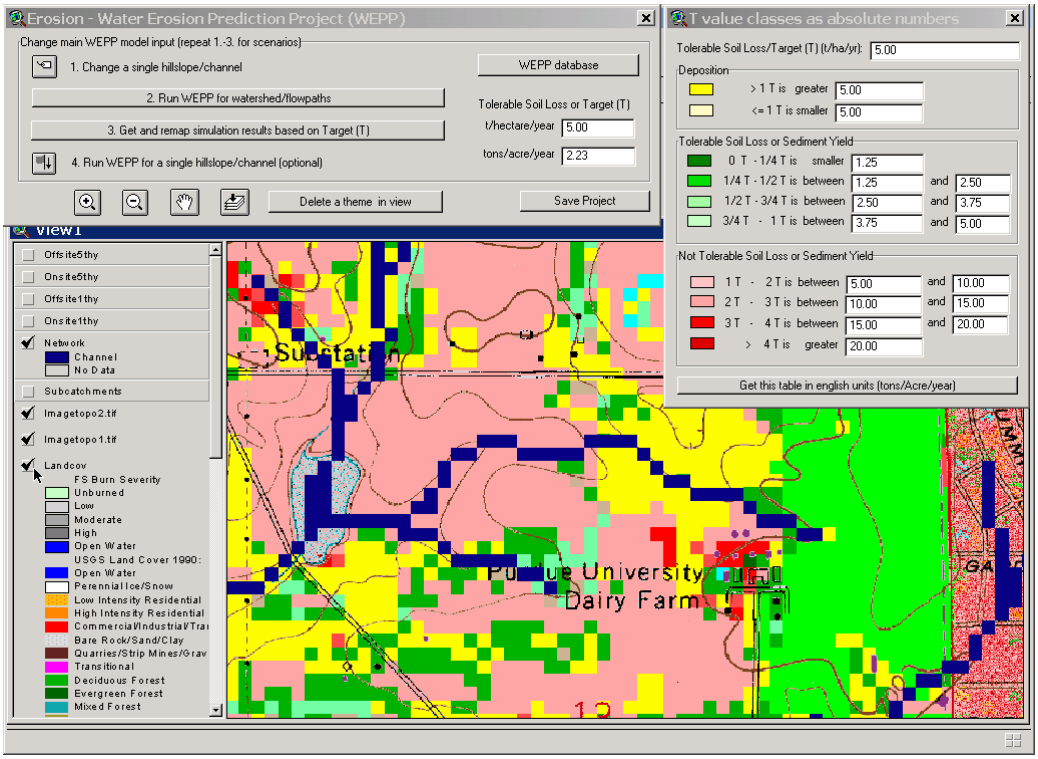
To analyze the spatial distribution of the results we use the general principle that the map that is the highest on the grey legend menu on the left side of the screen is drawn over the ones below if they are selected. By deselecting these maps we see the ones that are beneath (as it is shown in the two following maps.

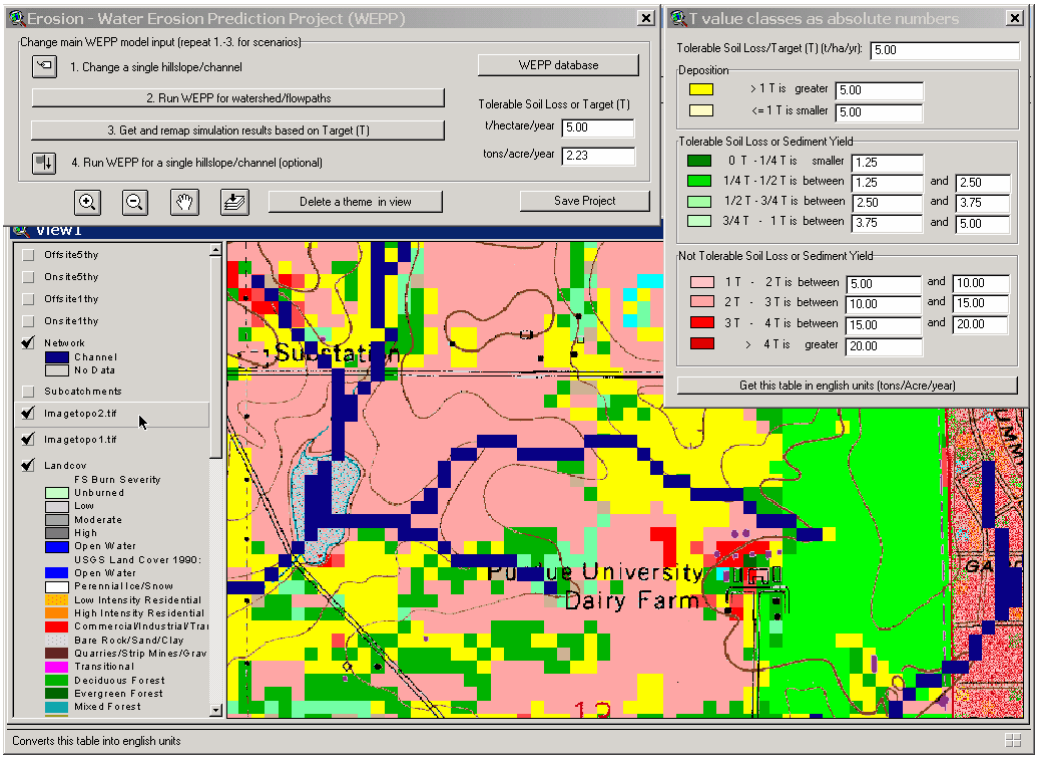


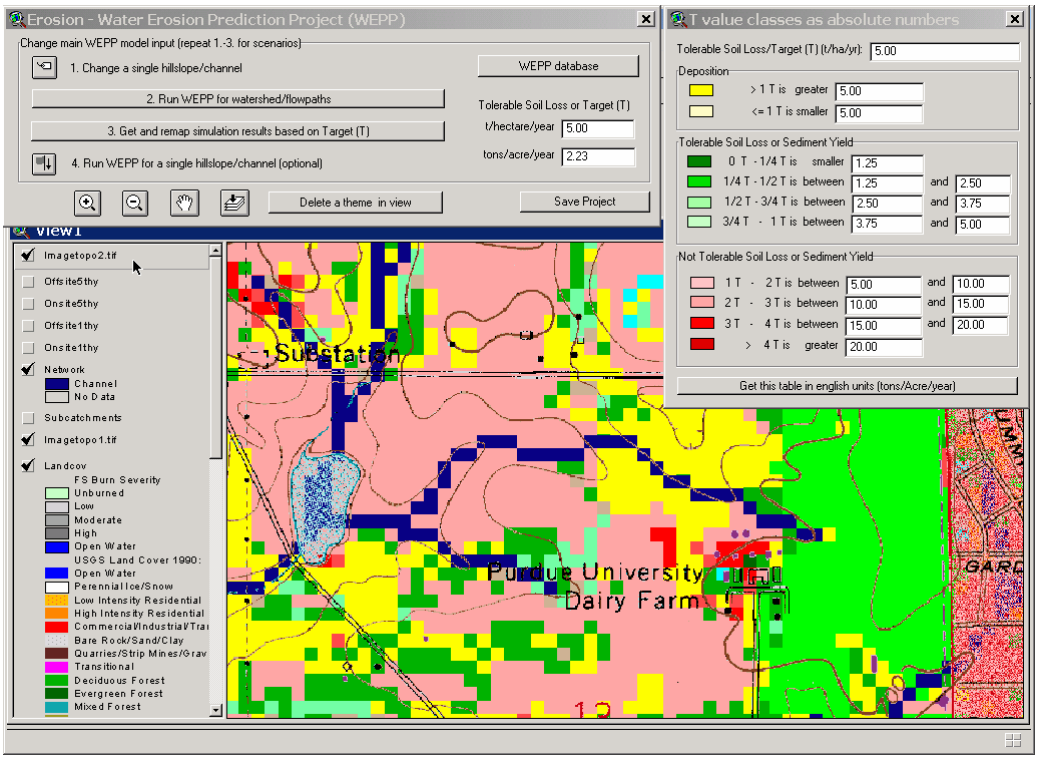
As we can see from these maps, despite the fact that all areas are green fro the off-site assessment, the on-site assessment reveals still areas with soil loss problems.

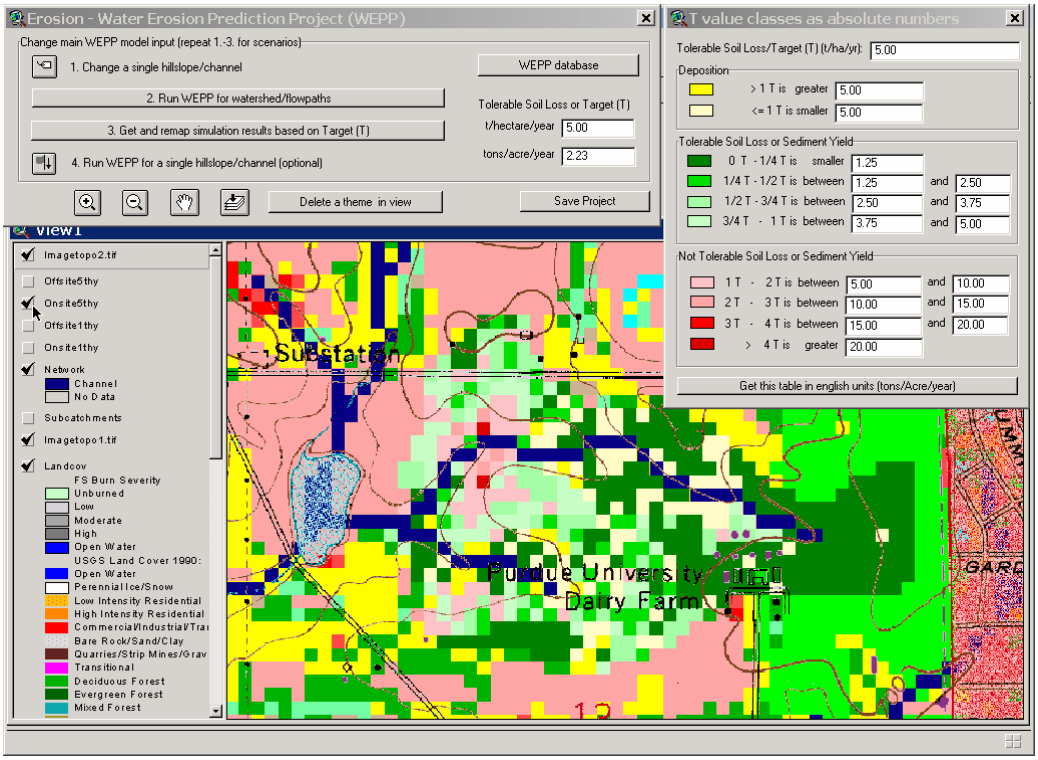


By deselecting some of the maps and dragging the Topomap "*.tif" files to the top of the legend one can lay the topomap over the land use or the simulation results to analyze the effect of land use or contour line pattern on the simulation results.






Erosion - Water Erosion Prediction Project (WEPP)
Change main WEPP model input (repeat 1.-3. for scenarios)
1. Change a single hillslope/channel
WEPP database
2. Run WEPP for watershed/flowpaths
3. Get and remap simulation results based on Target (T)
Tolerable Soil Loss or Target (T)
t/hectare/year 5.00
tons/acre/year 2.23
4. Run WEPP for a single hillslope/channel (optional)
Delete a theme in view
Save Project
View 1
Imagetopo2.tif
Offsite5thy
Onsite5thy
Offsite1thy
Onsite1thy
Network
Channel
No Data
Subcatchments
Imagetopo1.tif
Landcov
FS Burn Severity
Unburned
Low
Moderate
High
Open Water
USGS Land Cover 1990:
Open Water
Perennial Ice/Snow
Low Intensity Residential
High Intensity Residential
Commercial/Industrial/Trai
Bare Rock/Sand/Clay
Quarries/Strip Mines/Grav
Transitional
Deciduous Forest
Evergreen Forest
Mixed Forest
Substation
Purdue University
Dairy Farm
T value classes as absolute numbers
Tolerable Soil Loss/Target (T) (t/ha/yr): 5.00
Deposition
> 1 T is greater 5.00
<= 1 T is smaller 5.00
Tolerable Soil Loss or Sediment Yield
0 T - 1/4 T is smaller 1.25
1/4 T - 1/2 T is between 1.25 and 2.50
1/2 T - 3/4 T is between 2.50 and 3.75
3/4 T - 1 T is between 3.75 and 5.00
Not Tolerable Soil Loss or Sediment Yield
1 T - 2 T is between 5.00 and 10.00
2 T - 3 T is between 10.00 and 15.00
3 T - 4 T is between 15.00 and 20.00
> 4 T is greater 20.00
Get this table in english units (tons/Acre/year)


Erosion - Water Erosion Prediction Project (WEPP)
Change main WEPP model input (repeat 1.-3. for scenarios)
1. Change a single hillslope/channel
WEPP database
2. Run WEPP for watershed/flowpaths
3. Get and remap simulation results based on Target (T)
Tolerable Soil Loss or Target (T)
t/hectare/year 5.00
tons/acre/year 2.23
4. Run WEPP for a single hillslope/channel (optional)
Delete a theme in view
Save Project
View 1
Imagetopo2.tif
Offsite5thy
Onsite5thy
Offsite1thy
Onsite1thy
Network
Channel
No Data
Subcatchments
Imagetopo1.tif
Landcov
FS Burn Severity
Unburned
Low
Moderate
High
Open Water
USGS Land Cover 1990:
Open Water
Perennial Ice/Snow
Low Intensity Residential
High Intensity Residential
Commercial/Industrial/Trai
Bare Rock/Sand/Clay
Quarries/Strip Mines/Grav
Transitional
Deciduous Forest
Evergreen Forest
Mixed Forest
Substation
Purdue University
Dairy Farm
T value classes as absolute numbers
Tolerable Soil Loss/Target (T) (t/ha/yr): 5.00
Deposition
> 1 T is greater 5.00
<= 1 T is smaller 5.00
Tolerable Soil Loss or Sediment Yield
0 T - 1/4 T is smaller 1.25
1/4 T - 1/2 T is between 1.25 and 2.50
1/2 T - 3/4 T is between 2.50 and 3.75
3/4 T - 1 T is between 3.75 and 5.00
Not Tolerable Soil Loss or Sediment Yield
1 T - 2 T is between 5.00 and 10.00
2 T - 3 T is between 10.00 and 15.00
3 T - 4 T is between 15.00 and 20.00
> 4 T is greater 20.00
Get this table in english units (tons/Acre/year)

Appendix: GeoWEPP homepage

These capabilities, the delineation of larger watersheds and multiple soil-land use representative hillslope method are currently under development.

For the latest updates keep on checking the GeoWEPP homepage at:

http://www.geog.buffalo.edu/~rensch/geowepp/

For comments and bug report please send an email to Chris Renschler at

rensch@buffalo.edu

Thank you for your interest and support!