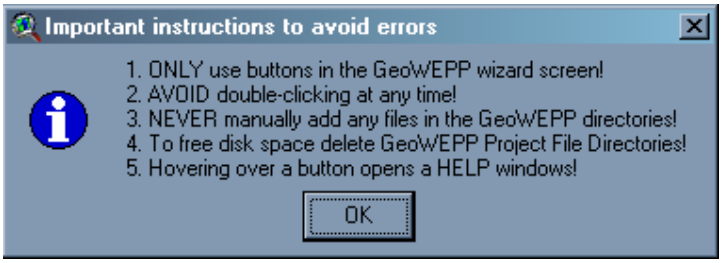
GeoWEPP ArcView Interface – Steps for BEAR Teams: post-fire & return period analysis

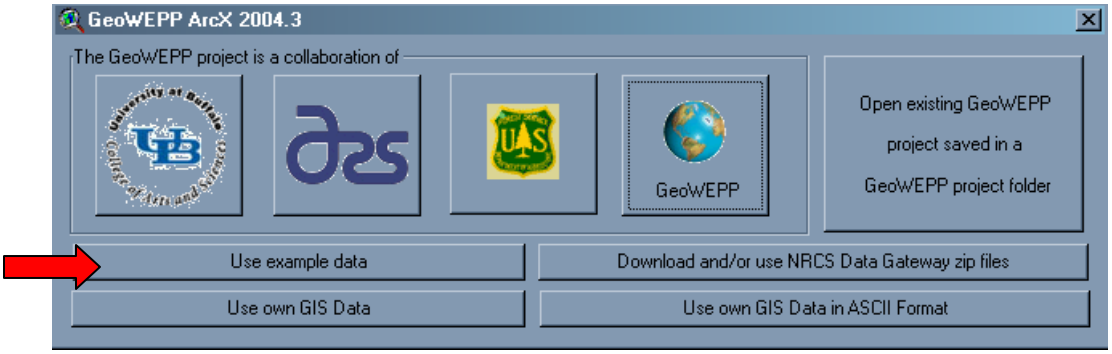
1. Introduction and Overview

Let's start GeoWEPP.

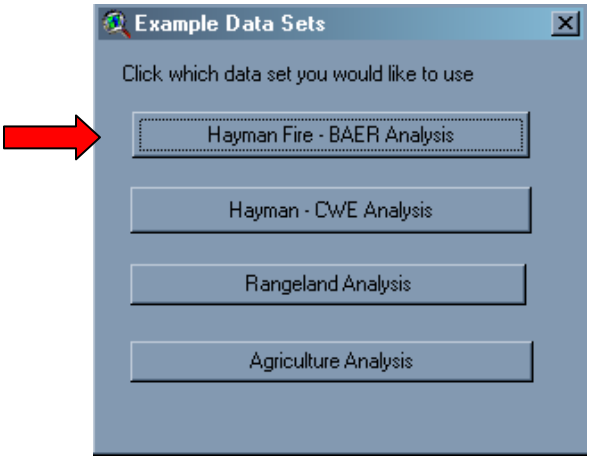
1. Double click on the **startgeowepp icon** or navigate to the geowepp folder and double click on **startgeowepp**. You will immediately get the **Important instructions** window. Read through them and click **OK**.



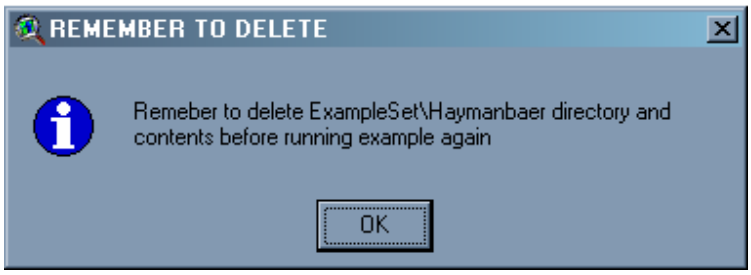
2. This will bring up the **GEOWEPP** wizard. Click onto the **Use example data** button.



3. You now see the **Example Data Sets** window. Click on the **Hayman Fire – BAER Analysis** button.

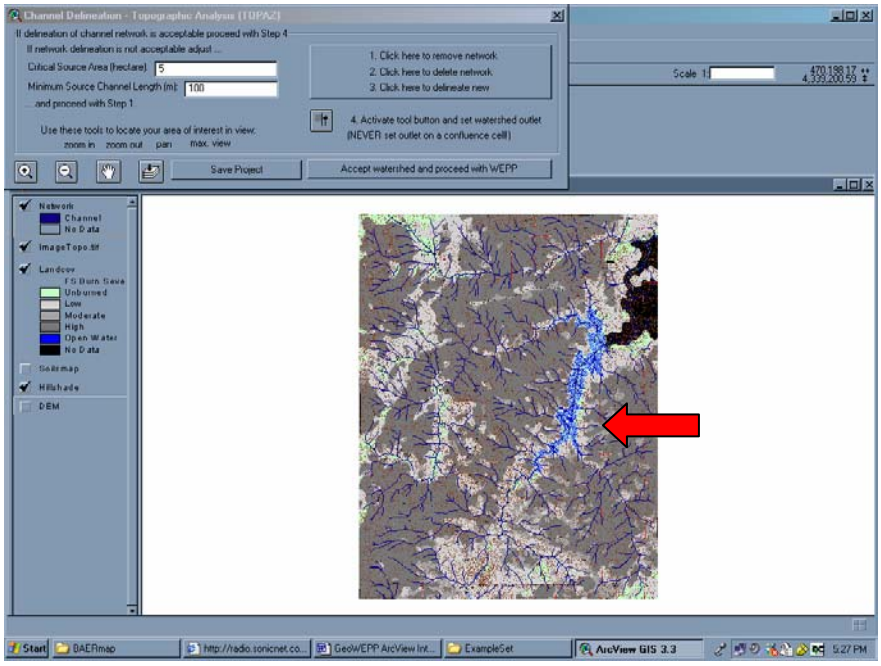


4. Click **OK** in the **Remember to Delete** window. This is just reminding you to delete the directory, so you can run the example analysis from the beginning the next time.

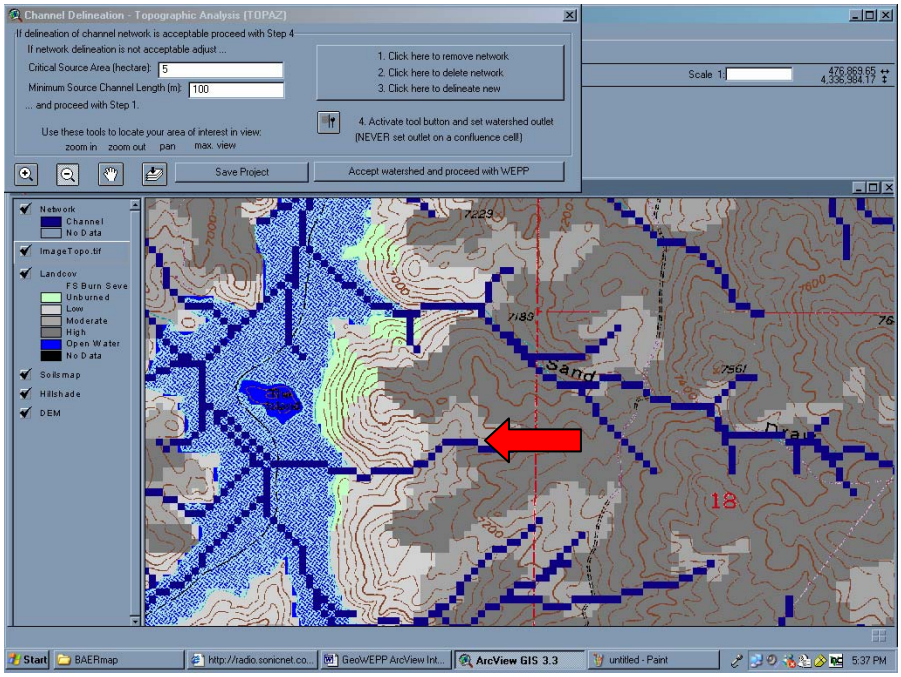


You now see DOS screens and layers being created for about a minute. Let the program run until its completion when you see the following screen. You have a view of the area suffering the most from the forest fire and the **Channel Delineation – Topographic Analysis (TOPAZ)** window, which we will now work from.

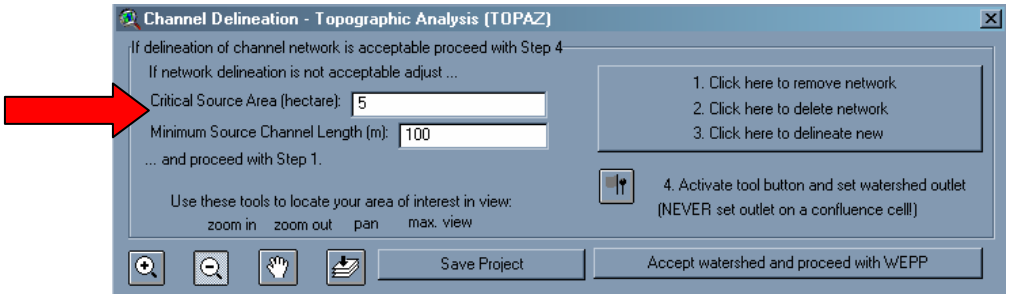
We are interested in the network channels and the watershed that is next to The Island in Cheesman Lake. Using the **Zoom** button  from the **TOPAZ** window, zoom into the area next to the red arrow.



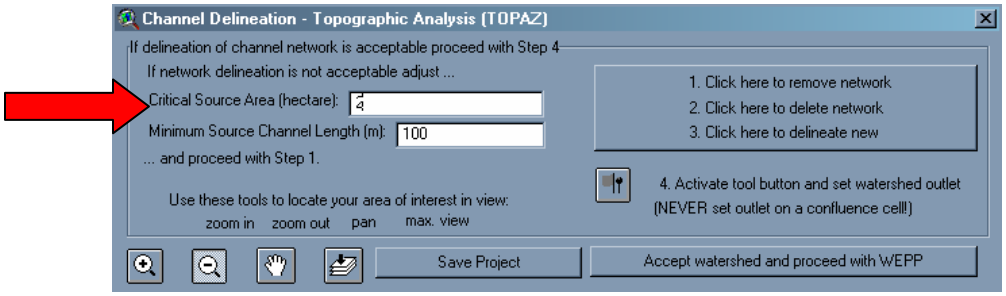
We are interested in the slope that is south east of The Island.



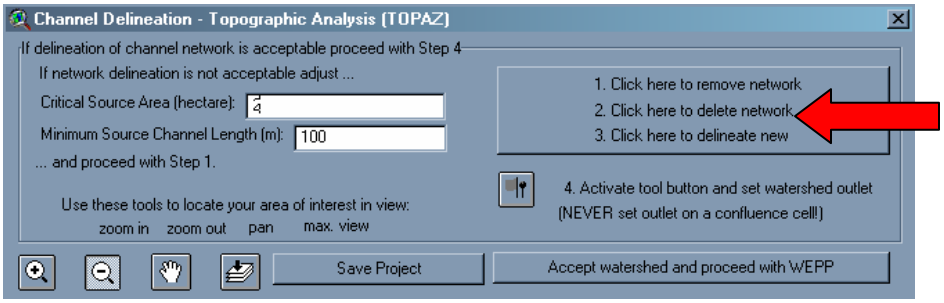
A little explanation is now in order. What we are doing here is delineating channel networks to set watershed outlets. As you can see in the **Channel Delineation** window, you have the normal ArcView icons, such as **zoom in** and **pan**. Also, you can see two options by the left arrow. **Critical Source Area (CSA)** is the area required to initiate a channel [1 hectare = 100 m * 100m = 2.471 acres] (For more information, read 3.1 Fundamental Concepts in OVERVIEW.txt). **Minimum Source Channel Length (MSCL)** is the minimum length of a channel in a drainage pattern (For more information, read 4.4 TOPAZ Input Requirements in the OVERVIEW.txt). We will now remove the channels we have on the screen, set up new ones and map out a watershed.



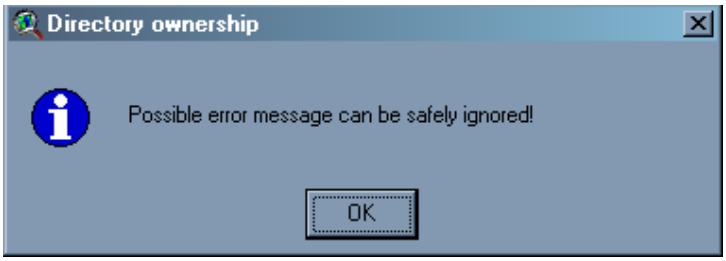
1. In the CSA, change the 5 to 2 (So, the area needed to create the channel will be reduced and we will see more channels on our view).



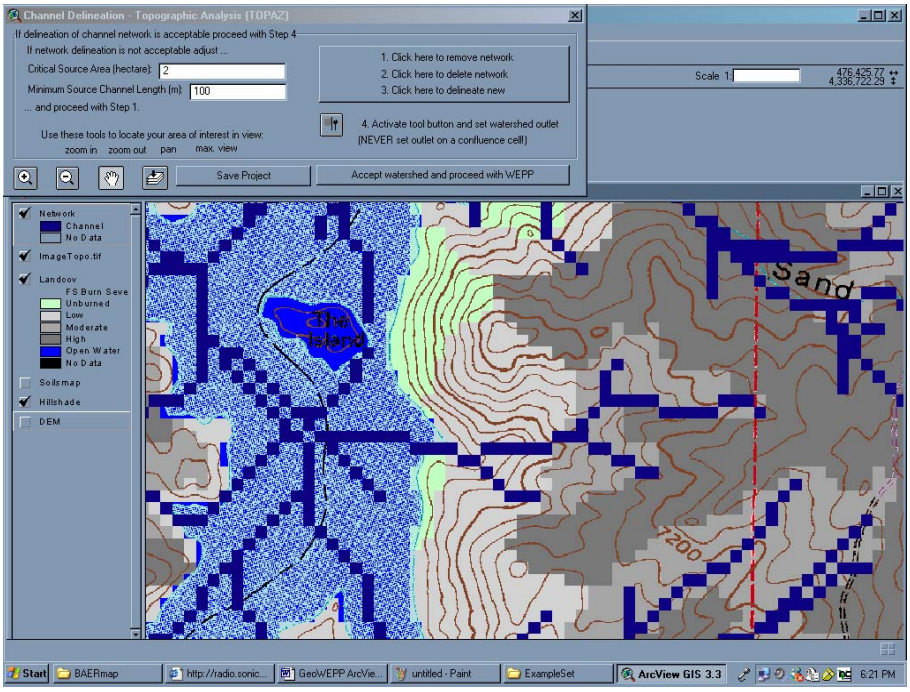
2. In the **Click here** window in the upper right, click once and you **remove the channels**.



3. The second click **deletes the network**.
4. After the second click, you see the **Directory ownership** window. Simply click **OK**.



5. If you receive an **Error** window, click **OK**.
6. The third click runs **TOPAZ** and **delineates the new network**. You see a number of DOS screens and then the view has the new channel network. As you can see below, our new network has more channels now.

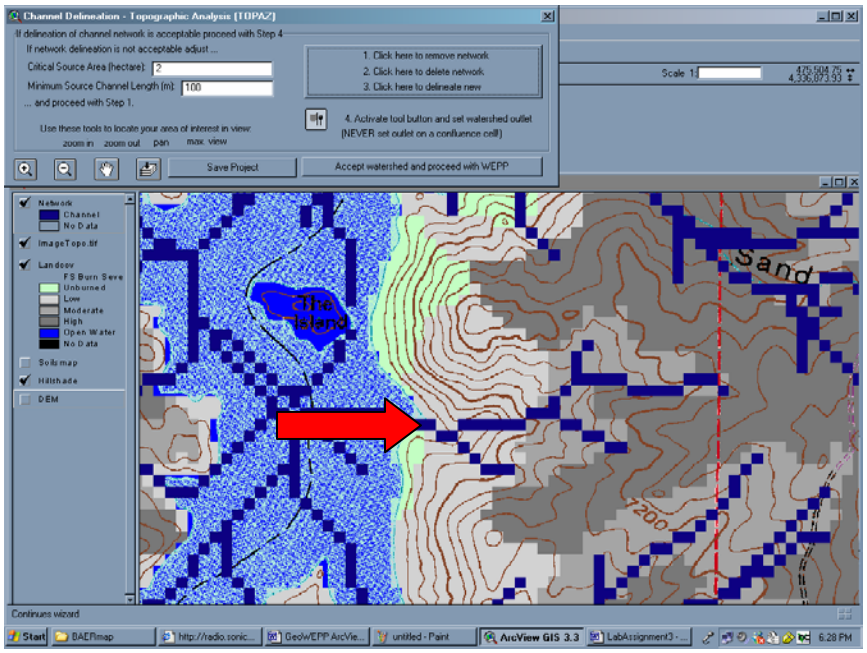


Now you can make the watershed permanent.

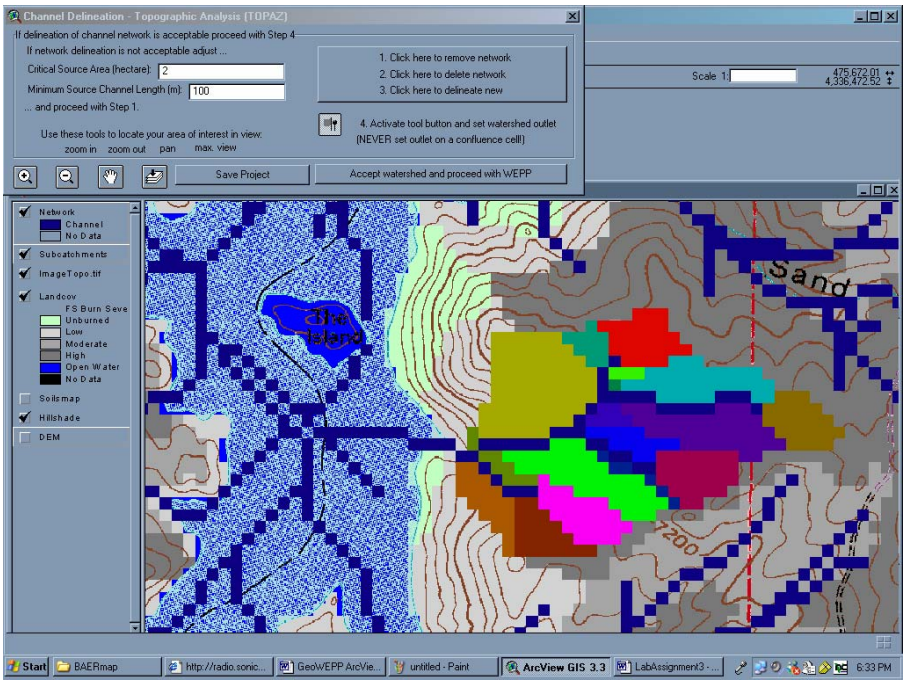
7. Click the **4. Activate tool and set watershed outlet** 

When you move the cursor over the view, you see that it's changed to a **cross in a circle**. We are ready mark off the watershed outlet that we are going to make the watershed for.

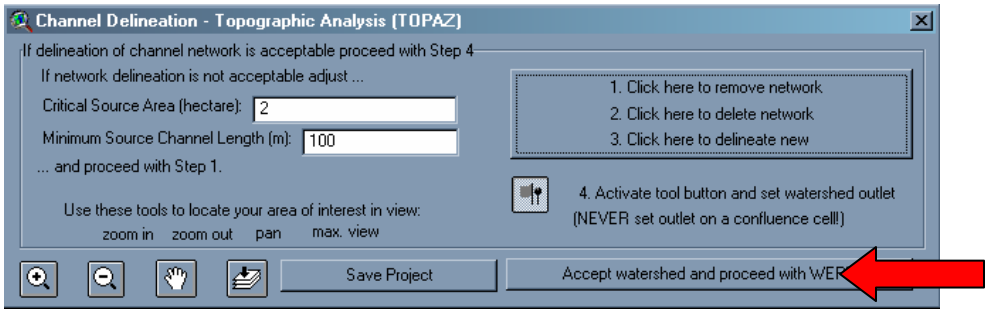
8. Put the cross in a circle cursor at the **end of the channel** (It must be at the end in order to delineate the channel). And click.



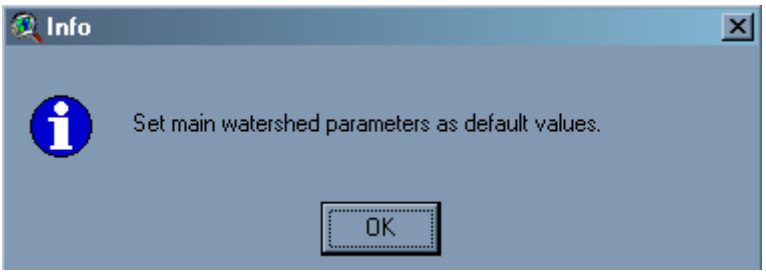
This process takes a couple of minutes and creates a new watershed.



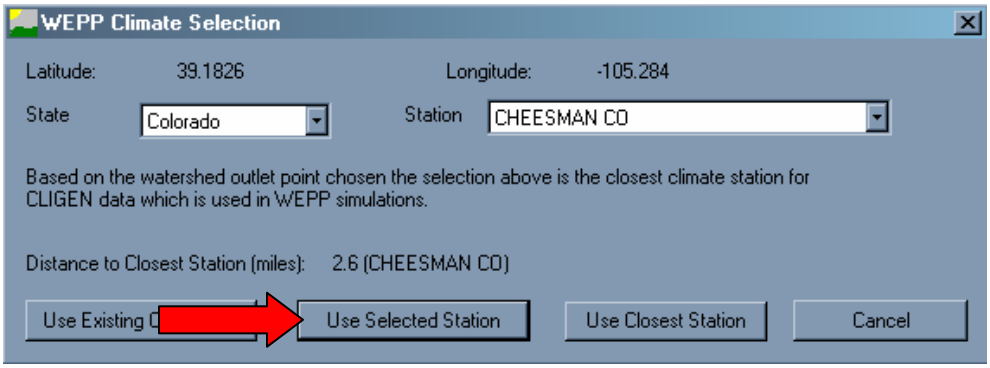
9. Now the final part. If this is the watershed you want, click on **Accept watershed and proceed with WEPP.**



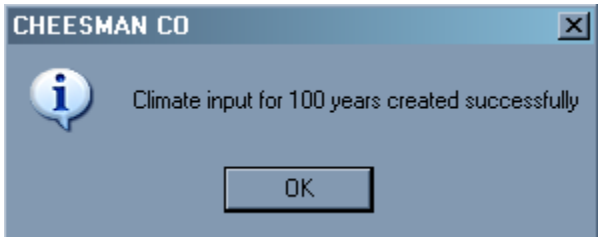
10. In the **Info** window, you are setting the watershed parameters. Click on **OK**.



11. In the **WEPP Climate Selection**, click the **Use Selected Station** to accept the weather station from Cheesman Co.

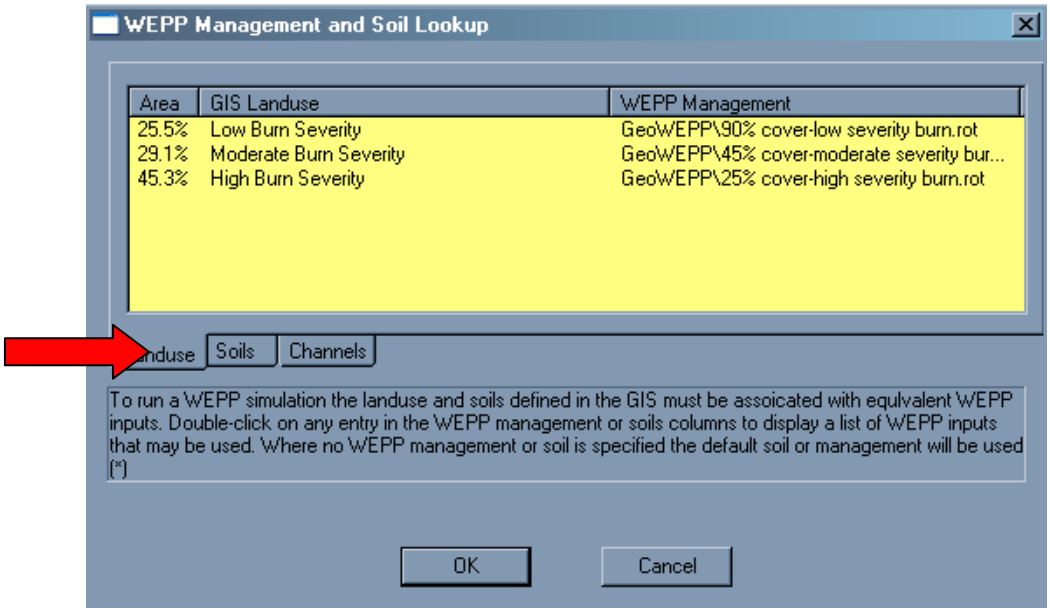


12. In the **Cheesman CO** window, click **OK**. This is setting up the data for 100 years.

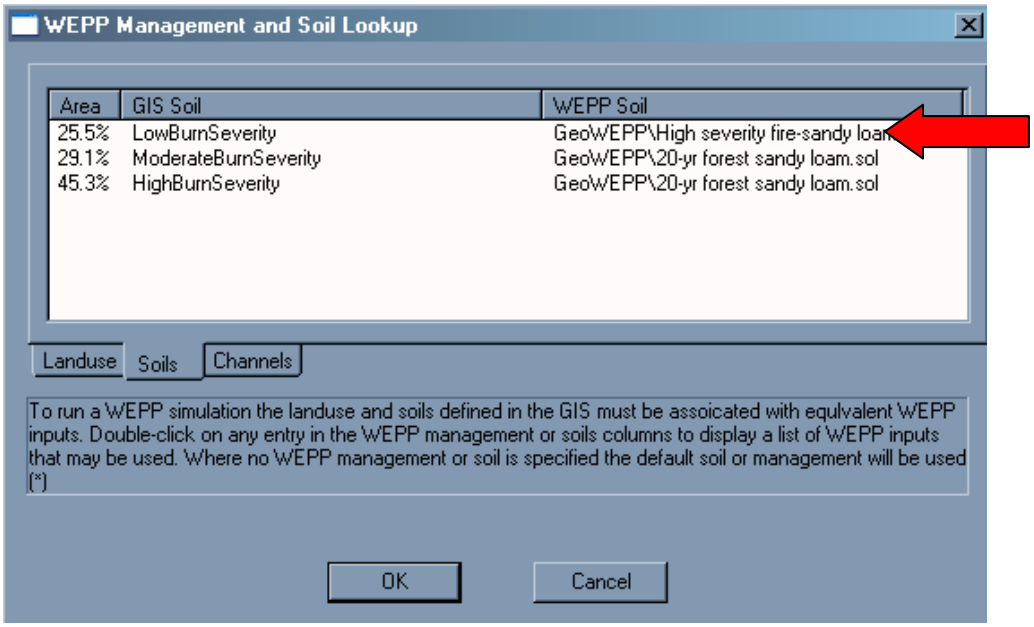


Now, we get the **WEPP Management and Soil Lookup** window. Here we can decide on the type of landuse and soils for our catchment areas. We'll leave the landuse as is, but we want to change the soils.

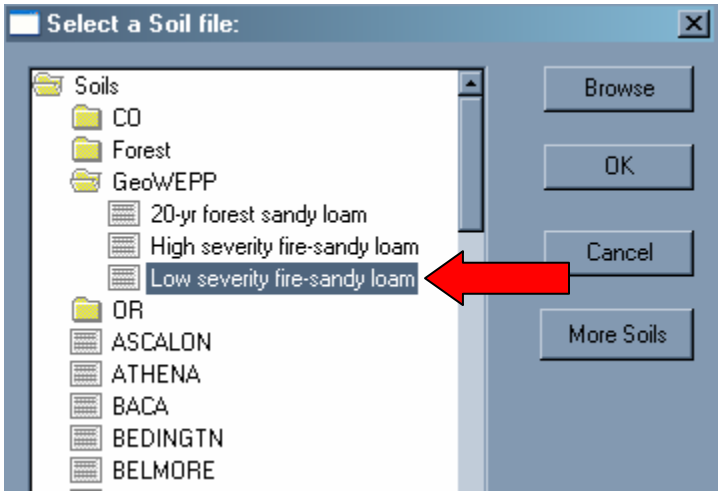
1. Click on the **Soils** tab.



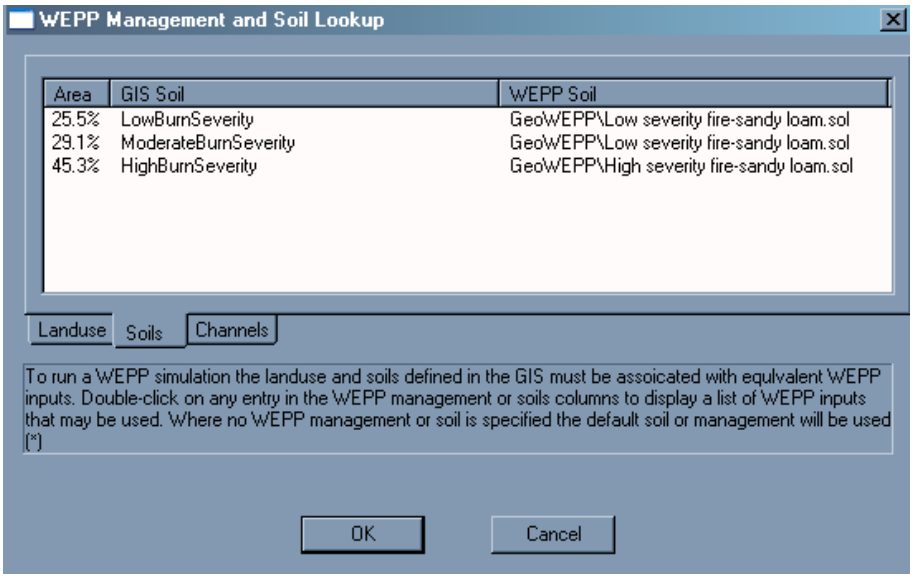
2. In the **Soils** window, click onto the **GeoWEPP\High severity fire-sandy loam.sol** in the **WEPP Soil** column.



3. In the **Select a Soil** file, navigate to **Low severity fire-sandy loam** and click on it to import this file.



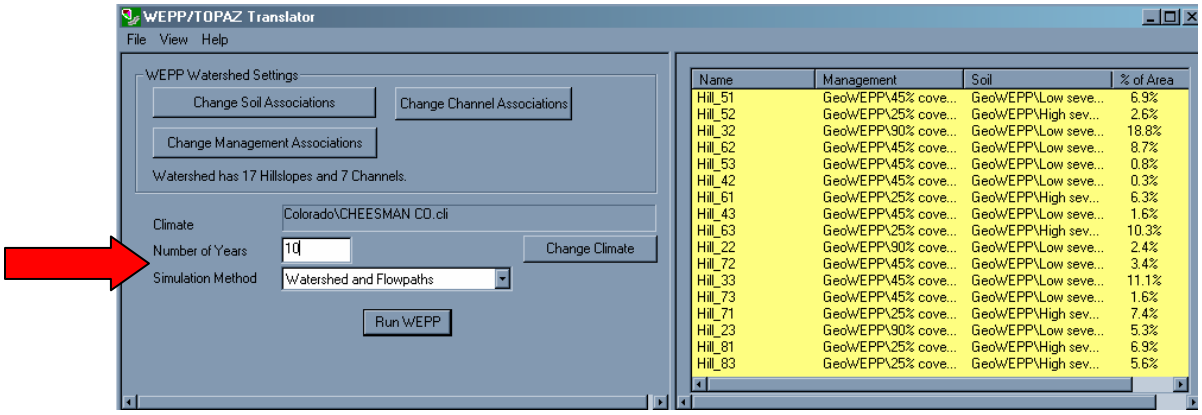
4. For the remaining areas in the **GIS Soil** column, change the **ModerateBurnSeverity** to **Low severity fire-sandy loam** and the **HighBurnSeverity** to **High severity fire-sandy loam.**



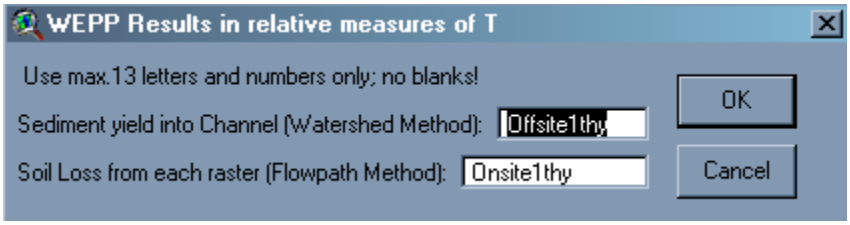
6. In the **WEPP Management and Soil Lookup** window, click **OK**.

Now you see the **WEPP/TOPAZ Translator**. We want to run a 10-year simulation for both Watershed and Flowpaths.

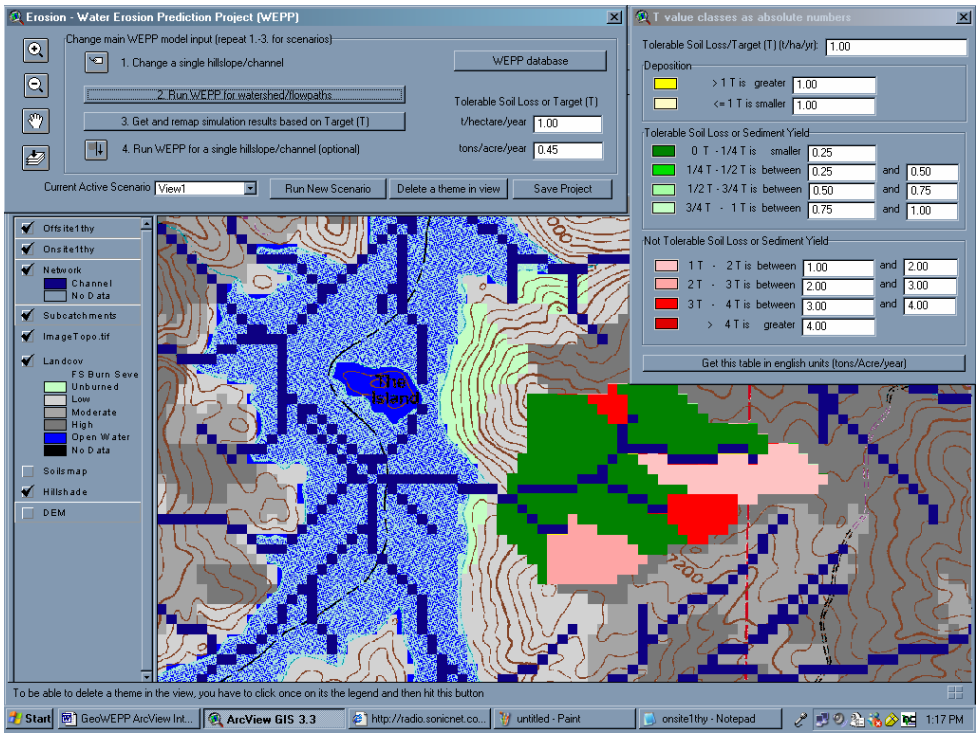
1. In **Number of Years**, type in 10.
2. In **Simulation Method**, choose **Watershed and Flowpaths**.
3. Click **Run WEPP**.



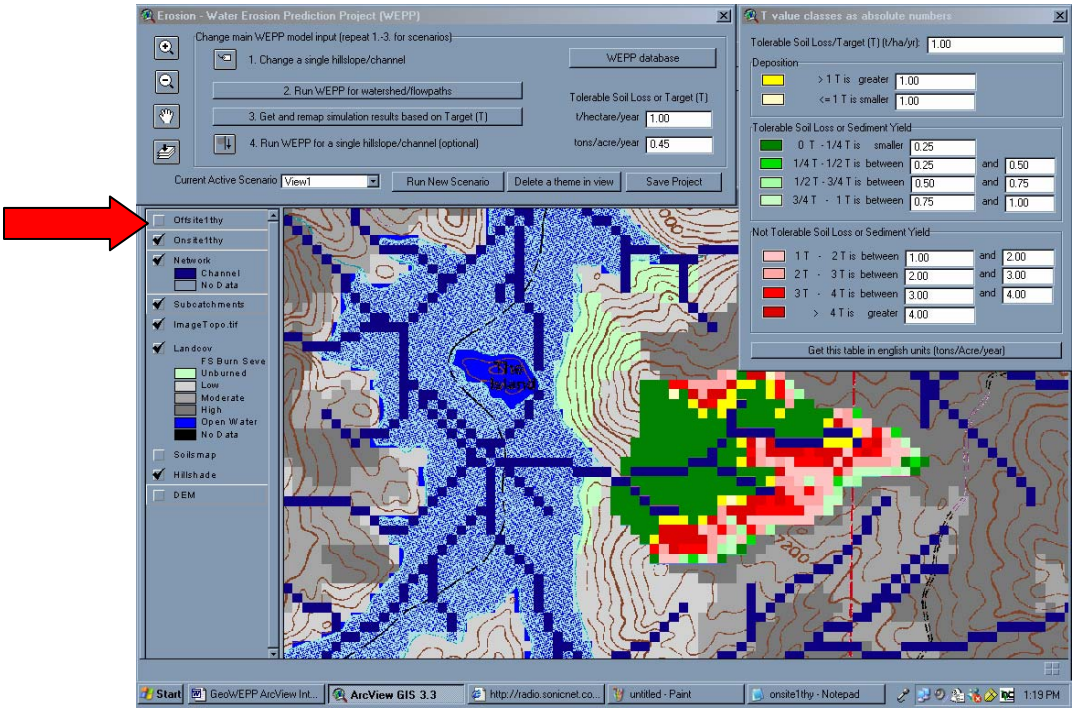
4. In the **WEPP Results in relative measures of T**, you can name the layers that were produced. Leave Watershed as **Offsite1thy** and Flowpath as **Onsite1thy**. Click **OK**.



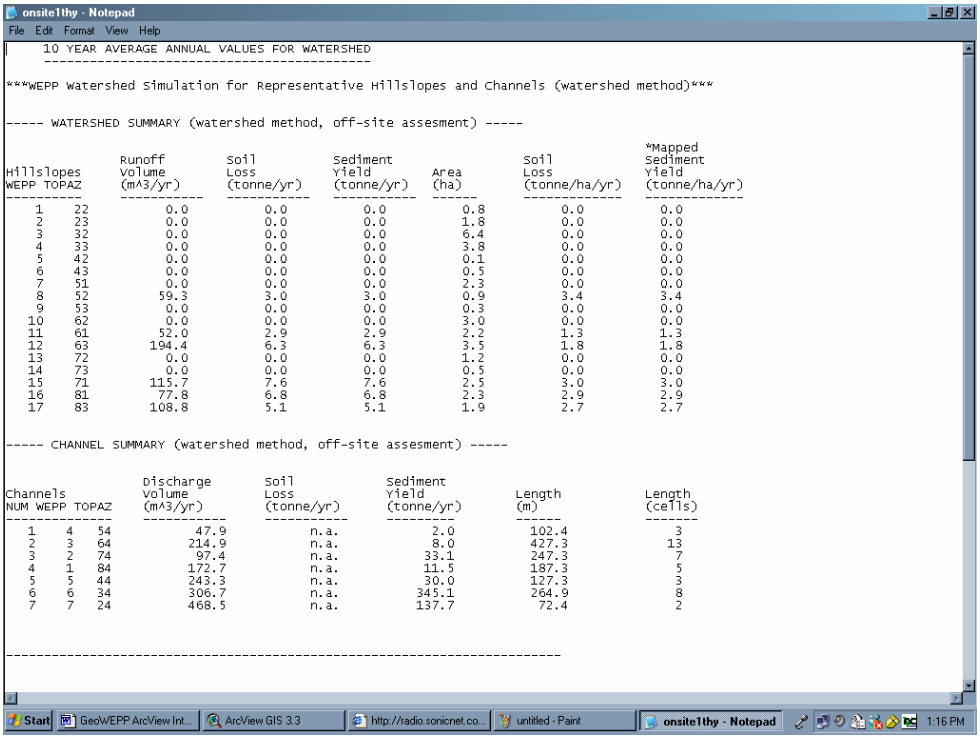
From the simulation, you get two results. First, you get the two new layers. The **Offsite1thy**, as seen below, shows the erosion for each subcatchment. The shades of red show a higher erosion level.



You can display the **Onsite1thy** by turning off the checkmark for **Offsite1thy** in the table of contents on the left side of the view. You now see that the simulation is given by pixel. This non-aggregated simulation shows greater detail of the erosion.

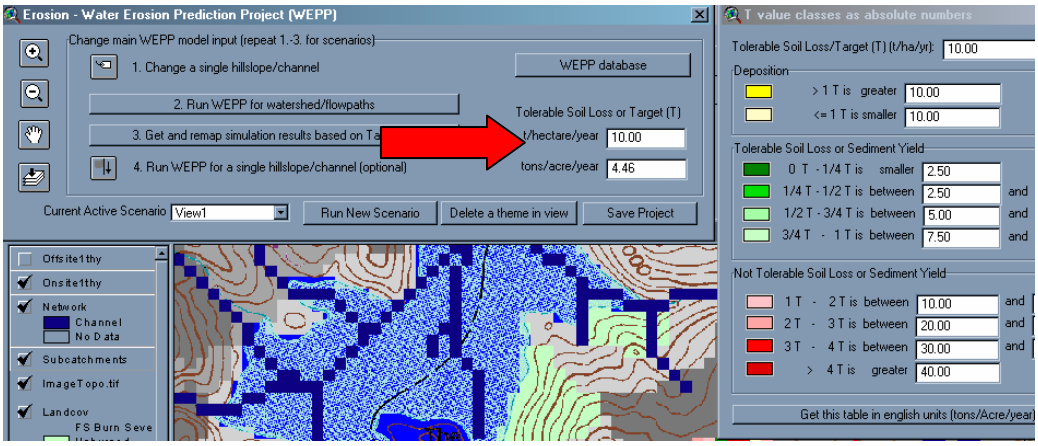


Second, you get a Notepad file with the actual results. Here you can find the numbers for the Runoff Volume, Soil Loss, Sediment Yield, etc. Please minimize the Notepad window. Do not close it. We'll need it for later.

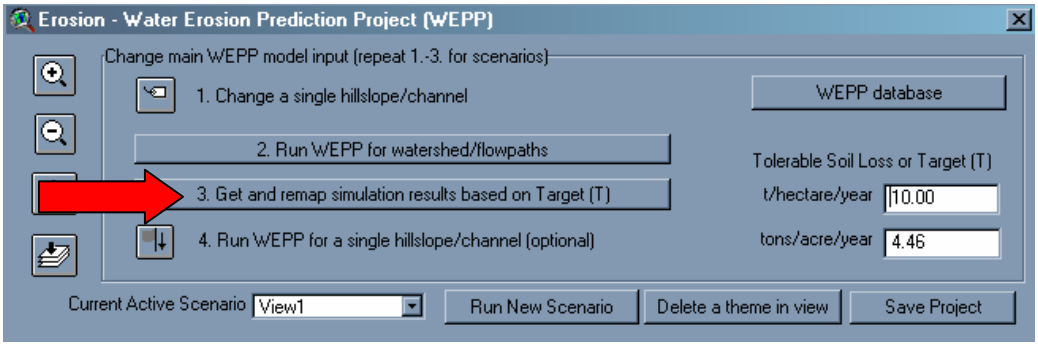


Next, we would like to remap the simulation output for the target value 'T' to 10 t/ha soil loss and sediment yield.

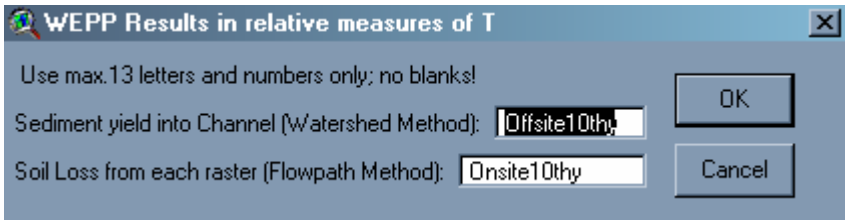
1. In the **Erosion – Water Erosion Prediction Project (WEPP)** window, go to the **Tolerable Soil Loss**. In the **t/hectares/year box**, type in 10 and press enter. Observe how the other numbers in the **T value classes** window change.



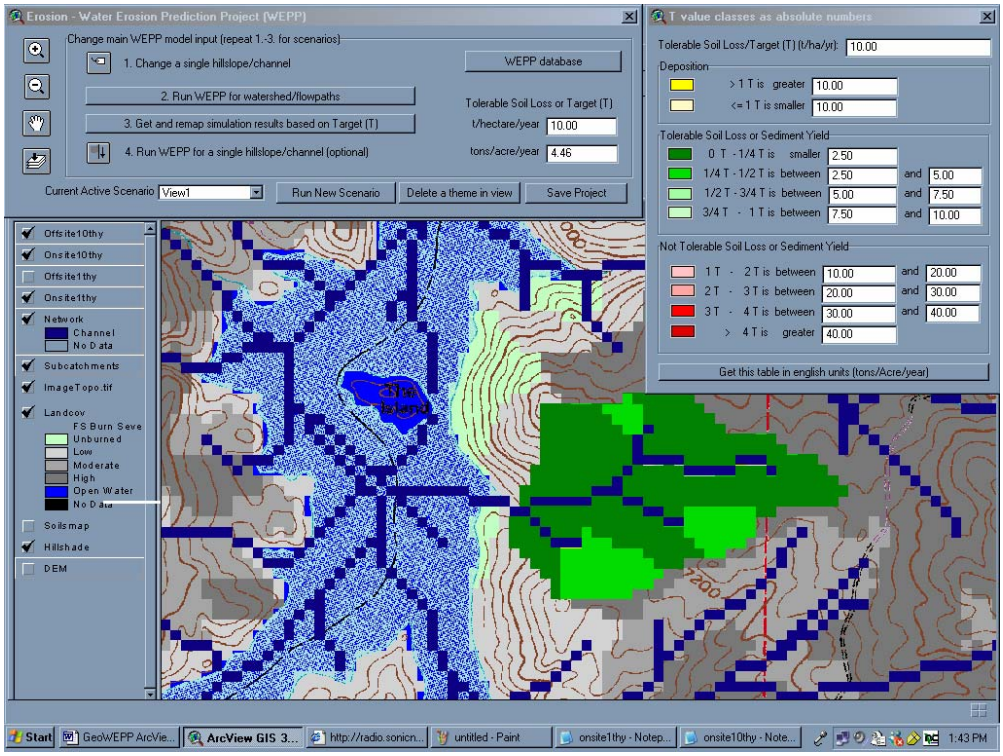
2. In the **Erosion – Water Erosion Prediction Project (WEPP)** window again, click on **Step 3. Get and remap simulation results based on Target (T)**.



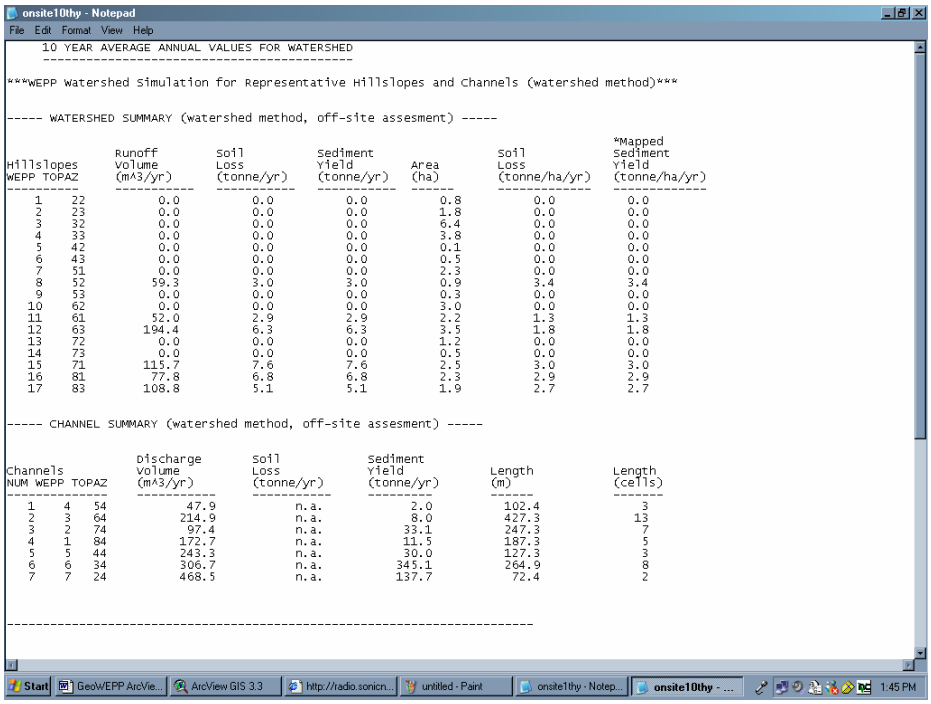
3. In the WEPP Results window, leave the name as **Offsite10thy** and click **OK**.



As you can see below, two new layers with the new soil loss were created. Since a greater amount of soil loss was considered tolerable, the colors for the subcatchments are given in green.

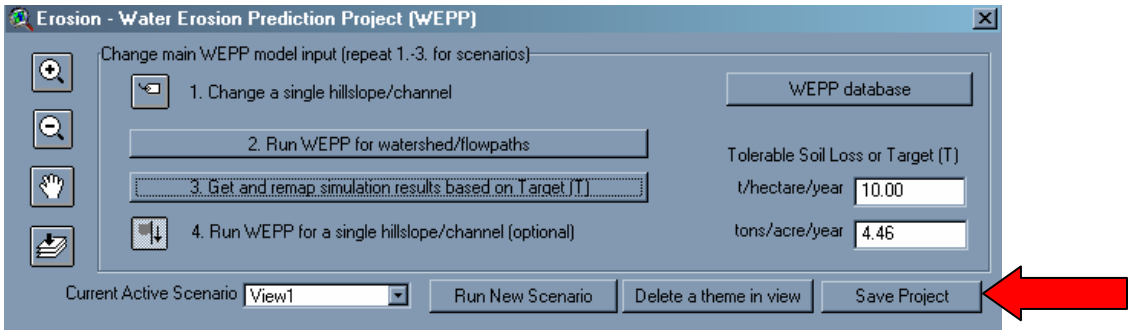


Also, a Notepad file was created. If you compare this new file to the first one that we created, you see the numbers are the same. The amount of erosion is the same, but the amount of what was tolerable was considered different and this was depicted in the view.



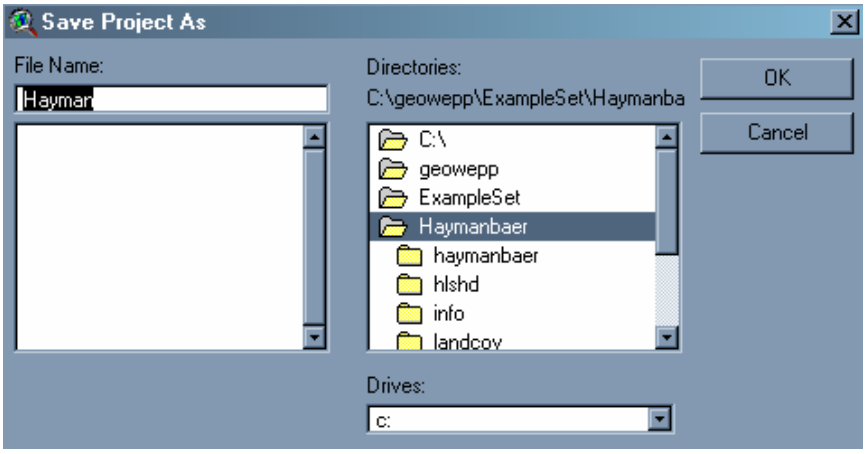
It's always a good idea to save your files often in case of crashes.

1. In the **Erosion – Water Erosion Prediction Project (WEPP)** window, click on the **Save Project** button.

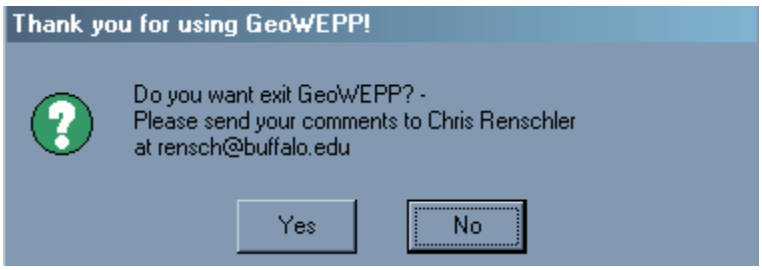


2. In the **GeoWEPP Watershed Directory**, note that you are saving this project in **C:\geowepp\ExampleSet\Haymanbaer**. Click **OK**.

3. In the **Save Project As** window, give the project the name **Hayman**. Click **OK**.

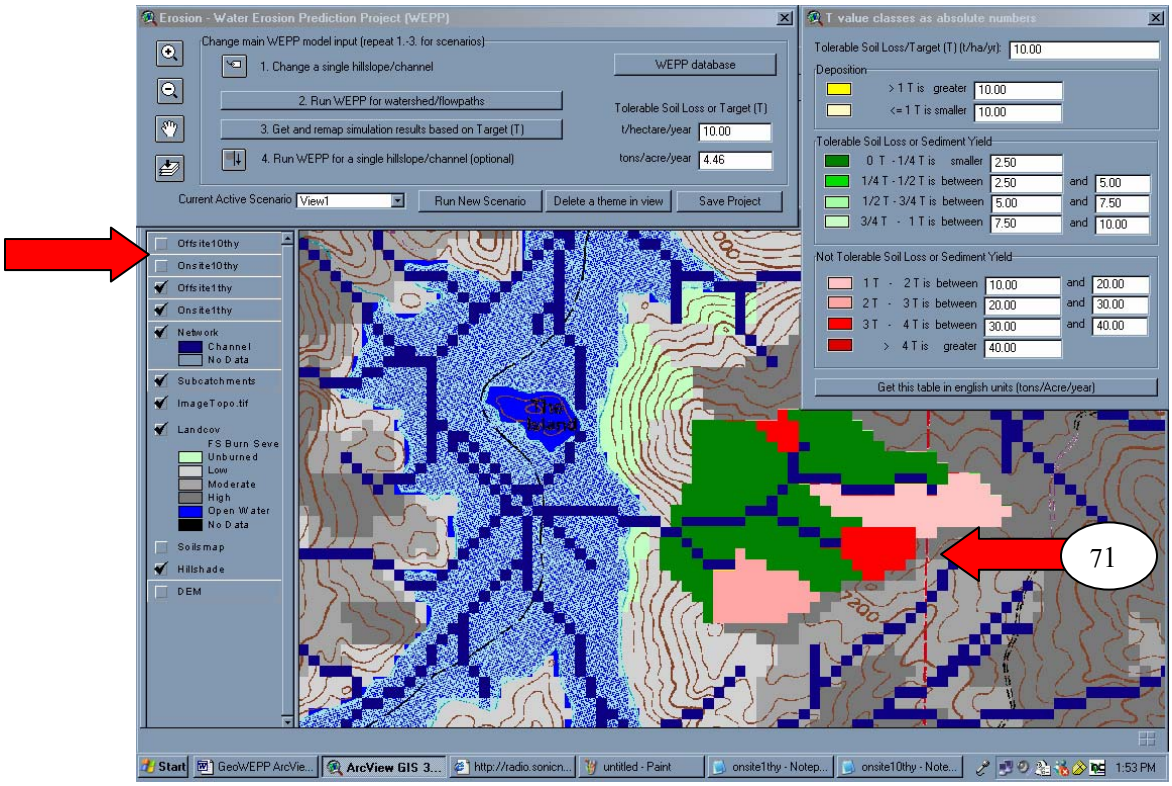


4. In the **Thank you for using GeoWEPP!** window, it prompts you to exit GeoWEPP. Click **No**.

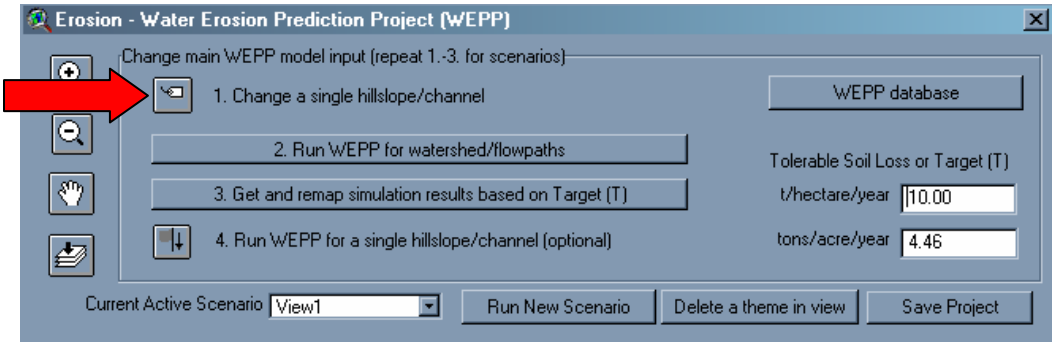


Now, we are interested in doing mitigation of the subcatchments. We want to change the soils of the subcatchment to reduce the amount of erosion. Note that often the tops and bottoms of many hills do not need mitiation, only the midslopes; also some low/medium burn severity areas can function as a buffer strip.

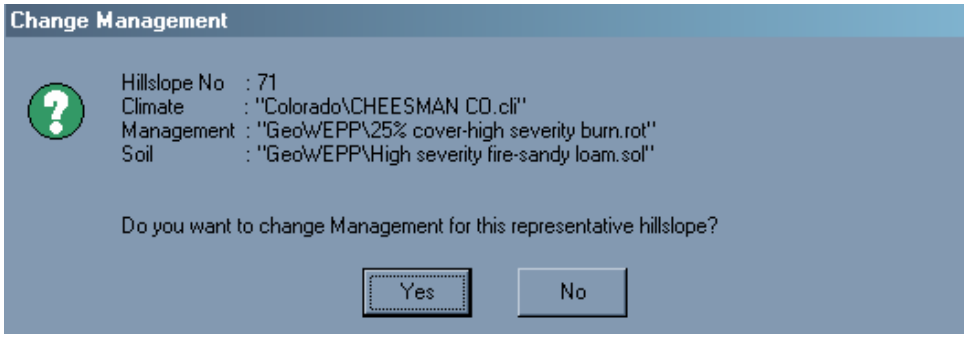
1. Turn off the **Offsite10thy** and **Onsite10thy** layers to show the **Offsite1thy** layer that depicts high erosion in red. This will give us a better sense of the erosion. We are interested in subcatchment 71, which is a subcatchment in the south-east of the catchment area.



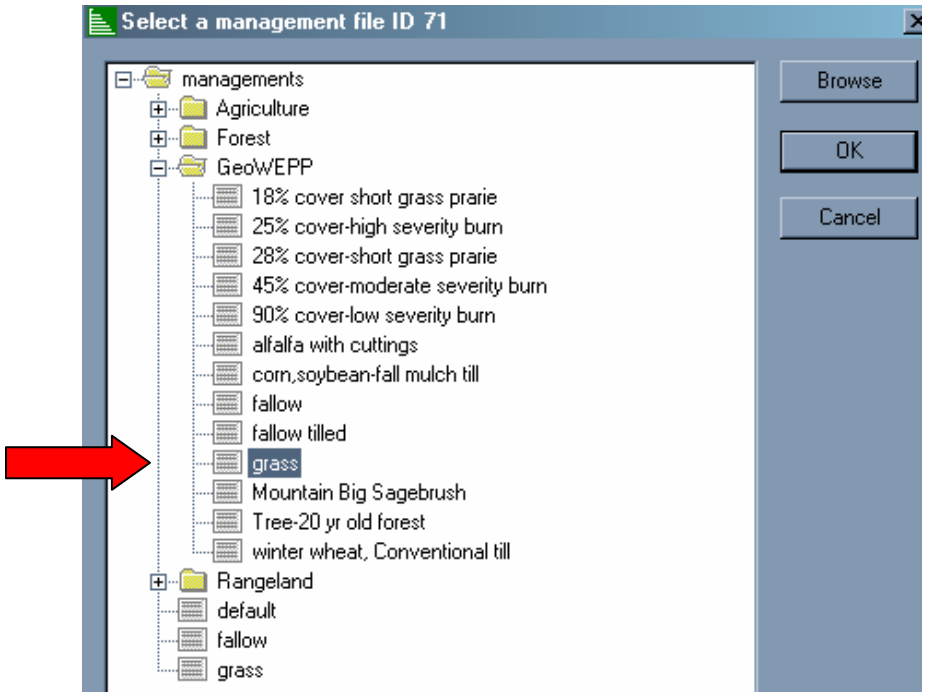
2. In the **Erosion – Water Erosion Prediction Project (WEPP)** window, click on **Step. 1. Change a single hillslope/channel** icon  . This will allow you to select the individual subcatchments.



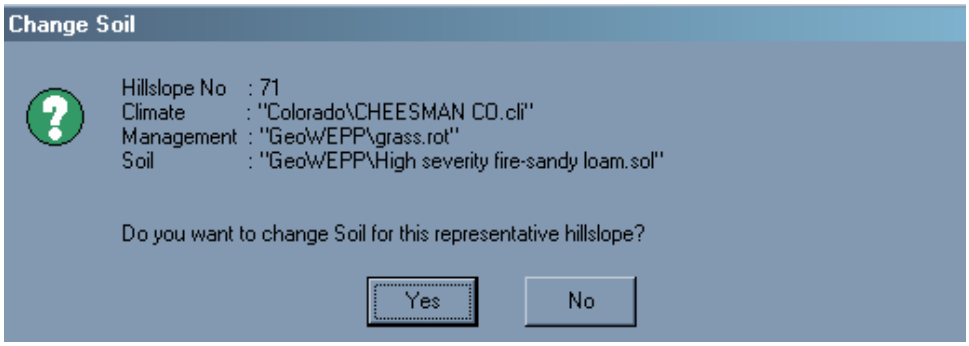
2. You now notice that the cursor has changed into a cross with a label symbol. Click this onto the subcatchment, and you get the **Change Management** window. Click **Yes**.



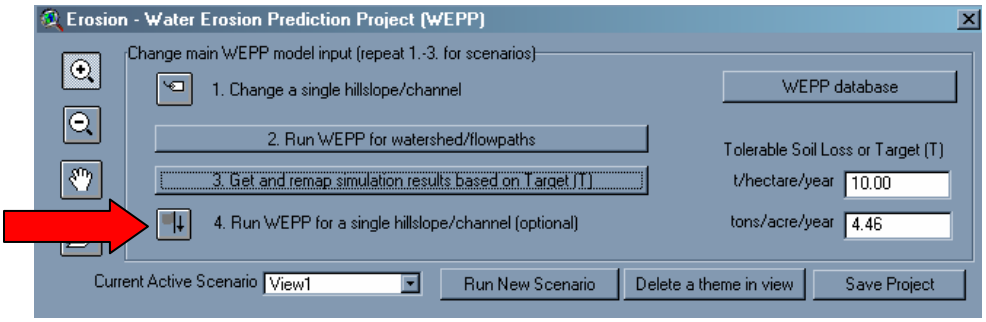
4. In the **Select a management** window, click on the **GeoWEPP** folder. There, double-click **grass** to use this management file.



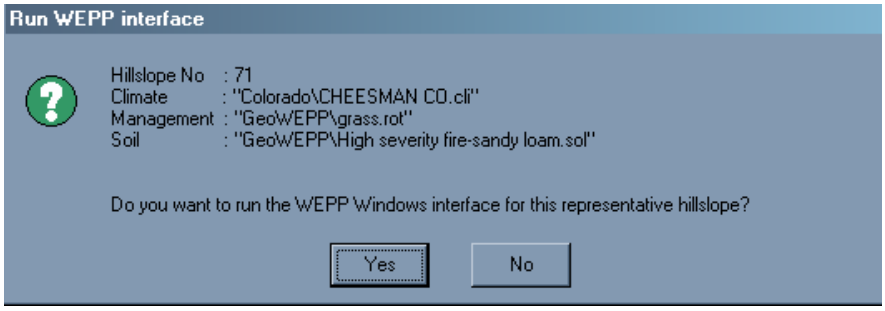
5. In the **Change Soil** window, click **No**.



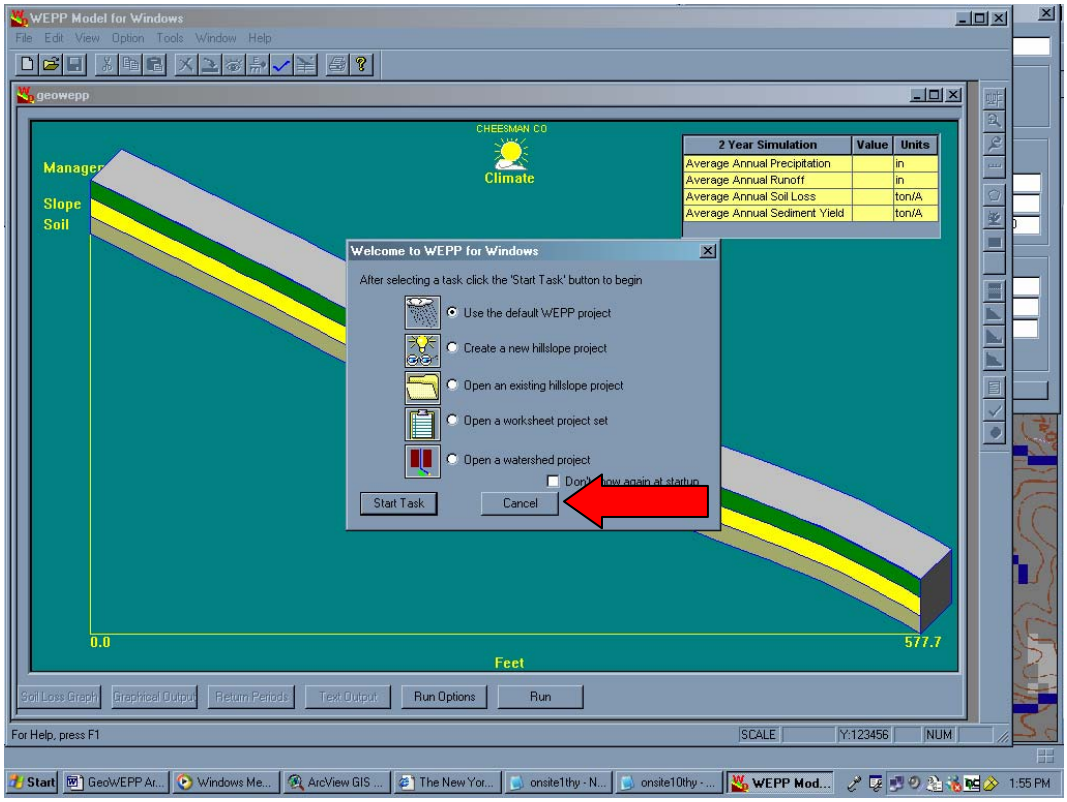
6. In the **Erosion – Water Erosion Prediction Project (WEPP)** window, click on **Step. 4. Run WEPP for a single hillslope/channel** icon . The cursor should now be a cross-hairs.



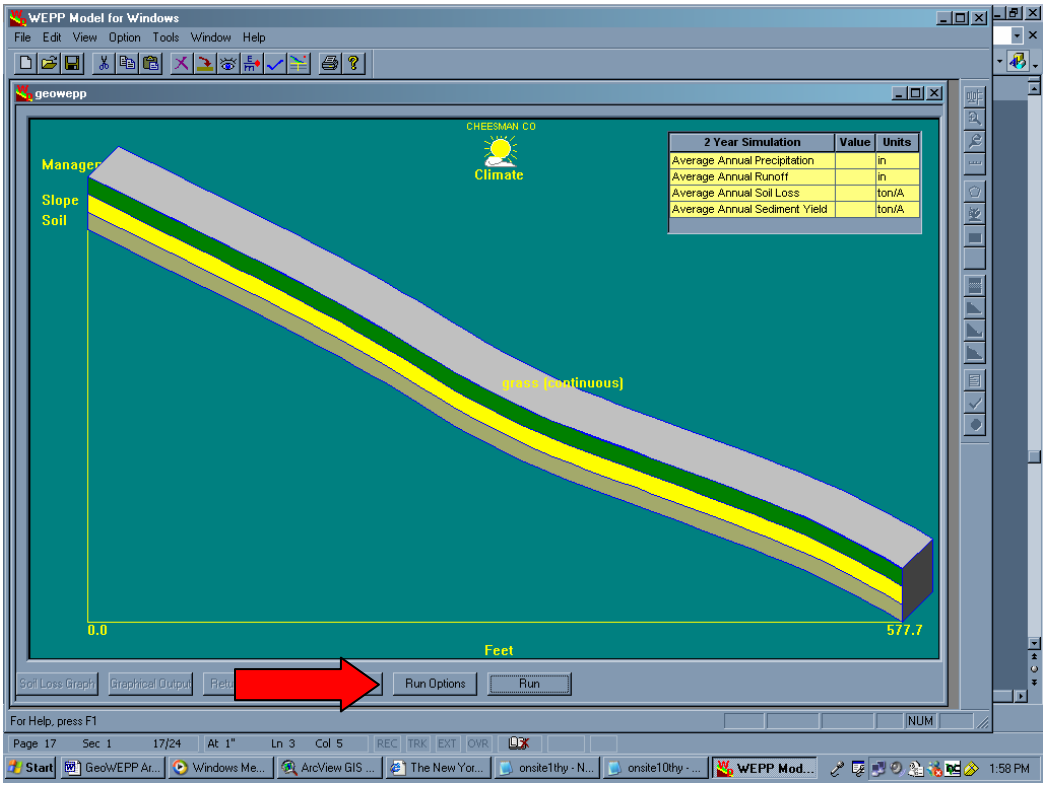
7. Click onto hillslop 71. You now get the **Run WEPP interface** window. Click **Yes**.



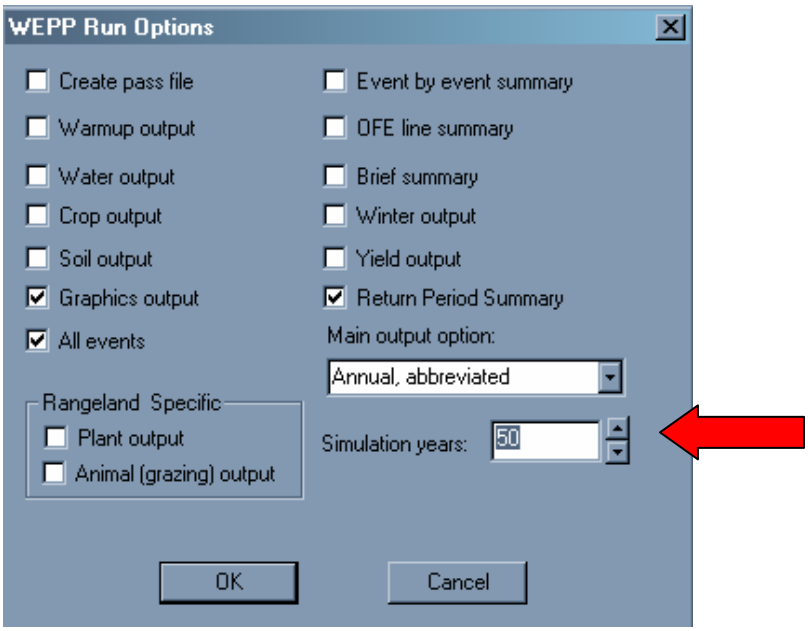
8. Next, **WEPP Model for Windows** appears. Here you can run you simulation for the individual hillslope. In **Welcome to WEPP for Windows**, click **Cancel** because hill #71 is already loaded.



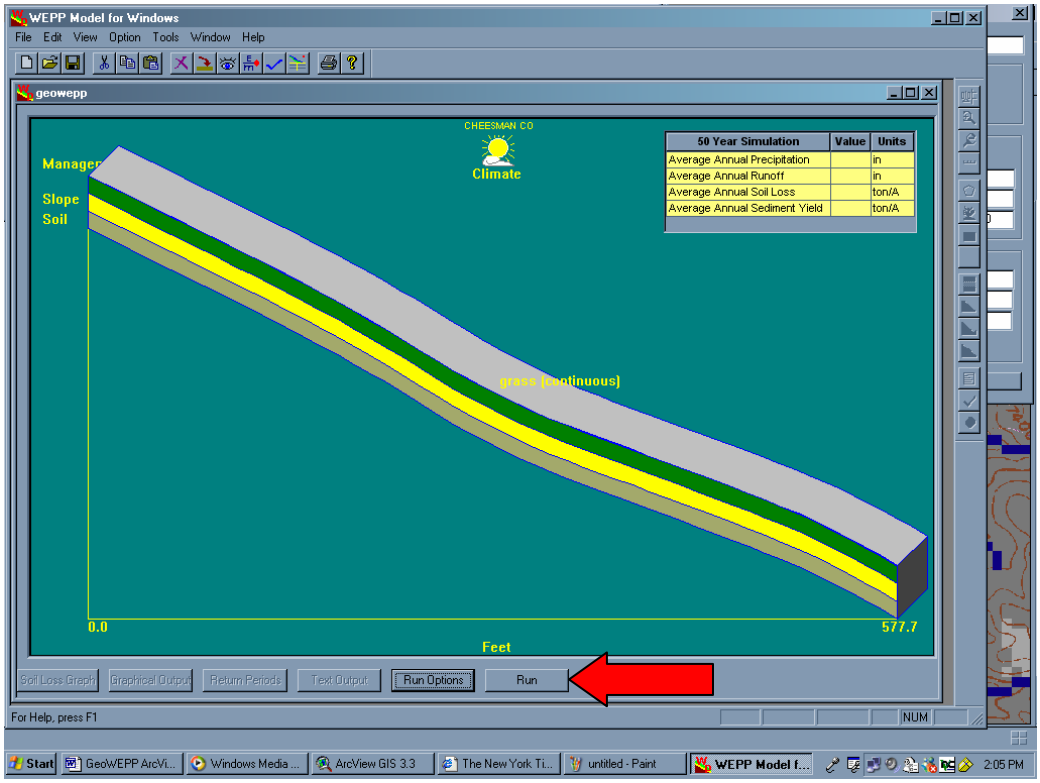
9. We want to now set the options for the run. On the bottom of the window, click **Run Options**.



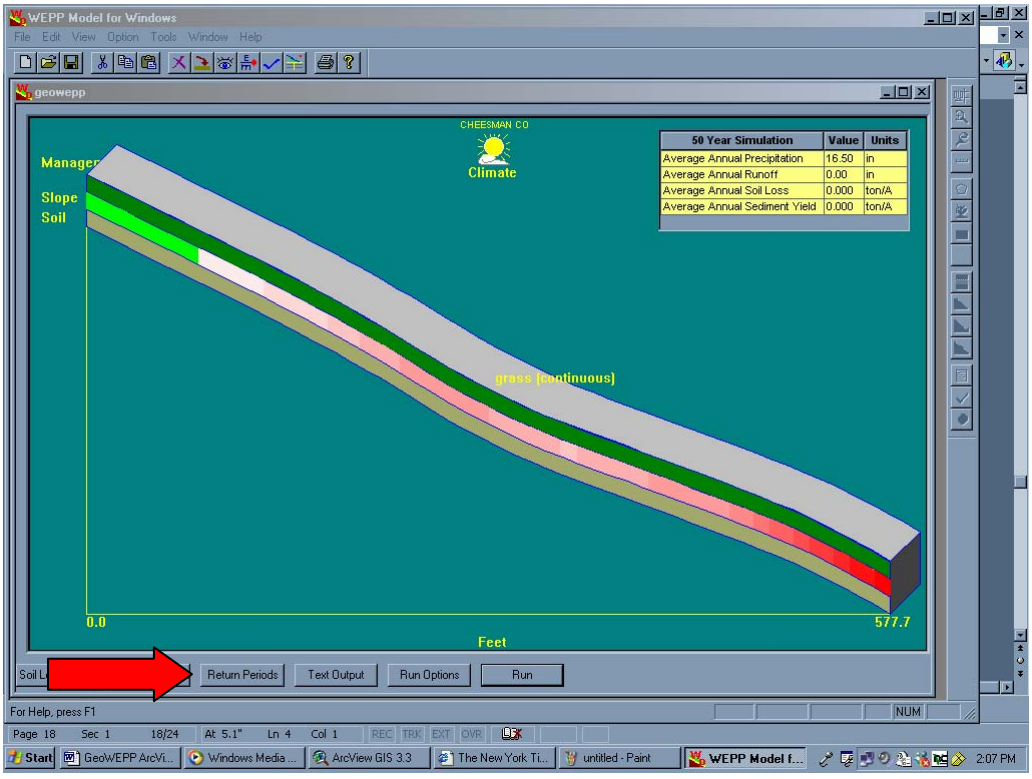
10. In the **Watershed Options** menu, make sure the **Return Period Summary** is checked. This will give you the summary report. Also, increase the **Simulation years** to 50. Click **OK**.



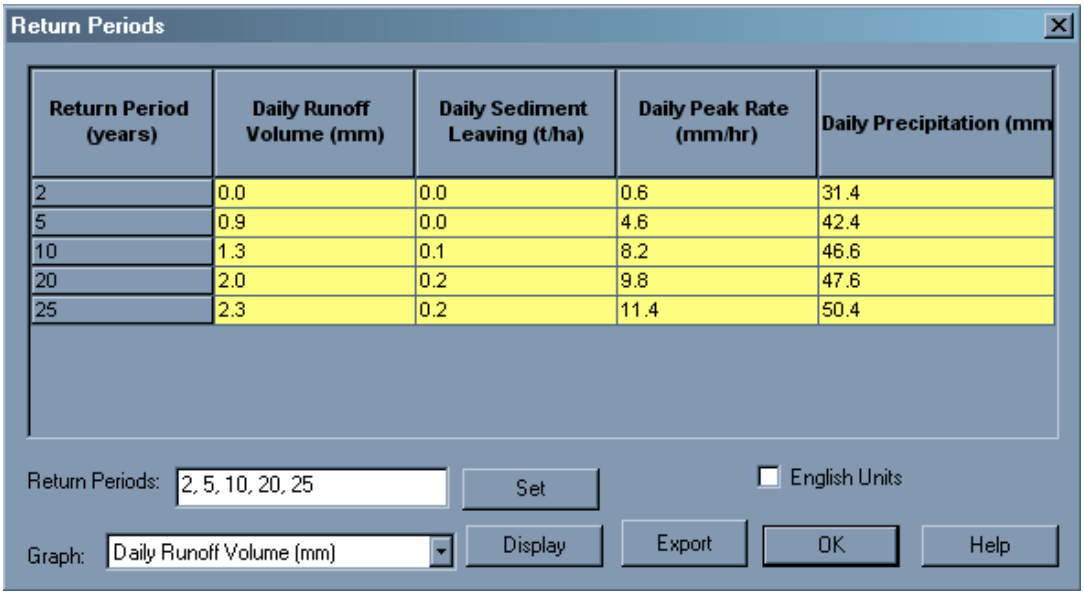
11. Back in the **WEPP Model for Windows,** click **Run** to run the simulation.



12. After the simulation runs, you get a new screen. You can see depicted in red that erosion is heaviest towards the bottom of the slope. Click onto **Return Periods** to get a summary of the results.

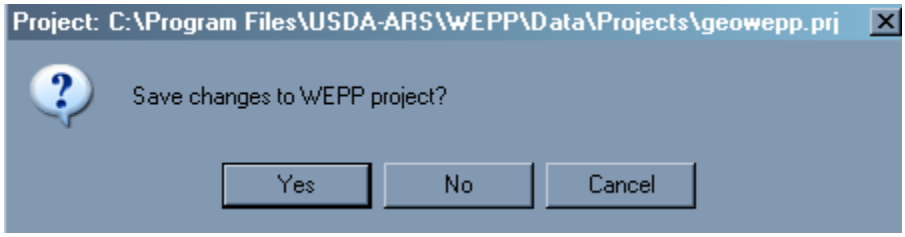


13. In the **Return Periods** window, you have the results of the simulation, such as runoff and sediment.

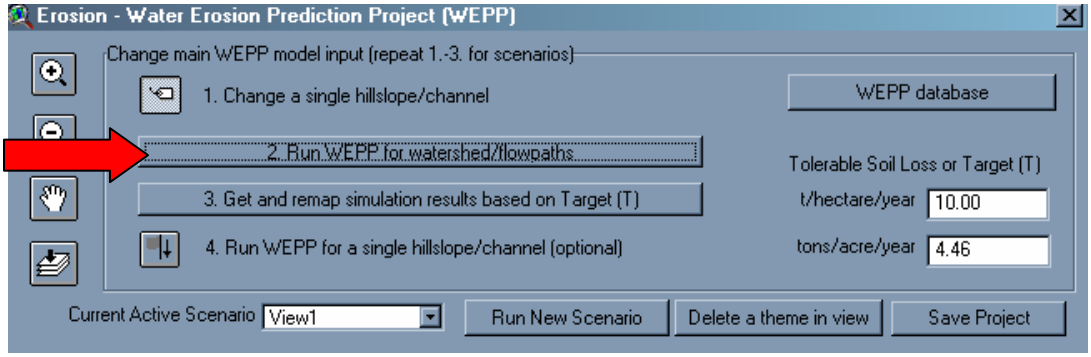


Finally, let's see the effect on hillslope 71 if we change it to grass. We need to go back into WEPP and run another simulation.

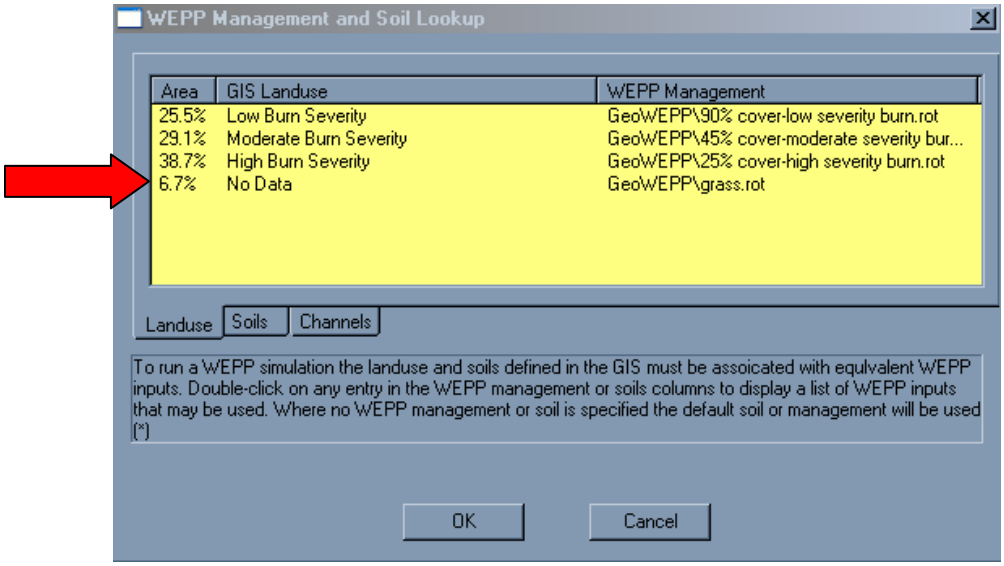
2. In **Return Periods**, click **OK** to close the window.
2. Close the **WEPP Model for Windows** to show the **GeoWEPP** screen.
2. You are prompted to save the WEPP project. Click **Yes**.



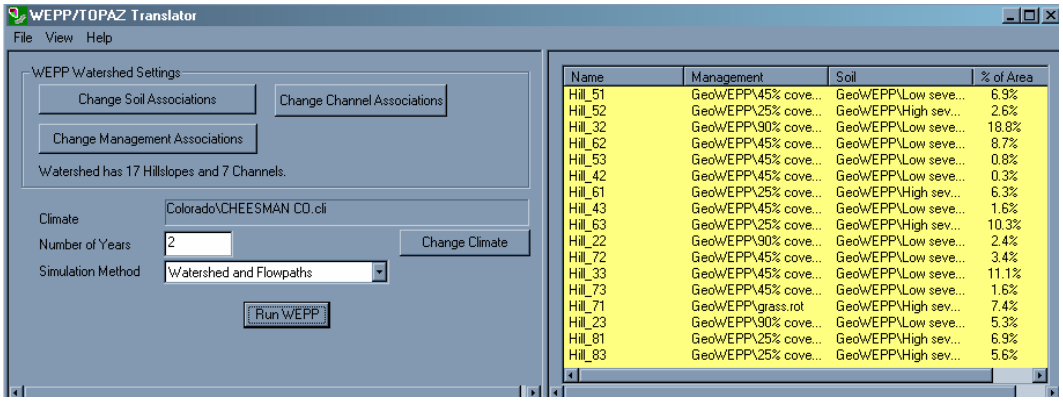
4. Back in **Erosion – Water Erosion Prediction Project (WEPP)**, click **2. Run WEPP for watershed/flowpaths**.



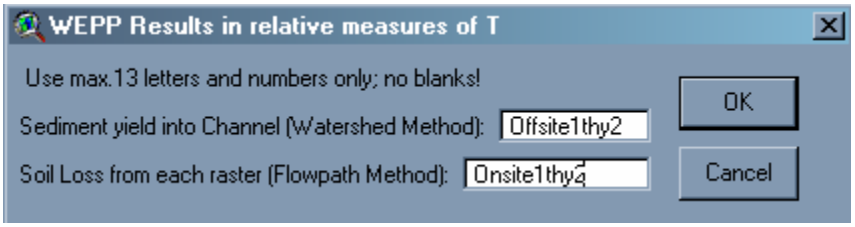
5. In the **WEPP Management and Soil Lookup**, notice that a 4th area has been created when we changed the management to grass. If you look in the **WEPP Management** field, you can now see a grass management. Click **OK**.



6. In the **WEPP/TOPAZ Translator**, make sure it's set for **2 years** and **Watershed and Flowpaths**. Click Run WEPP.



7. In the **WEPP Results in relative measure of T**, change the names to **Offsite1thy2** and **Onsitethy2**. Click **OK**.



You can now see that most of the erosion has stopped due to this change in landuse.