# GeoWEPP ArcX 2004.3 Tutorial

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#### 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.

WEPP For Windows CD	Install GeoWEPP
Install WEPP Water Eraks on Project model and Install GeoWEPP Are View Extension to ner WEPP: And Documentations Made Documentatio	Install GeoWEPP ArcView Extension and example data?

To unzip all files in GeoWEPF specified folder press the Unz	2004-3.exe to the ip button.	Unzip
Unzin to folder:		Run WinZip
c:\geowepp	Browse	Close
Verwrite files without prompting		About
		Help

File Edit View Favorites Tools	Help				1
+Back El QSearch Pa	Folders 🗿 🖺 🕾 🗙 💴 🖽	•			
Address 🔄 geowepp					▼ ∂Go
Folders	× 7447	Name	Size 🗸 Type	Modified	2
BM_PRELOAD (C:)     Barger     GrGsAFE     Data     Data_OD     DAta_OD	Sizer 0.98 MB Attributes: (normal)		1.006 KB APR File Open Scan for Vruses Open With Add to Zip Add to Zip Zip and E-Mail startgeowepp.zip Zip and E-Mail startgeowepp.zip Send To Cut Copy Create Shortcut Delete Rename Properties 22 KB Application 14 KB Text Documen 14 KB Text Documen	11/7/2002 4:24 PM 7/10/2000 1:0:06 AM 11/7/2002 4:23 PM 11/7/2002 4:09 PM 7/7/2002 7:39 AM 1/8/2001 10:21 AM 12/18/1998 12:26 PM 1/14/2001 12:34 PM 7/12/2000 5:16 AM 2/16/2001 12:24 PM 4/16/2000 11:59 PM 11/6/2002 8:47 PM 6/20/2001 9:53 AM 6/20/2001 9:53 AM 6/20/2001 9:53 AM 1/14/2001 10:23 PM 11/14/2001 10:23 PM 1/14/2001 10:27 PM 7/11/2002 8:23 AM 7/11/2002 8:23 PM 1/14/2001 10:27 PM 1/14/2001 10:27 PM	-

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.

startgeowe	pp Properties ? ×
General	
	startgeowepp
Type of file:	APR File
Opens with:	ArcView GIS 3.2 for Window: Change
Location:	C:\geowepp
Size:	0.98 MB (1,029,209 bytes)
Size on disk:	1.00 MB (1,048,576 bytes)
Created:	Today, November 07, 2002, 4:24:50 PM
Modified:	Today, November 07, 2002, 4:24:50 PM
Accessed:	Today, November 07, 2002
Attributes:	Read-only 🗖 Hidden 🔽 Archive
	OK Cancel Apply

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.

Operating System	
Are you running Windows NT as operating system?	
Yes No	
🝳 WEPP Work Directory	×
Specify WEPP root directory - Directory you installed WEPP	
U:\Program Files\USDA-ARS\WEPP	Lancel
Q GeoWEPP Work Directory	×
Specify GeoWEPP root directory - Directory you installed GeoWEPP	ок 📐
C:\geowepp	Cancel
🔍 Info	×





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

Q GeoWEPP ArcX 2004.3		×
The GeoWEPP project is a collaboration of		1
A Contraction of the second se	GeoWEPP	Open existing GeoWEPP project saved in a GeoWEPP project folder
Use example data	Use NRCS Data Gateway zip file	es from CD or go online
Use your own DEM	Use own DEM, Soils, and Land Use	in ASCII Format or from CD

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.

🍳 Proje	ct Work Directory - Example	×
Specify a p	project directory to work on the example data set	OK
C:\geowe	pp\example	Cancel
Create nev	v work directory	
<b>?</b>	neoweon\example is not a directory - Do you want to create a	directory with this name?
	Yes	
🔍 Info		×
0	GeoWEPP will prepare Topographical Map Model to delineate a drainage network for V this may take a few minutes!	and Digital Elevation West Lafayette, IN +
	OK	

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).

C:\WINNT\System32\cmd.exe	<u>- 🗆 ×</u>
VERSION 3.12, AUGUST 1999 PROGRAM DEDNM : DIGITAL ELEVATION DRAINAGE NETWORK MODEL PROGRAM VERSION 3.10, APRIL 1999	
J. GARBRECHT, USDA-ARS, EL RENO, OKLAHOMA, USA. L. MARTZ, UNIVERSITY OF SASKATCHEVAN, SASKATOON, CANADA.	
DISCLAIMER	
THIS PROGRAM AND ITS SUBROUTINES ARE ACCEPTED AND USED BY THE RECIPIENT UPO THE EXPRESS UNDERSTANDING THAT THE DEVELOPERS MAKE NO WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY OR SUITABILITY FOR ANY ONE PURPOSE, AND THAT THE DEVELOPERS SHALL BE UNDER NO LIABILITY TO ANY PERSON BY REASON OF ANY USE MADE THEREOF.	N
TITLE OF THE CURRENT TOPAZ APPLICATION:	
DATE: 23 AUGUST 1999 WEPP INTERFACE DEDNM VERSION 3.1 APPLICATION FOR TESTING AND VERIFICATION; INPUT FILE TESTING AND CALIBRATION.	
***** BEGINNING DEM INPUT AND DEM PRE-PROCESSING. ***** BEGINNING DEPRESSION AND FLAT AREA TREATMENT	-

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.

\_\_\_\_\_

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.

🔍 Dire	ctory ownership	×
0	Possible error message can be safely ignored!	

\_\_\_\_\_\_

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.

🚣 WEPP	Climate Selec	tion				×
Latitude:	40.443	Long	itude:	-86.9405		
State	Indiana	✓ Station	WEST LA	AYETTE 6 NW IN	•	
Based on t CLIGEN da	he watershed outlet poi ta which is used in WE	nt chosen the selection PP simulations.	n above is t	he closest climate statio	n for	
Distance to	Closest Station (miles):	3.6 (WEST LAFAY	ETTE 6 NW	/ IN)		
Use Exist	ing Climate File	Use Selected Statio	m _	Use Closest Station	Cancel	

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

Select a soil file ID 0	×
Select a soil file ID 0  KIM KIVA KIVA KIVA KIVA KIVA KIVA KIVA KIVA	Browse  CANCEL  More Soils



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".

<b>BWEP</b>	P Management and Soil Lookup	×
Area	GIS Landuse	WEPP Management
100	corn-fall moldboard plow	Agriculture\corn-fall moldboard plow.rot
Landus	Soils Channels	
To run a' inputs. Do that may (*)	WEPP simulation the landuse and soils defined in t uble-click on any entry in the WEPP management be used. Where no WEPP management or soil is s	he GIS must be assoicated with equivalent WEPP or soils columns to display a list of WEPP inputs pecified the default soil or management will be used
	ŌK	Cancel

📽 WEPP Management a	nd Soil Lookup	×
Area GIS Soil 100 KEITH	WEPP Soil KEITH.sol	
Landuse Soils Channels To run a WEPP simulation the landu inputs. Double-click on any entry in that may be used. Where no WEPP (*)	se and soils defined in the GIS must be assoicated with equivalent W he WEPP management or soils columns to display a list of WEPP inp management or soil is specified the default soil or management will b	/EPP outs e used
[	OK Cancel	

88	WEPF	Management a	nd Soil Lookup			×
	Order	WEPP Channel Type		Width(m)		
	01	OnRock		1.0		
	02	OnRodas		2.0		
	03	Undravel		2.0		
	04	OnEarth		3.0		
ī	anduse	Soils Channels				
_						
To	) run a W	EPP simulation the land	luse and soils defined in th	ne GIS must be a	issoicated with equivalent WB	IPP .
ling tha	outs. Dou at may he	ible-click on any entry in sused Where no WEPI	i the WEPP management P management of soil is so	or soils columns recified the defai	to display a list of WEPP inpu	ts used
(*)	3. maj 2.		management of controlp		an oon of management finites	
			ОК	Cancel		
				Cancer		

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.

Select a Channel Type:	×	
Channels Ditch Earth Channel Forest road ditch Graded Gravel Channel Rock Channel Ungraded Waterway Waterway	Browse OK Cancel	Change Channel Wi 🗙
		Width (m)

🚜 WEPP Management and Soil Lookup 📃 🔀				
	Order	WEPP Channel Type	Width(m)	
	1	WATERWAY	2.0	
	2	UNGRADED	3.0	
	3	GRADED	3.0	
	4	DITCH	4.U	
	5	DITCH	5.0	
_				
	anduse.	Soils Channels		
Te	un alt	EPP aimulation the Vanduas and soils defined in th	o GIS must be presidented with equivalent (CPP	
line	outs. Dou	ible-click on any entry in the WEPP management.	or soils columns to display a list of WEPP inputs	
tha	at may be	e used. Where no WEPP management or soil is sp	ecified the default soil or management will be used	
U				
		OK	Cancel	

## 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.

Name       Management       Soil       % of Area         Change Soil Associations       Change Channel Associations       Hill_32       Agriculture/com-fall moldboard plow.rot       KEITH.soi       18.3%         Change Management Associations       Hill_33       Agriculture/com-fall moldboard plow.rot       KEITH.soi       18.5%         Watershed has 7 Hillslopes and 3 Channels.       Hill_34       Agriculture/com-fall moldboard plow.rot       KEITH.soi       0.3%         Climate       Indiana/WEST LAFAYETTE 6 NW IN.cli       Indiana/WEST LAFAYETTE 6 NW IN.cli       Hill_41       Agriculture/com-fall moldboard plow.rot       KEITH.soi       16.1%
WEPP Watershed Settings       Soil       % of Area         Change Soil Associations       Change Channel Associations       Hill_32       Agriculture/corn-fall moldboard plow.rot       KEITH.sol       18.3%         Change Management Associations       Hill_33       Agriculture/corn-fall moldboard plow.rot       KEITH.sol       18.5%         Watershed has 7 Hillslopes and 3 Channels.       Hill_22       Agriculture/corn-fall moldboard plow.rot       KEITH.sol       0.3%         Climate       Indiana/WEST LAFAYETTE 6 NW IN.cli       Hill_41       Agriculture/corn-fall moldboard plow.rot       KEITH.sol       16.1%
Simulation Method Watershed and Flowpaths

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.

Running WEPP					
	Running Flowpath 13 of 124 (Hill_32)				
	Cancel				

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.

🝳 WEPP Results in relative measures of T	×
Use max.13 letters and numbers only; no blanks!	
Sediment yield into Channel (Watershed Method): Dffsite1th;	
Soil Loss from each raster (Flowpath Method): Onsite1thy	Cancel

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.

onsite1thy	- Notepad						
File Edit For	mat Help						
2 YEAR A	VERAGE ANNUAL \	ALUES FOR WAT	ERSHED				
***WEPP Water	shed Simulation	n for Represer	tative Hillsl	opes and Cha	annels (watershed	method)***	
WATERSH	HED SUMMARY (wa1	ershed method	i, off-site as	sesment)			
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 3 31 4 33 5 42 6 43 7 41	98.3 3793.6 2741.1 1858.9 4472.9 3601.8 2315.6	0.7 23.2 9.5 13.1 20.9 17.2 7.9	0.7 23.2 6.2 13.1 14.9 17.2 7.3	0.1 6.2 2.3 7.6 5.8 5.4	8.3 3.8 1.5 5.8 2.7 3.0 1.5	8.3 3.8 1.0 5.8 2.0 3.0 1.4	
CHANNEL hannels UM WEPP TOPA	_ SUMMARY (water Discharge Volume AZ (m^3/yr) 	soil soil Loss (tonne/	off-site asse sedi yiel 'yr) (ton 	sment) ment d ne/yr) 	Length (m)	Length (cells)	
1 2 3 2 1 4 3 3 2	34 8579. 14 10640. 24 19371.	.8 r .4 r .2 r	1.a. 1.a. 1.a.	44.8 46.8 94.1	349.7 494.6 60.0	10 14 2	
***WEPP Water	rshed Simulation	n for all flow wpath method,	vpaths average on-site asses	d over subca ment)	 atchments (flowpan *Mapped	I th method)***	
illslopes EPP TOPAZ	Runoff Volume (m^3/yr)	soil Loss (tonne/yr)	Sediment Yield (tonne/yr)	Area (ha)	soil Loss (tonne/ha/yr)	Sediment Yield (tonne/ha/yr)	
1 22 2 32 3 31 4 33 5 42 6 43 7 41	95.2 4244.8 3602.9 1727.4 4416.8 3880.9 2961.9	0.9 38.1 15.9 11.9 18.3 33.5 10.4	n. a. n. a. n. a. n. a. n. a. n. a. n. a.	0.1 6.1 6.2 2.2 7.6 5.8 5.4	9.9 6.2 2.6 5.3 2.4 5.8 1.9	n.a. n.a. n.a. n.a. n.a. n.a. 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.

🝳 Erosion - Water Erosion Prediction Project (WEPP)	×
Change main WEPP model input (repeat 13. for scenarios)	
1. Change a single hillslope/channel	WEPP database
2. Run WEPP for watershed/flowpaths	Tolerable Soil Loss or Target (T)
3. Get and remap simulation results based on Target (T)	t/hectare/year 5.00
. 4. Run WEPP for a single hillslope/channel (optional)	tons/acre/year 2.23
Q < ₹ Delete a theme in view	Save Project
KEPP Results in relative measures of T	×
Use may 13 letters and numbers only: no blankel	



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.

🝳 Erosion - Water Erosion Prediction Project (WEPP)	×
Change main WEPP model input (repeat 13. for scenarios)	
1. Change a single hillslope/channel	WEPP database
2. Run WEPP for watershed/flowpaths	Tolerable Soil Loss or Target (T)
3. Get and remap simulation results based on Target (T)	t/hectare/year 5.00
4. Run WEPP for a single hillslope/channel (optional)	tons/acre/year 2.23
Q     ₹       Delete a theme in view	Save Project



🍳 Save Project As		×
File Name: RunGeoWEPP	Directories: C:\geowepp\example	ок 🛌
×	C:\ geowepp example elevation grid_meter hlshd info network	Cancel
	Drives:	

Thank you for using GeoWEPP!				
Do you want exit GeoWEPP? - Please send us your comments to Chris Renschler at rensch@buffalo.edu				
	Yes			

# Section 7: Start up an existing GeoWEPP project

Start the GeoWEPP software from your desktop.



Then choose the button for an existing GeoWEPP project.

🍳 GeoWEPP ArcX 2004.3		×
The GeoWEPP project is a collaboration of		
of the state of th	GeoWEPP	Open existing GeoWEPP project saved in a GeoWEPP project folder
Use example data	Use NRCS Data Gateway zip file:	s from CD or go online
Use your own DEM	Use own DEM, Soils, and Land Use in	n ASCII Format or from CD

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

🍳 Open Project		×
File Name:  rungeowepp.apr  rungeowepp.apr	Directories: c:\geowepp\example c:\ c:\geowepp c:\ c:\ geowepp c: example c: d: d: d: d: d: d: d: d: d: d	Cancel
List Files of Type: Project (*.apr)	Drives:	I

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 Management				
•	Hillslope No : 33 Climate : "Indiana\WEST LAFAYETTE 6 NW IN.cli" Management : "Agriculture\corn-fall moldboard plow.rot" Soil : "KEITH.sol"			
	Do you want to change Management for this representative hillslope?			
	Yes No			

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



Change Soil				
?	Hillslope No : 33 Climate : "Indiana\WEST LAFAYETTE 6 NW IN.cli" Management : "Agriculture\corn-no till.rot" Soil : "KEITH.sol"			
	Do you want to change Soil for this representative hillslope?			
	Yes No			

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.

🔍 Erosion - Water Erosion Prediction Project (WEPP)					
Change main WEPP model input (repeat 13. for scenarios)					
1. Change a single hillslope/channel	WEPP database				
2. Run WEPP for watershed/flowpaths	Tolerable Soil Loss or Target (T)				
3. Get and remap simulation results based on Target (T)	t/hectare/year				
4. Run WEPP for a single hillslope/channel (optional)	tons/acre/year 2.23				
Q < ∑ Delete a theme in view	Save Project				

🍳 Erosion - Water Erosion Prediction Project (WEPP) 🛛 🛛 💌				
(Change main WEPP model input (repeat 13. for scenarios)				
I. Change a single hillslope/channel     WEPP database				
2. Run WEPP for watershed/flowpaths	Tolerable Soil Loss or Target (T)			
3. Get and remap simulation results based on Target (T) t/hectare/year 5.00				
. Run WEPP for a single hillslope/channel (optional)	tons/acre/year 2.23			
O ₹ Delete a theme in view	Save Project			

🗱 WEPP Management and Soil Lookup 📃				
	Area	GIS Landuse	WEPP Management	
	6.3%	corn-no till	Agriculture\com-no till.rot	
	93.7%	corn-fall moldboard plow	Agriculture\corn-fall moldboard plow.rot	
	Landuse	Soils Channels		
To run a WEPP simulation the landuse and soils defined in the GIS must be assoicated with equivalent WEPP inputs. Double-click on any entry in the WEPP management or soils columns to display a list of WEPP inputs that may be used. Where no WEPP management or soil is specified the default soil or management will be used (*)				
		ОК	Cancel	

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

See WEPP Management and Soil Lookup					
	Order	WEPP Channel Type	Width(m)		
	01	WATERWAY	2.0		
	02	DITCH	3.0		
	03	GRADED	3.0		
	04	DITCH	4.0		
	05	DITCH	5.0		
	, 		· · · · · · · · · · · · · · · · · · ·		
	Landuse Soils Channels				
To run a WEPP simulation the landuse and soils defined in the GIS must be assoicated with equivalent WEPP inputs. Double-click on any entry in the WEPP management or soils columns to display a list of WEPP inputs that may be used. Where no WEPP management or soil is specified the default soil or management will be used (*)					
		OK Cancel			

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".

<b>Q WEPP Results in relative measures of T</b>	×
Use max.13 letters and numbers only; no blanks!	
Sediment yield into Channel (Watershed Method): 0ffsite5thy2	
Soil Loss from each raster (Flowpath Method): Onsite5thy2	Cancel

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.

🝳 example			<u>- 🗆 ×</u>
] File Edit View Favorites Tools	Help		<u></u>
Address 🗀 example	🖸 🖉 Go 🗍 ⇔Back 🔻 ⇒ 🔻 🖻 🗎	Search 🔁 Folders 🎯	BBX®  »
Folders  Folders  Archive  Folders  GISascii  Copen  Folders  Fold	× • • • • • • • • • • • • • • • • • • •	Name △     III offsite5thy2     IIII onsite1thy     IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	4 1 4 4 4 4 4 4

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.

The Ed	e5thy2 -	Notepad						
-11e Ea 2 '	YEAR AVE	ERAGE ANNUAL	VALUES FOR WAT	TERSHED				
	Watanch	ad cimulatio			anne and chi	appole (watanchod	wath ad \ ***	
WEPP	waters	ieu simulatio	on for kepreser	icacive minisi	upes and cha	anneis (watersneu	methody	
W.	ATERSHE	) SUMMARY (wa	atershed method	d, off-site as	sesment)			
11-1-		Runoff	soil	Sediment	4000	soil	*Mapped Sediment	
PP TO	PAZ	(m^3/yr)	(tonne/yr)	(tonne/yr)	(ha)	(tonne/ha/yr)	(tonne/ha/yr)	
1	22 32	98.3 3793.6	0.7 23.2	0.7 23.2	0.1 6.1	8.3 3.8	8.3 3.8	
3 4	31 33	2741.1 1614.3	9.5	6.2 2.2	6.2	1.5	1.0	
6	42	4472.9 3601.8	20.9	14.9	7.6 5.8	2.7	2.0	
	41	2513.0	7.9	7.5	5.4	1.5	1.4	
C	HANNEL S	SUMMARY (wate	ershed method,	off-site asse	sment)			
		Discharge	e Soil	Sedi	nent			
annel M WEP	S P TOPAZ	volume í (m∧3/yr)	Loss (tonne,	∕yr) (ton	d ne/yr)	Length (m)	Length (cells)	
1	2 34	8337	 7.0 r	 n.a.	34.8	349.7	10	
3	1 44 3 24	18998	3.2 r	1.a. 1.a.	46.8 83.5	494.6 60.0	2	
							Ι	
**WEPP	Watersh	ned Simulatio	on for all flow	wpaths average	d over subca	atchments (flowpa	th method)***	
_				•.				
F	LOWPATH	SUMMARY (TIC	owpatn method,	on-site asses	nent)	Wassend		
illslo	nes	Runoff Volume	Soil	Sediment Vield	Area	soil	Sediment Vield	
PP TO	PAZ	(m^3/yr)	(tonne/yr)	(tonne/yr)	(ha)	(tonne/ha/yr)	(tonne/ha/yr)	
1	22 32	95.2 4244.8	0.9 38.1	n.a. n.a.	0.1 6.1	9.9 6.2	n.a. n.a.	
ź	24	2602.0	15 0	n.a.	6.2	2.6	n.a.	
2 3 4	33	3602.9 1461.1	1.6	n.a.	2.2	0.7	n.a.	
423456	33 42 43	3602.9 1461.1 4416.8 3880.9	1.6 18.3 33.5	n.a. n.a. n.a.	2.2 7.6 5.8	2.4	n.a. n.a.	
2 3 4 5 6 7	31 33 42 43 41	3602.9 1461.1 4416.8 3880.9 2961.9	10.4	n.a. n.a. n.a. n.a.	2.2 7.6 5.8 5.4	2.4 5.8 1.9	n.a. n.a. n.a. n.a.	
12 3 4 5 6 7	31 33 42 43 41	3602.9 1461.1 4416.8 3880.9 2961.9	1.6 18.3 33.5 10.4	n.a. n.a. n.a. n.a.	2.2 7.6 5.8 5.4	2.4 5.8 1.9	n.a. n.a. n.a. n.a.	
12 34 56 7	31 33 42 43 41	3602.9 1461.1 4416.8 3880.9 2961.9	1.6 18.3 33.5 10.4	n.a. n.a. n.a. n.a.	2.2 7.6 5.8 5.4	2.4 5.8 1.9	n.a. n.a. n.a. 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.

	Image: Solid constraints         Image: Solid constraints <th image:<="" th=""></th>	
<ul> <li>Offs H4S thy2</li> <li>Ons #68 thy3</li> <li>Ons #68 thy3</li> <li>Ons #68 thy3</li> <li>Ons #68 thy3</li> <li>Oddoesd at #</li> <li>Odd</li></ul>	Not Tolerable Soil Loss or Sedment Yield           1         1         2         1         between         500         and         1000           2         1         3         is between         1500         and         1500           3         1         4         is prevent         1500         and         2000           3         1         4         is greater         2000         and         2000           Get this table in english units (tons/Acre/year)         Get this table in english units (tons/Acre/year)         Get this table in english units (tons/Acre/year)	

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".

Run WEPP interface				
?	Hillslope No : 32 Climate : "Indiana\WEST LAFAYETTE 6 NW IN.cli" Management : "Agriculture\corn-fall moldboard plow.rot" Soil : "KEITH.sol"			
	Do you want to run the WEPP Windows interface for this representative hillslope?			
	Yes No			



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.

🍳 GeoWEPP ArcX 2004.3			2	×
The GeoWEPP project is a collaboration of				
A A A A A A A A A A A A A A A A A A A	G	eoWEPP	Open existing GeoWEPP project saved in a GeoWEPP project folder	
Use example data	Use NRCS Da	ta Gateway zip files	from CD or go online	
Use your own DEM	Use own DEM, Soi	ils, and Land Use in	ASCII Format or from CD	



# Use NRCS Data Gateway Data Downloads

Do you want to get online to download data from the internet?

('Yes', if you want to go online to the NRCS Data Gateway!)

('No', if you already have the previously downloaded zip files on a CD or your PC!)





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).

🔍 Select all ZIP files for import 🛛 🛛 🗙					
File Name: pographic_images_80_12238_1.zip elevation_96_12238_2.zip topographic_images_80_13 v	Directories: c:\geoweppblm04\nrcszip\westlafaye c:\ geoweppblm04 nrcszip westlafayette vestlafayette				
List Files of Type: All Zip Files (*.zip)	Drives:				



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.

Q GeoWEPP ArcX 2004.3			×
The GeoWEPP project is a collaboration of			1
Solution of the second		GeoWEPP	Open existing GeoWEPP project saved in a GeoWEPP project folder
Use example data	Use N	IRCS Data Gateway zip files	from CD or go online
Use your own DEM	Use own [	DEM, Soils, and Land Use in	ASCII Format or from CD

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.

🔍 Select all files for import 🛛 🛛 🗙					
File Name: oilsmap.asc;soilsmap.txt;utmzone.txt imagetopo2.tif landcov.asc landcov.txt landusedb.txt soilsmap.asc soilsmap.txt utmzone.txt	Directories: c:\geoweppblm04\gisascii\westlafayı Cancel Cancel				
List Files of Type: All Files (*.*)	Drives:				

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 US	GS Topomap Image
•	Do you want to overlay a georeferenced topomap/USGS DRG (image) Image must have the same projection than the other maps!
	Yes

🝳 Add Theme 🔀					
Directory: c:\geoweppblm04\mygis	ascii				
<ul> <li>hlshd</li> <li>imagetopo1.tif</li> <li>imagetopo2.tif</li> <li>landcov</li> <li>soilsman</li> </ul>	info info info info info temp	Directories			
Data Sauraa Junaa		C Libraries			
Image Data Source	C:				

🝳 Add Theme 🔀					
Directory: c:\geoweppblm04\mygis	eascii	OK Cancel			
Data Source Types:	Drives:				

Add US	GS 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:\geoweppblm0	4\mygisascii	ок		
<ul> <li>dem</li> <li>hlshd</li> <li>imagetopo1.tif</li> <li>imagetopo2.tif</li> <li>landcov</li> <li>soilsmap</li> </ul>	<ul> <li>▲ C:\</li> <li>➢ geoweppblm04</li> <li>➢ mygisascii</li> <li>ⓒ info</li> <li>ⓒ temp</li> </ul>	Cancel Cancel		
Data Source Types:	Drives:			
Image Data Source	<b>•</b> C:			
Add another USGS Top	pomap another USGS topographical map?			
🍳 Info		×		
GeoWEPP will prepare Digital Elevation Model to delineate a drainage network - this may take a few minutes!				

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.

Channel Delineation - Topographic Analy	sis (TOPAZ)	
If delineation of channel network is acceptable proceed with Step- If network delineation is not acceptable adjust	4	
Critical Source Area (hectare): 5	<ol> <li>Click here to remove network</li> <li>Click here to delete network</li> </ol>	Scale 1/951.088.331 504.828.55 ↔
Minimum Source Channel Length (m): 100	3. Click here to delineate new	4,477,490.94 \$
and proceed with Step 1. Use these tools to locate your area of interest in view:	4. Activate tool button and set watershed out (NEVER set outlet on a confluence cell!)	let
	Accept watershed and proceed with WEPP	
Network Channel Ch	fati vi	
Se WEPP Management ar	nd Soil Lookup	×
Area CIC Landuce	[ WEB	P Management [
Area GIS Landuse	Wetlands Geoly	r Management
0.2% Evergreen Forest	Geov	VEPP\Tree-20 ut old forest rot
0.8% Low Intensity Residentia	al Geov	VEPP\grass.rot
1.5% Grasslands/Herbaceou	s Geov	VEPP\Mountain Big Sagebrush.rot
1.8% Commercial/Industrial/T	ransportation GeoV	VEPP\grass.rot
11.6% Deciduous Forest	GeoV	VEPP\Tree-20 yr old forest.rot
13.3% Urban/Recreational Gra	asses GeoV	VEPP\grass.rot
2.5% Woody Wetlands	Geov	VEPP\Mountain Big Sagebrush.rot
20.0% Pasture/Hay	Geov	VEPP\altalta with cuttings.rot
48.3% How Lrops	lae0V	VEPP/corn.sovbean-fall mulch till.rot
	400.	
Landuse Soils Channels		
Landuse Soils Channels To run a WEPP simulation the landu Double-click on any entry in the WEP used. Where no WEPP managemen	se and soils defined in the GIS mus PP management or soils columns to t or soil is specified the default soil	st be assoicated with equivalent WEPP inputs. o display a list of WEPP inputs that may be or management will be used (*)
Landuse Soils Channels To run a WEPP simulation the landu Double-click on any entry in the WEP used. Where no WEPP managemen	se and soils defined in the GIS mus PP management or soils columns to t or soil is specified the default soil	at be assoicated with equivalent WEPP inputs. b display a list of WEPP inputs that may be or management will be used (*)
Landuse Soils Channels To run a WEPP simulation the landu Double-click on any entry in the WEP used. Where no WEPP managemen	se and soils defined in the GIS mus PP management or soils columns to t or soil is specified the default soil	at be assoicated with equivalent WEPP inputs, o display a list of WEPP inputs that may be or management will be used (*)

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.

<b>WEPP</b>	<sup>o</sup> Management and Soil Lookup	×				
Area	GIS Soil	WEPP Soil				
1.5%	MILFORD	(*) KEIT <sub>H</sub> H.sol				
18.5%	TREATY	(*) KEITkr/				
2.0%	HOUGHTON	(*) KEITH.sol				
28.3%	MIAMI	(*) KEITH.sol				
49.8%	FINCASTLE	(*) KEITH.sol				
,						
Landuse	Soils Channels					
To run a WEPP simulation the landuse and soils defined in the GIS must be assoicated with equivalent WEPP inputs. Double-click on any entry in the WEPP management or soils columns to display a list of WEPP inputs that may be used. Where no WEPP management or soil is specified the default soil or management will be used (*)						
	ОК	Cancel				

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.

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

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		
Sele	ct Soil File			
Select a state:	All Files			
IN (Indiana )	🔿 Crop Land Files			
	C Range Land Files			
Soil File List 395 files could be selecte	ed. 1 file has been sele	ected.		
METEA(LS)2.sol	MILLSDALE(SICL).so	l l		
MIAMI(SIL).sol MIAMIAN(SIL).sol	MILTUN(SIL).sol MONITOB(L) sol			
MIDDLEBURY(SIL).sol	MONTGOMERY(SIC	L).sol		
MILFORD(SICL).sol		.).sol		
MILLBRUUK(SIL).sol	MOREET(SIL).sol			
		F		
Extract Select All	Exit	Help		



Here Management and Soil Look	up 🗶				
Area         Gils Soil           1.5%         MILFORD           18.5%         TREATY           2.0%         HOUGHTON           28.3%         MIAMI           49.8%         FINCASTLE	WEPP Soil IN\MILFORD(SICL).sol IN\TREATY(SIL).sol IN\FINCASTLE(SIL).sol IN\MIAMI(SIL).sol IN\FINCASTLE(SIL).sol				
Landuse Soils Channels					
To run a WEPP simulation the landuse and soils define Double-click on any entry in the WEPP management or used. Where no WEPP management or soil is specified	d in the GIS must be assoicated with equivalent WEPP inputs. roils columns to display a list of WEPP inputs that may be the default soil or management will be used (*)				
ОК	Cancel				
Se WEPP Management and Soil Loo	kup 🔀				
Order   WEPP Channel Type	Width(m)				
2 UNGRADED	3.0				
4 DITCH	3.0 4.0				
5 DITCH	5.0				
To run a WEPP simulation the landuse and soils defined in the GIS must be assoicated with equivalent WEPP inputs. Double-click on any entry in the WEPP management or soils columns to display a list of WEPP inputs that may be used. Where no WEPP management or soil is specified the default soil or management will be used (*)					
ОК	Cancel				

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.

Supprovements with the second				<u>×</u>
WEPP Watershed Settings         Change Soil Associations         Change Management Associations         Watershed has 8 Hillslopes and 3 Channels.         Climate         Indianat/WEST LAFAYETTE 6 NW IN.cli         Number of Years         Simulation Method         Watershed and Flowpaths	Name           Hill_32           Hill_33           Hill_31           Hill_22           Hill_23           Hill_23           Hill_23           Hill_43           Hill_43           Hill_43           Hill_44	Management GeoWEPP\corn.soybean-fall GeoWEPP\corn.soybean-fall GeoWEPP\corn.soybean-fall GeoWEPP\corn.soybean-fall GeoWEPP\corn.soybean-fall GeoWEPP\corn.soybean-fall	Soil INVMIAMI(SIL) sol INVFINCASTE(SIL) sol INVFINCASTE(SIL) sol INVMIAMI(SIL) sol INVMIATE(SIL) sol INVMIAMI(SIL) sol INVMIAMI(SIL) sol INVMIAMI(SIL) sol	% of Area 27.6% 28.2% 11.4% 0.2% 12.8% 0.4% 10.0% 11.4%

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).

🝳 WEPP Results in relative measures of T 👘	×
Use max.13 letters and numbers only; no blanks!	
Sediment yield into Channel (Watershed Method): 0ffsite5thy2	
Soil Loss from each raster (Flowpath Method): Onsite5thy2	Cancel

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

ans 🖉	ite5thy -	Notepad						<u> </u>
File E	Edit Forn	nat Help						
2 YEAR AVERAGE ANNUAL VALUES FOR WATERSHED						*		
***WEPP Watershed Simulation for Representative Hillslopes and Channels (watershed method)***								
	WATERSHE	ED SUMMARY (wa	tershed method	l, off-site as:	sesment)			
Hillsl WEPP T	opes OPAZ	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 2 3 4 5 6 7 8	22 23 32 31 42 43 41	78.7 213.4 6349.2 6023.5 626.8 2773.8 2404.4 2558.4	0.6 0.9 42.3 36.0 0.4 17.1 16.2 9.8	0.6 0.9 42.3 35.9 0.4 14.8 16.2 5.7	0.1 0.2 13.9 13.2 5.8 6.5 5.0 5.8	6.3 4.8 3.0 2.7 0.1 2.6 3.2 1.7	6.3 4.8 3.0 2.7 0.1 2.3 3.2 1.0	
	CHANNEL	SUMMARY (wate	rshed method,	off-site asse: Sedir	ment)	L su sta		
Channe NUM WE	PP TOPAZ	z (m^3/yr)	Loss (tonne/	/yr) (toni	ne/yr)	(m)	(cells)	
1 2 3	2 34 1 44 3 24	13269 7896 21329	.7 r .3 r .3 r	 .a. .a.	88.9 41.2 L34.6	1181.5 422.1 120.0	34 12 4	
							I	
***WEF	P Waters	hed Simulatio	n for all flow	/paths average	d over subca	atchments (flowpa	th method)***	
	FLOWPATH	H SUMMARY (flo	wpath method,	on-site assesm	nent)			
Hillsl WEPP T	opes OPAZ	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 2 3 4 5 6 7 8	22 23 32 33 31 42 43 41	68.8 154.1 5072.7 3820.6 1292.6 1607.1 1685.6 2592.4	0.5 0.8 34.4 25.4 0.7 10.2 11.9 9.5	n.a. n.a. n.a. n.a. n.a. n.a. n.a. n.a.	0.1 0.2 13.9 13.2 5.8 6.5 5.0 5.8	5.5 4.3 2.5 1.9 0.1 1.6 2.4 1.7	n.a. n.a. n.a. n.a. n.a. n.a. n.a. n.a.	
4								r F //

## 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.









## 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!