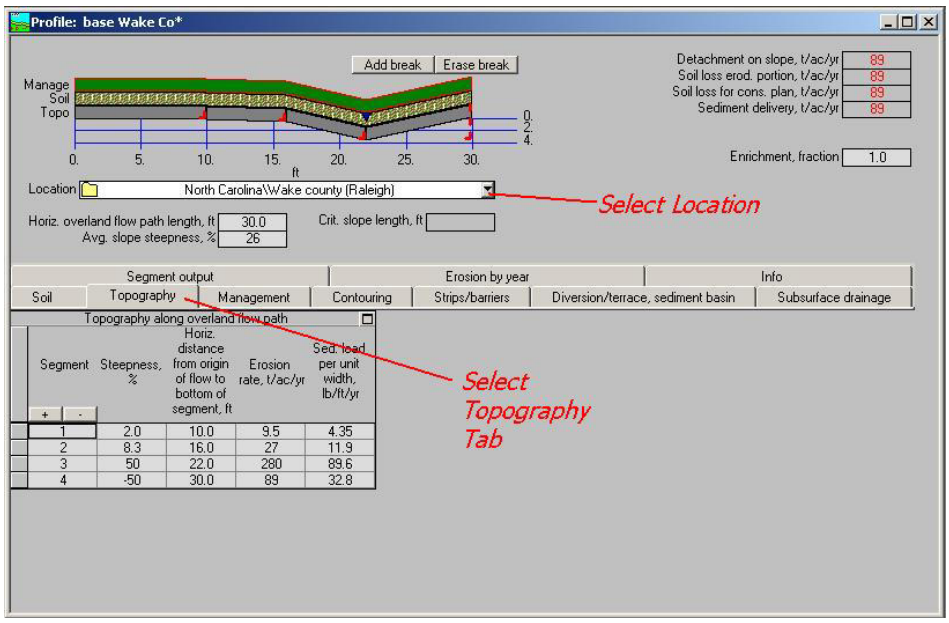
RUSLE2 Guide for Modeling Non-Typical Sections

June 9, 2009



Use for Reclamation Plan Design and Secondary Road Construction Design

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PREFACE

This guide has been developed to help Erosion Control Plan Designers handle areas that are considered to be non-typical sections.

Non-typical sections can be defined as:

- **Sections of Secondary Roads sections with steep back slope cuts (>10') or fill slopes or have runoff coming onto the project from off the right of way with drainage areas greater than 3 acres.**

- **Reclamation sites for waste and borrow materials. RUSLE2 can be used along with the Reclamation Design spreadsheet to design sediment dams.**

Downloading the RUSLE2 Software

Step 1. Go to http://www.ars.usda.gov/Research/docs.htm?docid=6010

Step 2. Click on the *Download RUSLE2* Tab

Step 3. Scroll to the bottom of the screen and select *RUSLE2(program, templates, databases).*

Step 4. Save the self-extracting zip file to a temporary location on your hard drive. Run the executable to install RUSLE2 on your computer. (You may accept the default subdirectory, or specify one of your choice).

Step 5. In order to get the full use out of the RUSLE2 Database, you will need to download and import climate and soils data for your particular area.

Step 6. To download climate data see the **Downloading and Importing Climate Data** section in this guide.

Step 7. To download soils data see the **Downloading and Importing Soils Data** section in this guide.

Step 8. You are ready to begin using RUSLE2.

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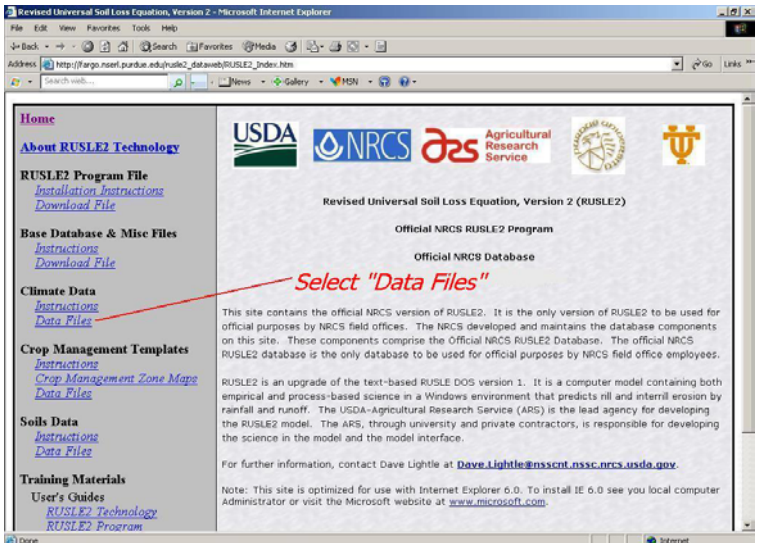
Downloading and Importing NC Climate Data into YOUR RUSLE2 Program

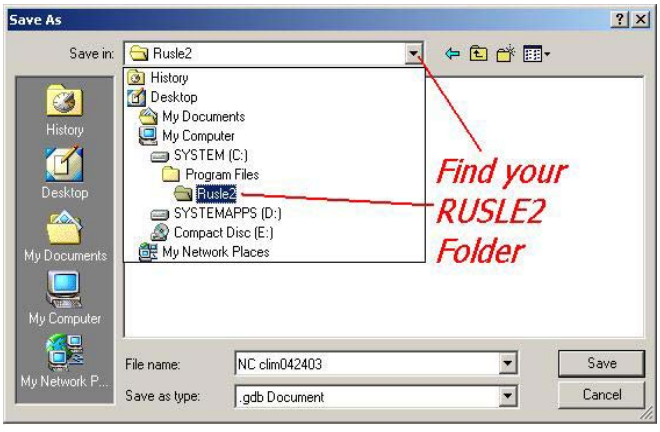
Step 1 Open the NRCS Official RUSLE2 Database

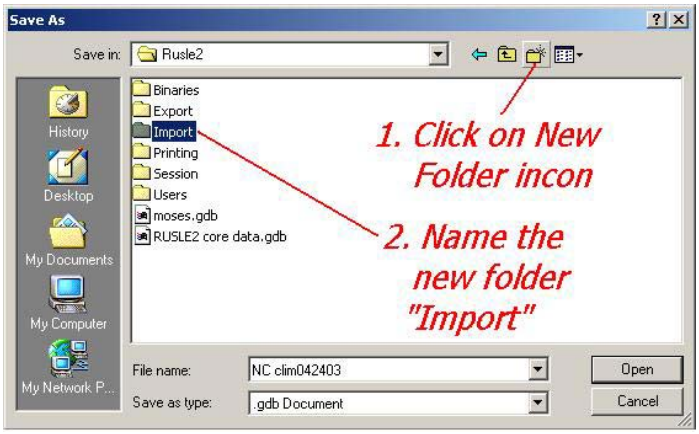
- Follow the link, **Official NRCS RUSLE2 Database**, provided on the REU Field Ops web page or go to http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm
- Select the **"Data Files"** link under the **Climate Data** heading.



Step 2 Download the NC Climate File

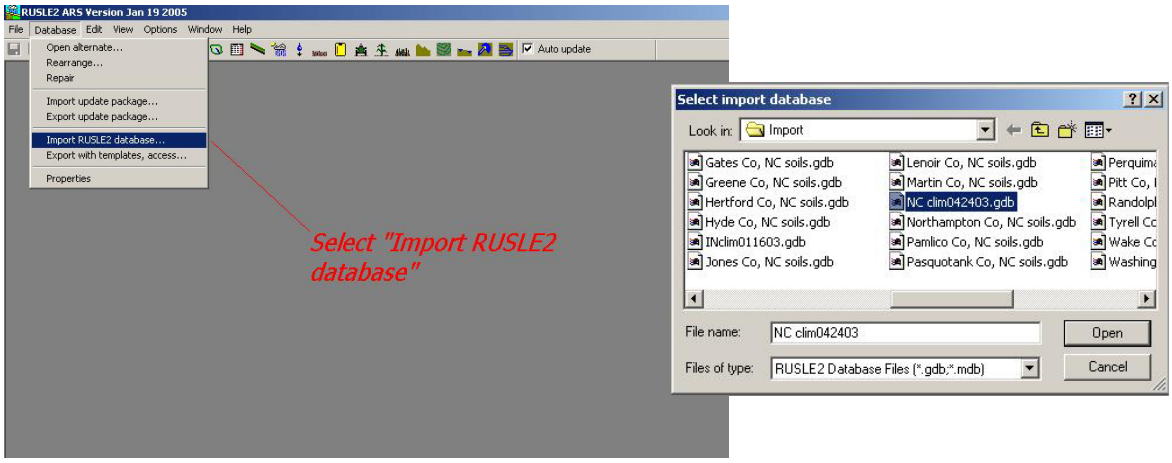
- Double click the ***NC clim042403.zip*** file and click **SAVE**.
- Using the drop down button, find your RUSLE2 folder. It should be located in your C: directory in the Program Files folder. Double click on your RUSLE2 folder.
- If you don't have an **Import** folder, make a new folder under your RUSLE2 folder named **Import.** Once the new folder is named you can select it and hit **OPEN**.
- Hit **SAVE** on the next window to download the file to the folder.
- After the download is complete, hit **CLOSE**.
- Locate the ***NC clim042403.zip*** file that you just downloaded. Double click it to extract the file. Make sure you extract it into your RUSLE2/Import folder.



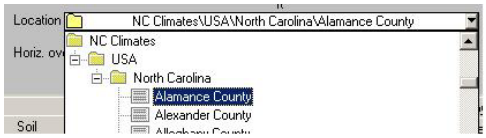


Step 3 Importing the NC Climate data into RUSLE2.

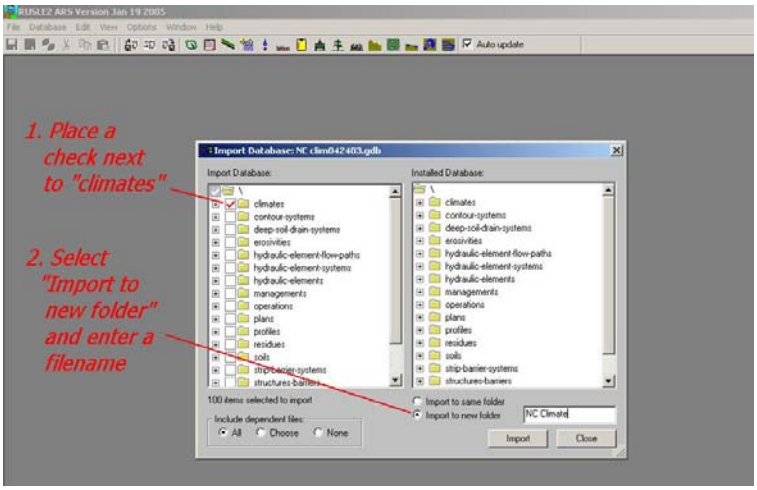
- If it is not already running, open the **RUSLE2** Program.
- If you opened RUSLE2 you can **CANCEL** the *Introduction* screen. If you already have a profile open, you are fine. The main goal is to have access to the menu items at the top of the program.
- Under the Database menu, select **Import RUSLE2 Database**.
- A new window should display the files located in your **Import** folder that was created during Step 2.
- Select the **NC clim042403.gdb** file and hit **OPEN**.

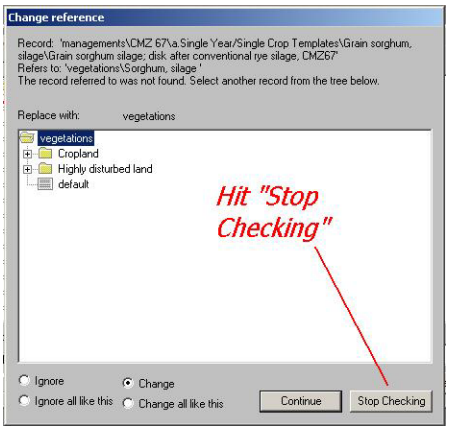


- In the left hand column, place a check mark next to the **Climates** folder.
- Select the **Import to new folder** option and enter a filename. This will be the folder name that will contain the climate data for all 100 counties when you select your **location** for your specific profile.



- Hit **IMPORT**.
- You should receive a message saying that the import is complete. Hit **OK**.
- You may see another window pop up called "**Change Reference**". Hit **Stop Checking**.
- A message should appear saying, "**The import is finished**".
- You can rearrange your database by going to the **Rearranging After Import** section in this guide.
- Return to Step 3 of: Widening Model, Waste Area Model, SR Construction Model.





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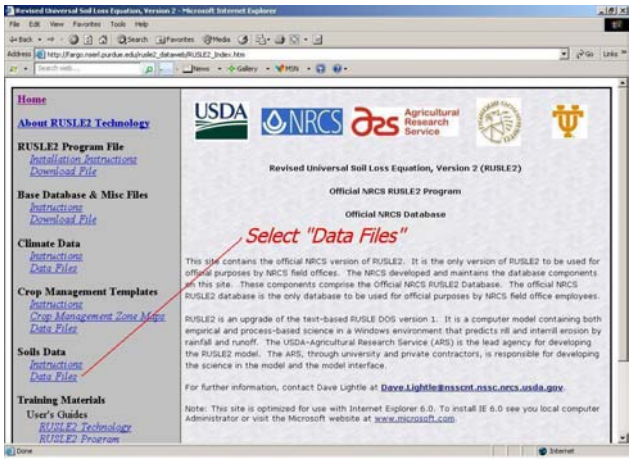
Downloading and Importing NC Soils Data into YOUR RUSLE2 Program

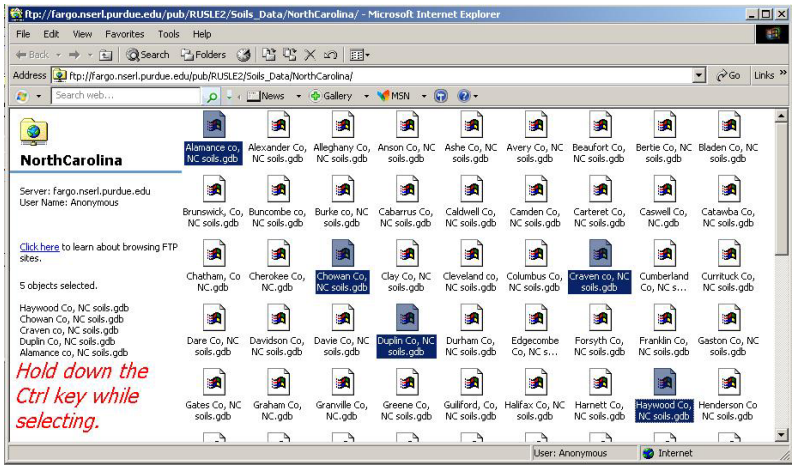
Step 1 Open the NRCS Official RUSLE2 Database

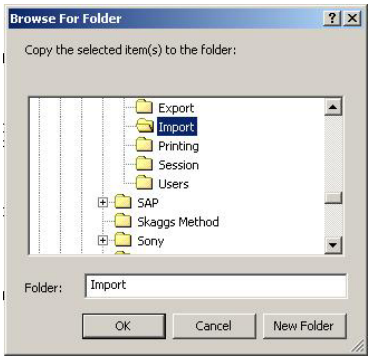
- Follow the link, **Official NRCS RUSLE2 Database**, provided on the REU Field Ops web page or go to http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm
- Select the **"Data Files"** link under the **Soils Data** heading.



Step 2 Download the necessary soil files

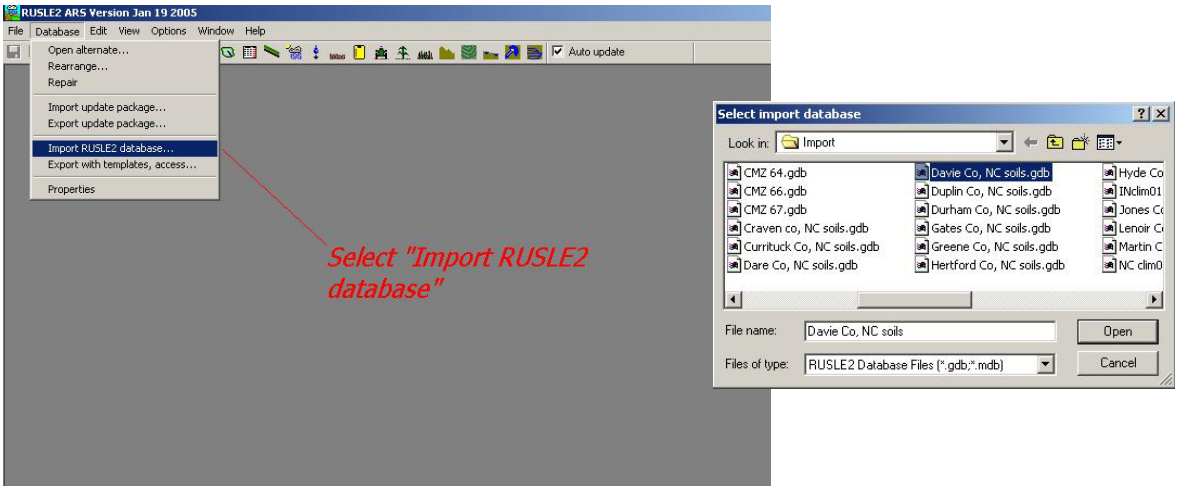
- Click the **North Carolina** folder**.**
- While holding down the **Ctrl key**, select the necessary soil files.
  - If you only need one, you can double click on it directly to download it. Be sure to save it in your Rusle2/Import folder. If you select the **North Carolina.zip** file, you will have to save it in your **Import** folder and then extract the files.
- **Right click** on one of the selected files and select "**Copy to folder**".
- Using the directory tree, locate your **Import** folder under *C:/Program Files/Rusle2* (use the **New Folder** button to create an **Import** folder if you don't have one).
- Hit **Ok** to download the files.



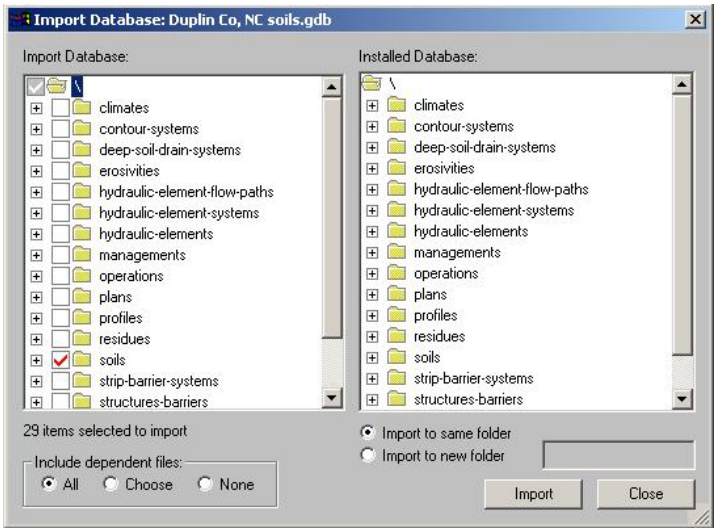


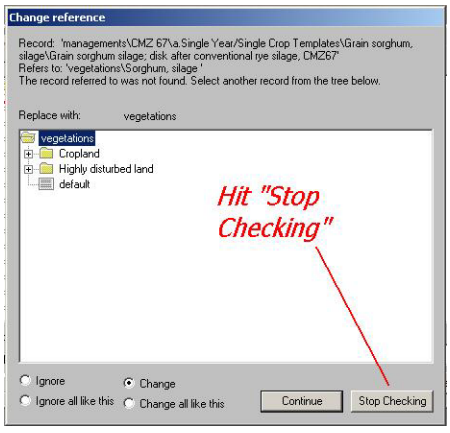
Step 3 Importing the soils data into RUSLE2.

- If it is not already running, open the **RUSLE2** Program.
- If you opened RUSLE2 you can **CANCEL** the *Introduction* screen. If you already have a profile open, you are fine. The main goal is to have access to the menu items at the top of the program.
- Under the Database menu, select **Import RUSLE2 Database**.
- A new window should display the files located in your **Import** folder that was created during Step 2.
- Select a soil file and hit **OPEN**.



- In the left hand column, place a check mark next to the **Soils** folder.
- Select the **Import to same folder** option.
- Hit **IMPORT**.
- You should receive a message saying that the import is complete. Hit **OK**.
- You *may* see another window pop up called "**Change Reference**". Hit **Stop Checking**.
- A message should appear saying "**The import is finished**".
- Repeat this step until all of the downloaded soil files are imported.
- Return to Step 6 of: Widening Model, Waste Area Model, SR Construction Model.





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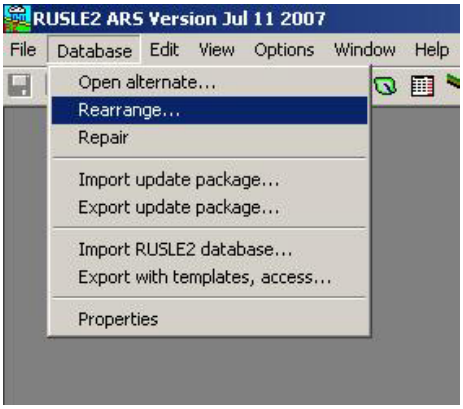
Rearranging Data After Importing

This example will show you how to rearrange your database after downloading the climate data, but the steps can be used to rearrange other areas as well.

Step 1. Open up the RUSLE2 Database if it is not already open. Close out all windows within RUSLE2.

Step 2. Go to the *Database* menu at the top and select ***Rearrange***.



Step 3. Select and expand the climate database component by clicking the "+" sign next to *climate*.

Step 4. Find the folder that you imported the climate data into. In this case it was **NC Climate**. Click the "+" sign next to **NC Climate** and **USA** and then select **North Carolina** so that all of the counties show up on the right hand side of the window.

Step 5. In the right hand window, click on **Alamance County** and then scroll down to where you can see **Yancey County**. While holding the ***Shift*** key down, click on **Yancey County**. All of the counties should be highlighted in blue.

Step 6. Right click and select **Copy**.

Step 7. Now find the **North Carolina** folder on the left hand side of the window located directly below **New York** (not the one under USA). Click on it and you should notice that only a few counties show up on the right hand side. Right click within the right hand side window and select paste. All 100 counties should now appear in the right hand side window.

Step 8. You can delete the **NC Climate** folder now by right clicking on top of it and selecting **Delete**. Answer **yes** to the warning message.

Step 9. Select **Close**. You are ready to open a profile and begin using RUSLE2.

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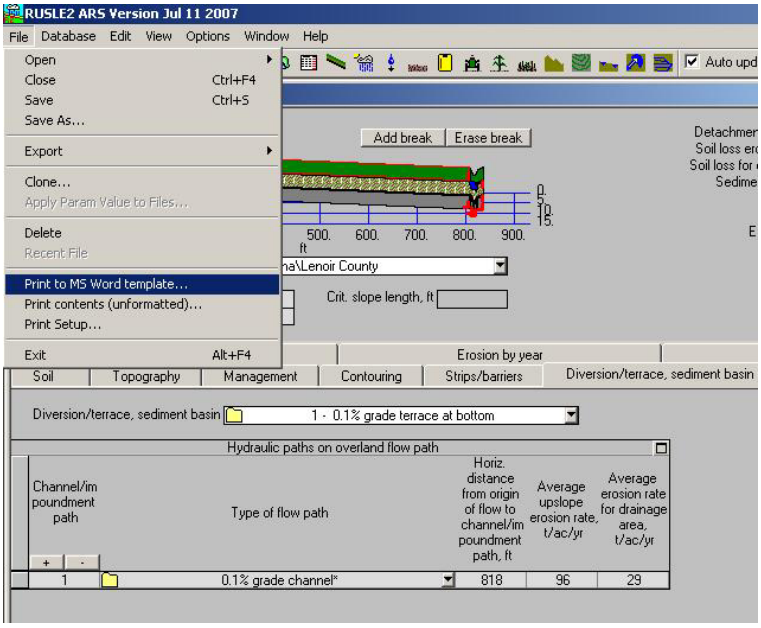
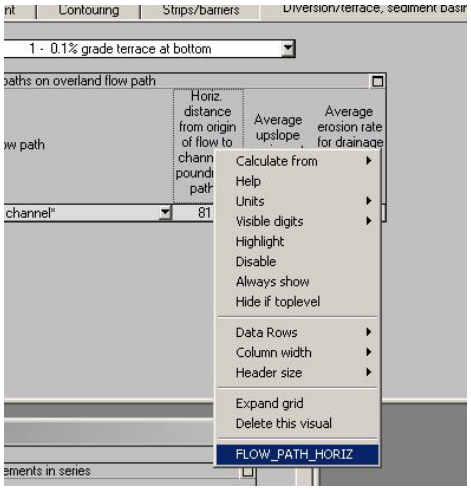
Printing Reports

Creating reports from the information shown on the RUSLE2 screen can be done by going to the ***File*** menu and selecting ***Print to MS Word Template*** or ***Print Contents (unformatted)***. Recommend using the templates.



Example MS Word Templates are provided with the core database. They can be modified by opening them up from your *Program Files/RUSLE2/Printing* folder. RUSLE2 places variable values in the document at the place where you give variable names in the template. The variable name is RUSLE2's computer program variable name, not what is shown on the screen. Variable names can be found by right clicking on the variable on the screen. Example: FLOW_PATH_HORIZ.



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EXAMPLES

Widening Project Model

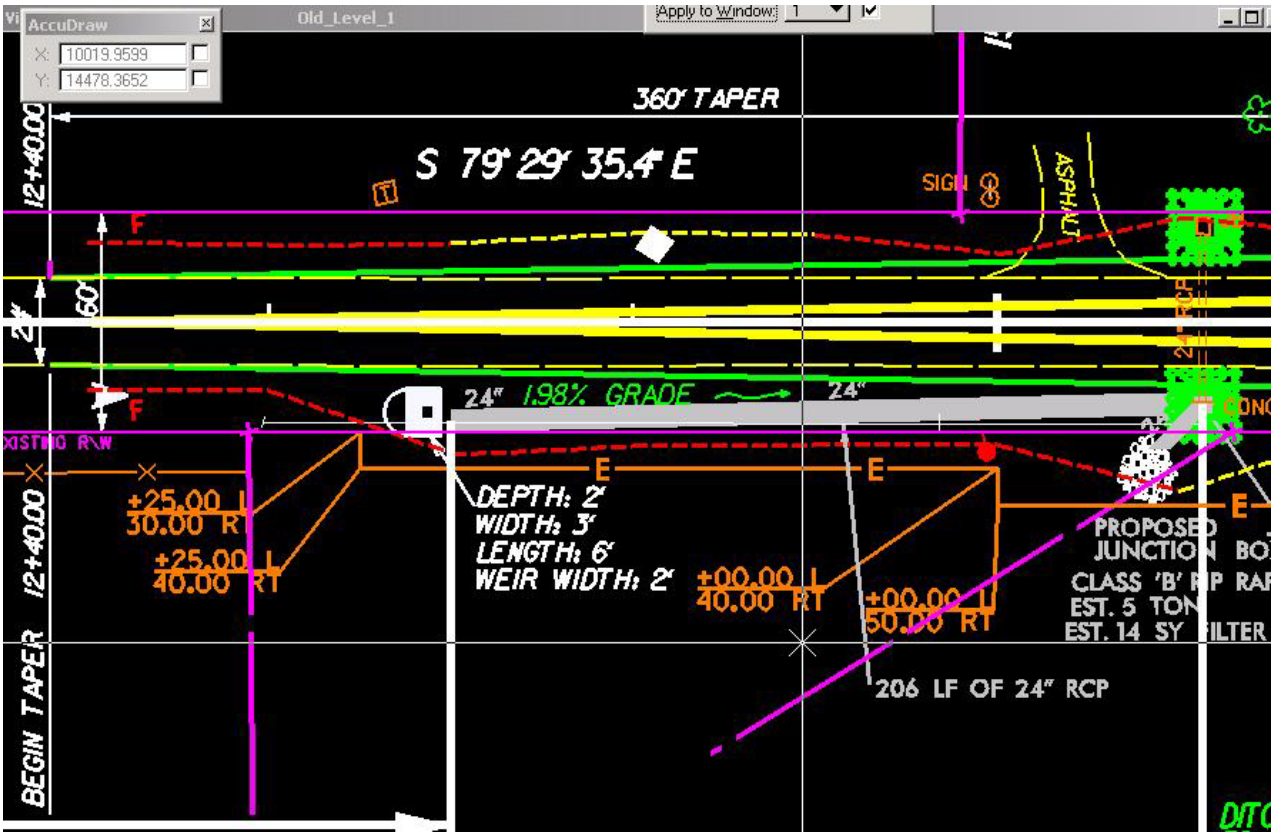
Project Location: NC 55 Lenoir County, sta. 12+00 to 15+57 Rt.

Project Description: Widening project that includes turn lanes and setting ditches back. Section being modeled has a 1.9% ditchline grade. No HQW. Contributing ROW is 20'.

Soils: Norfolk Sandy Loam (Nb), 2-6 % slope; K=0.32; Hydrologic Class B

Drainage Area: 4.5 acres

Disturbed Area: 0.16 Acres (length of run of 357' by 20' wide)



Step 1 Open RUSLE2 Soil Erosion Prediction Profile

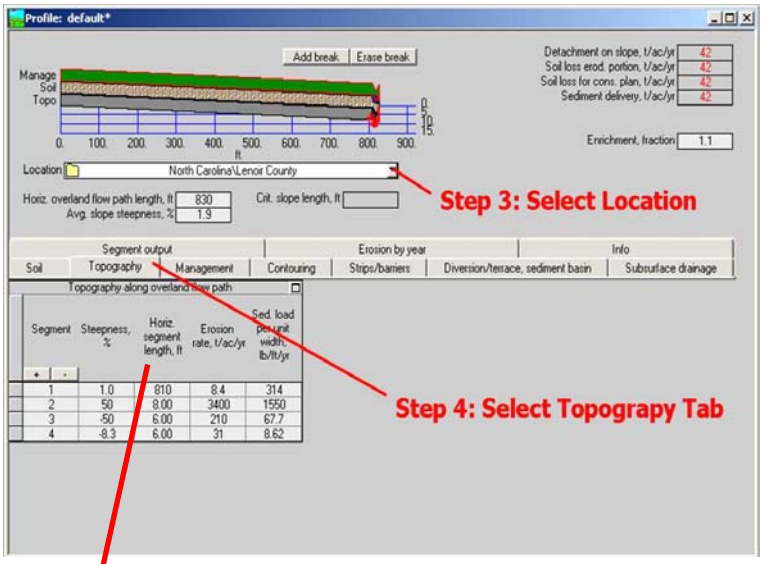
- Select on the Introduction Screen: Profile, ARS Basic Complex Slope
- Click OK

Step 2 Open Base File

- Select the *default* profile or a previously saved base file and click OPEN.

Step 3 Select Location

- Select your *Location.*
- **Example: Lenoir Co**
- See Downloading and Importing Climate Data if your county is not loaded.



Step 4 Create Project Topography

- Select Topography Tab
- Add Segments for each change in Steepness % (Positive Slope = Downhill, Negative Slope = Uphill) **Starting from the left. *Maximum cross-section is 1000' wide.*

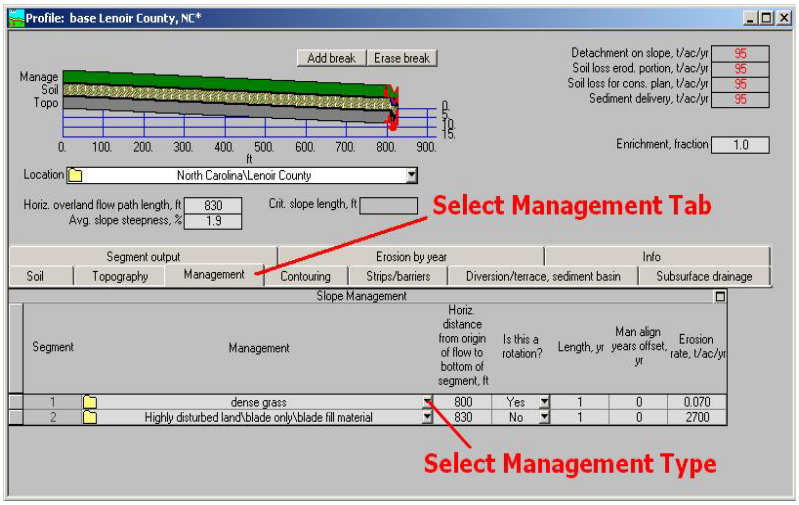
Hint: Right click here and select *Show As: Horizontal Segment Length* so you can input the actual lengths of each segment.

EXAMPLE: Using a standard typical section for a widening of an existing paved road.

- Segment #1: 810' of pasture with a 1% grade (0.12" per foot of fall).
- Segment #2: 8' of back slope (measured horizontally) with a 2:1 slope (50% grade).
- Segment #3: 6' front slope (measured horizontally) with a 2:1 slope (-50% grade).
- Segment #4: 6' shoulder with an -8.3% grade (1" per foot of fall).

Step 5 Profile Management

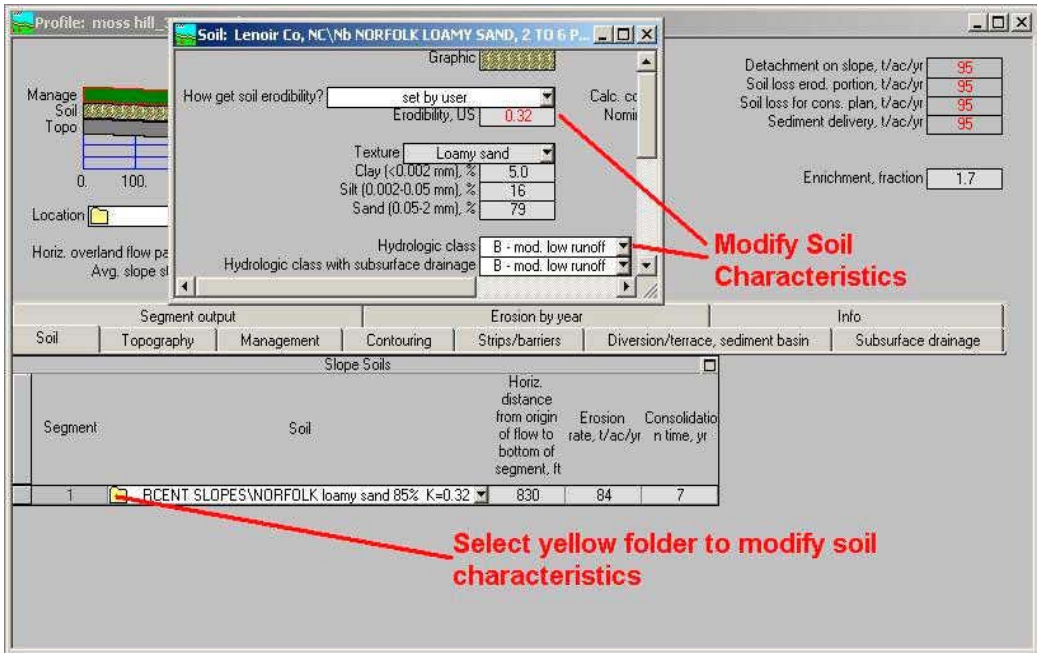
- Select Management Tab
- The "*Add break*" button above the profile diagram will allow you to divide up each segment if you want to identify different management plans. Click on Manage (green area) to add a break.
- Use the drop down menu to select the management type for each segment.
- Use **Highly disturbed land\blade only\blade fill material** for worse case scenario.



Note: Be sure segment lengths are correct.

Step 6 Select Soil Type for Project

- Select the *Soil* Tab
- Select your specific soil type by county from the drop down menu.
- **EXAMPLE: Nb Norfolk Loamy Sand, 2-6 % Slope**
- See Downloading and Importing Soil Data if your county's soils are not loaded.
- Click on the yellow folder to review your specific soil characteristics. Modify them as needed to match the info provided in the NRCS Soil Survey (click OK on any pop up messages). *A link is provided for the NCSS Web Soil Survey on the REU Field Ops web page.*
  - In order to change the Erodibility Factor you must select "set by user" from the drop down.
- Close the window and select YES to save changes. You must give it a new file name.
- If you get a message saying AUTO UPDATE has been turned off, go to OPTIONS at the top and select AUTO UPDATE to turn it back on.



Step 7 Setting Remaining Tabs

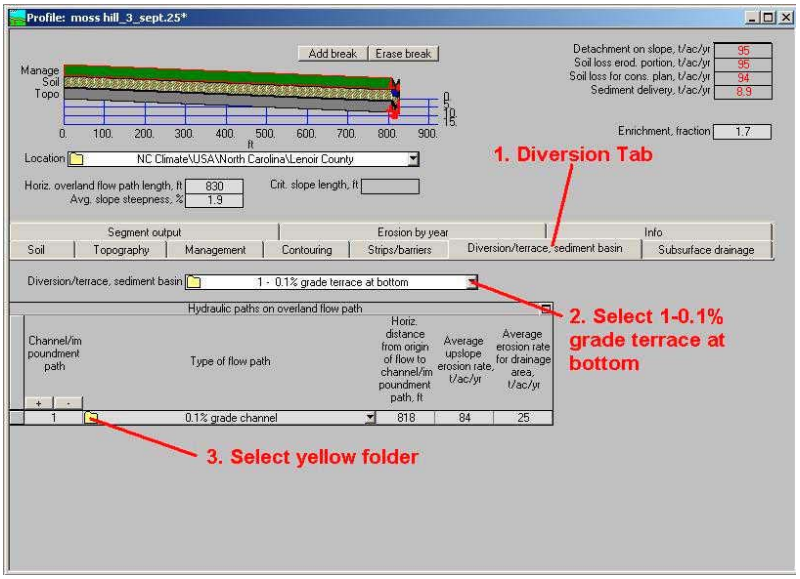
Select the following for each tab:

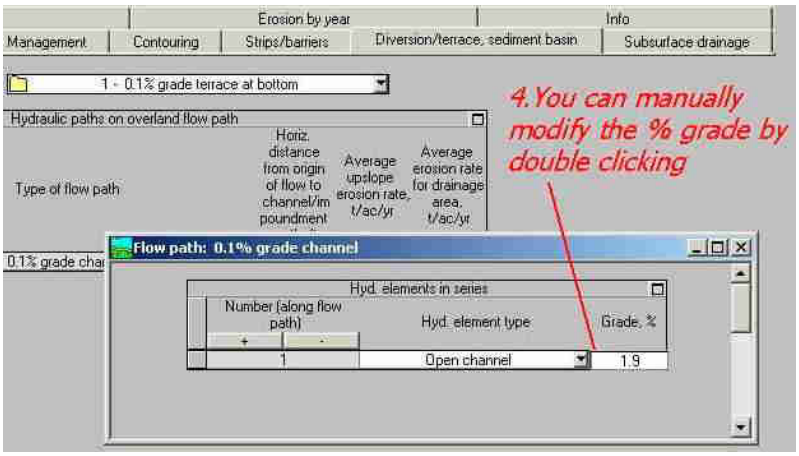
- *Contouring Tab*: "a up-and-down slope" (should be the default).
- *Strips/barriers Tab*: "none"
- *Subsurface drainage Tab*: "none"

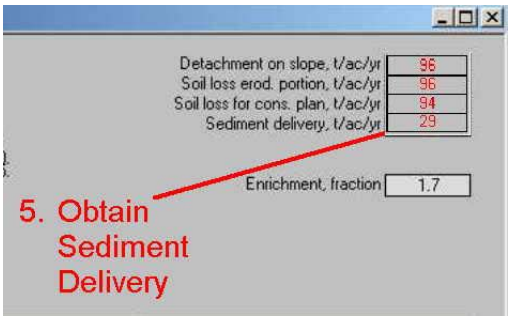
Step 8 Setup Ditchline Grades

1. Select the *Diversion/terrace, sediment basin* Tab
2. Select *1-0.1% grade terrace at bottom* from the drop down
3. Select the yellow folder
4. You will be able to manually modify the % grade in the new window. **EXAMPLE: 1.9%.** Double click on the % grade and enter in 1.9 and hit enter.
5. **Make note of the Sediment Delivery value in the upper right hand corner. EXAMPLE: 29 t/ac/yr**

- Close out the windows in RUSLE2 associated with the Diversion tab ***(don't close RUSLE2)***. Answer NO to the question asking if you want to save the changes. Otherwise your 0.1 % grade option may in fact be a 1.9 % grade option on future runs.
- Note: This feature can be used to model Silt Ditches as well.







Step 9 Using Sediment Delivery Values

- At this point you have successfully modeled your section.
- The **Sediment Delivery** (t/ac/yr) found in Step 8 now becomes *the Required Design Storage Volume.* **EXAMPLE: 29 t/ac/yr**.
- **You can now save your RUSLE2 file as "base ***ANY*** County" by going to *File/Save As* and type in the filename and hit *SAVE*.**
- In order to convert from t/ac/yr to ft^3/ac/yr you must first obtain your soil's density from the NRCS Soil Survey or a link is provided for the *NCSS Web Soil Survey* on the REU Field Ops web page. Most density's run from 1.3 to 1.6 g/cm^3.
- **Conversion: Take your Sediment Delivery (t/ac/yr) and multiply by 32.02. Then divide by your density (g/cm^3). This gives you the Required Design Storage Volume (ft^3/ac/yr) to be used in the EC Plan Design. ****Not required if you move to Step 10.***

Step 10 Sizing the EC Device(s)

- **EXAMPLE:** Assuming a density of 1.4 g/cm^3 , the Design Storage Volume is **663 ft^3/ac/yr**. *Note: You do not have to make the conversion if you utilize the ERODES spreadsheet. You can enter the tons/acre/yr directly into the spreadsheet.*
- With a Disturbed acreage of 0.16 acres, the Required Storage is **106 ft^3**.

OPTIONS

- Utilize the ERODES Spreadsheet by completing all of the information in Step 1. This is considered a Non-Typical section due to the large drainage area (>3 acres). This prohibits the use of Option 4. You will be prompted to enter the Sediment Delivery value into Option 4B and then to move to Option 5. Option 5 uses the surface area calculations and will more than likely create a basin size that is too large for your site. Move on to Option 6.
    - 30 Day Option:
        - Basin options would be 12'x2'x3', 9'x3'x3', or 8'x4'x3' if using a 3' design depth with 1.5:1 sideslopes.
        - The area must be stabilized within 30 days from the time clearing and grubbing begins due to the fact you are only using 23 % of the required RUSLE2 volume.
    - 60 Day Option:
        - Basin options would be 14'x3'x3', or 11'x4'x3' if using a 3' design depth with 1.5:1 sideslopes.
        - The area must be stabilized within 60 days from the time clearing and grubbing begins due to the fact you are only using 43 % of the required RUSLE2 volume.

VERY IMPORTANT:

In order for the spreadsheet to calculate the correct basin sizes based on the RUSLE2 information, it is very important that all of the pertinent project information be entered into STEP 1 of the ERODES Spreadsheet.

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Waste Area Model

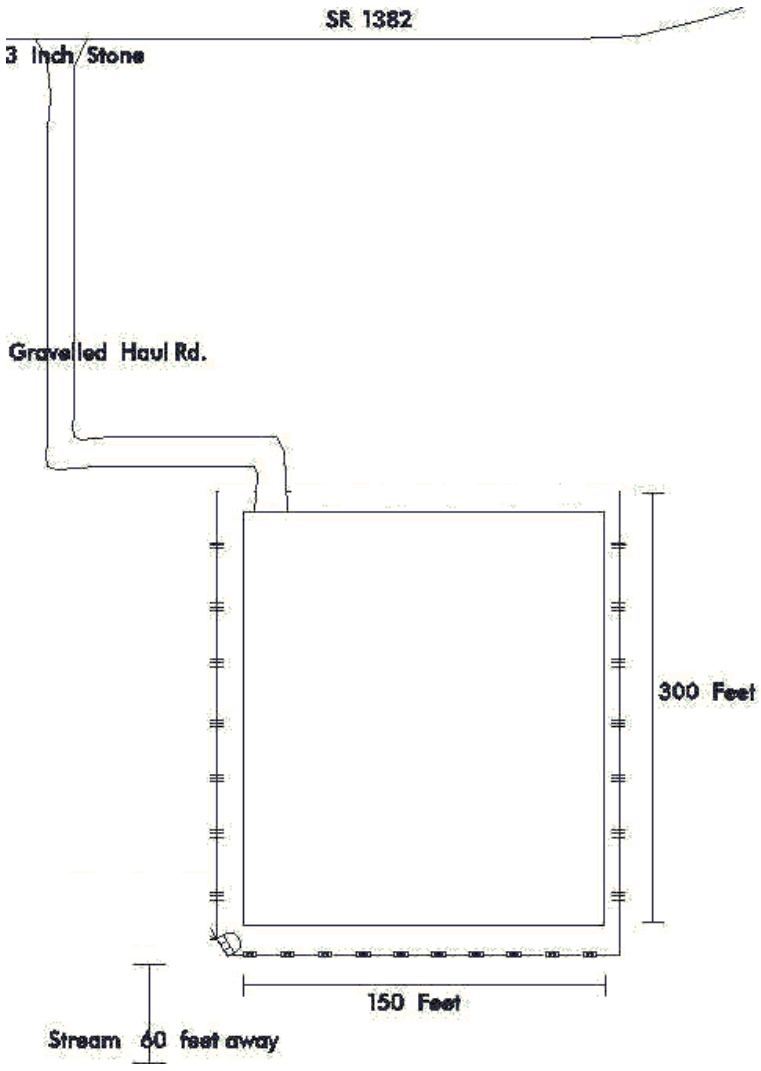
Project Location: Waste Area off of SR 1382 in Haywood Co.

Project Description: Waste area for SR 1379 Secondary Road Construction project. There will be about 25 feet of fill. No HQW.

Soils: Saunook Loam (SdC) with 8-15 % slopes, and Evard Gravelly Loam (EwF) with 50-95 % slopes

Drainage Area: 5 Acres. The waste site receives runoff coming from SR 1382.

Disturbed Area: 1.04 acres



Step 1 Open RUSLE2 Soil Erosion Prediction Profile

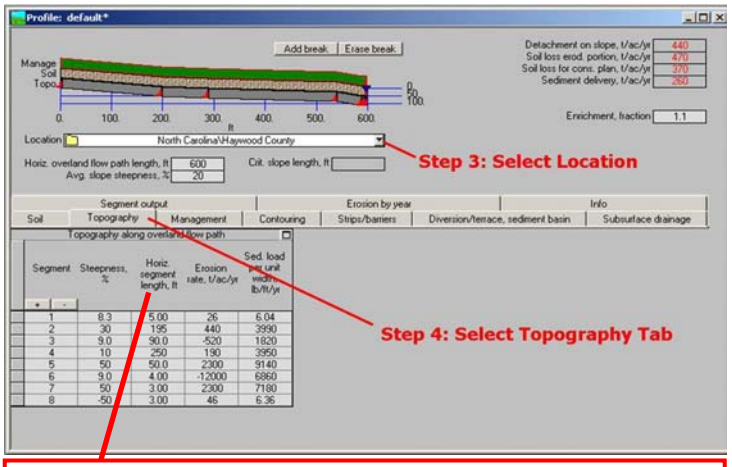
- Select on the Introduction Screen: Profile, ARS Basic Complex Slope
- Click OK

Step 2 Open Base File

- Select the *default* profile or a previously saved base file and click OPEN.

Step 3 Select Location

- Select your *Location.*
- **Example: Haywood Co**
- See Downloading and Importing Climate Data if your county is not loaded.



Hint: Right click here and select *Show As: Horizontal Segment Length* so you can input the actual lengths of each segment.

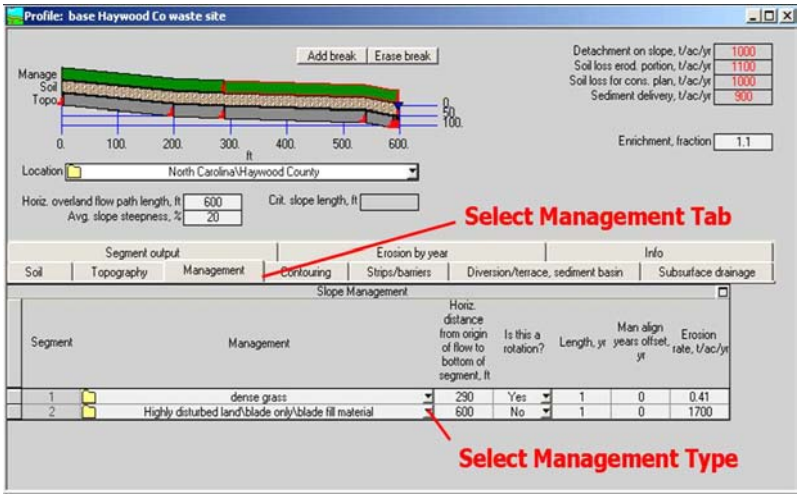
Step 4 Create Project Topography

- Select Topography Tab
- Add Segments for each change in Steepness % (**+** Slope = Downhill, **-** Slope = Uphill).
  **Starting from the left. *Maximum cross-section is 1000' wide.*

EXAMPLE:
- Segment #1: 5' of grassed shoulder with a 8.3% grade (1" per foot of fall).
- Segment #2: 195' of grassed slope with a 30% grade.
- Segment #3: 90' of grassed slope with a 9% grade.
- Segment #4: 250' of disturbed waste area with a 10% grade.
- Segment #5: 50' of disturbed slope on a 2:1 (50% grade).
- Segment #6: 4' of disturbed area at toe of slope with a 9% grade.
- Segment #7: 3' of disturbed ditch front slope on a 2:1 (50 % grade).
- Segment #8: 3' of disturbed ditch back slope on a 2:1 (-50 % grade).

Step 5 Profile Management

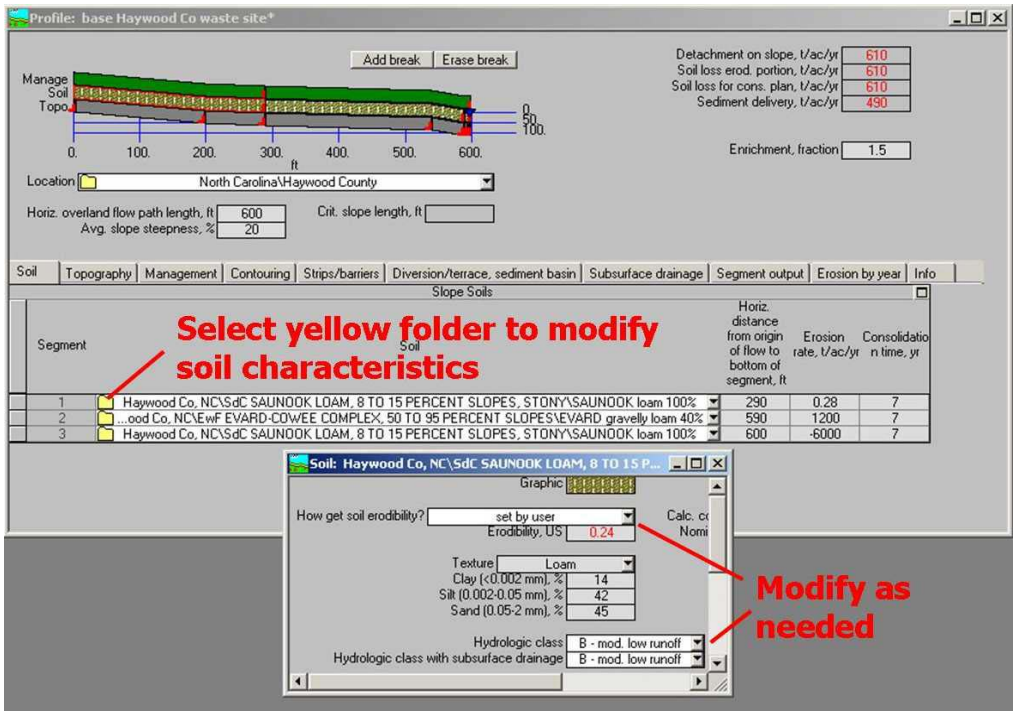
- Select Management Tab
- The "*Add break*" button above the profile diagram will allow you to divide up each segment if you want to identify different management plans. Click on Manage (green area) to add a break.
- Use the drop menu to select the management type for each segment.
- Use **Highly disturbed land\blade only\blade fill material** for worse case scenario.



Note: Be sure segment lengths are correct.

Step 6 Select Soil Type for Project

- Select the *Soil* Tab
- Select your specific soil type by county from the drop down menu.
- **EXAMPLE: Saunook Loam (SdC) represents the existing soils at the site, and the Evard Gravely Loam (EwF) represents the waste material brought in from SR 1379.**
- Use the "Add Break" button and select areas within the Soils Layer on the diagram to add breaks at the approximate locations. The horizontal lengths can be adjusted in the chart below if need be.
- See Downloading and Importing Soil Data if your county's soils are not loaded.
- Click on the yellow folder to review your specific soil characteristics. Modify them as needed to match the info provided in the NRCS Soil Survey (click OK on any pop up messages). *A link is provided for the NCSS Web Soil Survey on the REU Field Ops web page.*
  - In order to change the Erodibility Factor you must select "set by user" from the drop down.
- Close the window and select YES to save changes. You must give it a new file name.
- If you get a message saying AUTO UPDATE has been turned off, go to OPTIONS at the top and select AUTO UPDATE to turn it back on.



Step 7 Setting Remaining Tabs

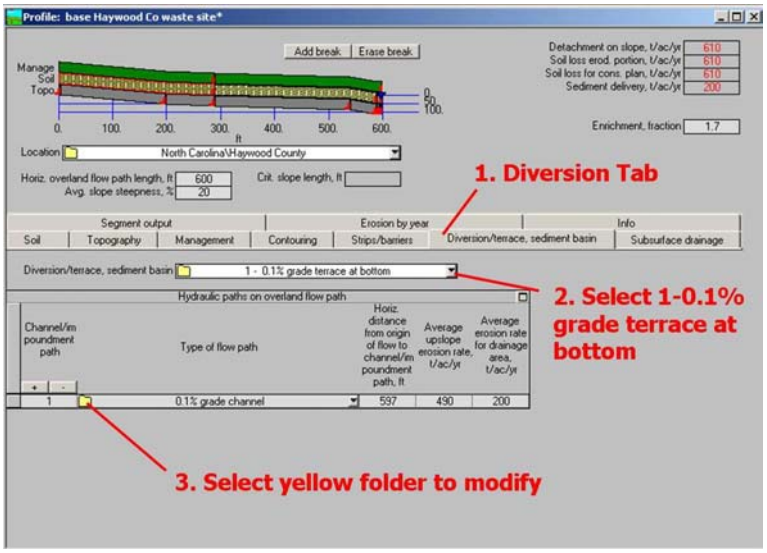
Select the following for each tab:

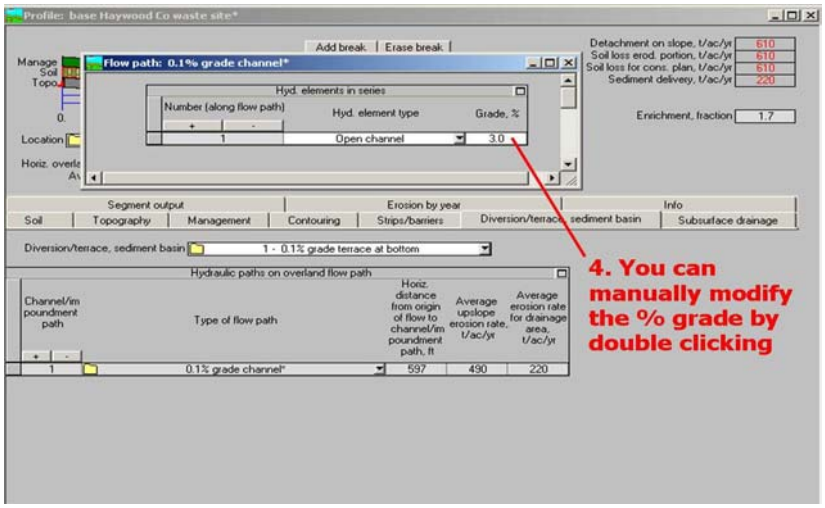
- *Contouring Tab*: "a up-and-down slope" (should be the default).
- *Strips/barriers Tab*: "none"
- *Subsurface drainage Tab*: "none"

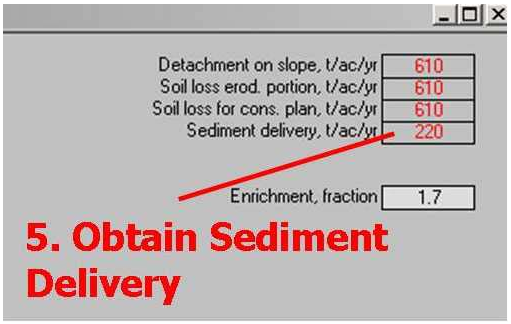
Step 8 Setup Ditchline Grades

1. Select the *Diversion/terrace, sediment basin* Tab
2. Select *1-0.1% grade terrace at bottom* from the drop down
3. Select the yellow folder
4. You will be able to manually modify the % grade in the new window. **EXAMPLE: 3.0%.** Double click on the % grade and enter in 3.0 and hit enter.
5. **Make note of the Sediment Delivery value in the upper right hand corner. EXAMPLE: 220 t/ac/yr**

- Close out the windows in RUSLE2 associated with the Diversion tab ***(don't close RUSLE2)***. Answer NO to the question asking if you want to save the changes. Otherwise your 0.1 % grade option may in fact be a 3 % grade option on future runs.
- Note: You have successfully modeled a Temporary Silt Ditch.







Step 9 Using Sediment Delivery Values

- At this point you have successfully modeled your section.
- The **Sediment Delivery** (t/ac/yr) found in Step 8 now becomes *the Required Design Storage Volume.* **EXAMPLE: 220 t/ac/yr**.
- **You can now save your RUSLE2 file as "base ***ANY*** County" by going to *File/Save As* and type in the filename and hit *SAVE*.**
- In order to convert from t/ac/yr to ft^3/ac/yr you must first obtain your soil's density from the NRCS Soil Survey or a link is provided for the *NCSS Web Soil Survey* on the REU Field Ops web page. Most density's run from 1.3 to 1.6 g/cm^3.
- **Conversion: Take your Sediment Delivery (t/ac/yr) and multiply by 32.02. Then divide by your density (g/cm^3). This gives you the Required Design Storage Volume (ft^3/ac/yr) to be used in the EC Plan Design. ****Not required if you move to Step 10.***

Step 10 Sizing the EC Device(s)

- **EXAMPLE:** Assuming a density of 1.4 g/cm^3 , the Design Storage Volume is **5032 ft^3/ac/yr**. *Note: You do not have to make the conversion if you utilize the Reclamation Design Spreadsheet. You can enter the tons/acre/yr directly into the spreadsheet.*
- With a Disturbed acreage of 1.04 acres, the Required Storage is **5233 ft^3**.

OPTIONS

- Utilize the Reclamation Design Spreadsheet to size the basin.
    - Using the RUSLE2 Analysis by answering "Y" in Step 1
        - Complete the information in Step 1 and then enter the RUSLE2 Sediment Delivery value into Step 2.
        - Step 4 gives a possible sediment dam option of: 66'x33'x3' if using a 3' design depth and 1.5:1 sideslopes.
    - Using Step 3 of the Reclamation Design Spreadsheet
        - Complete the information in Step 1. Be sure to answer "N" to the question regarding the RUSLE2 analysis
        - Complete the information in Step 3. This example used a Runoff Coefficient, C, of 0.3, Drainage Area of 5 acres, and a Rainfall Intensity of 8.22 in/hr.
        - Step 4 gives a possible sediment dam option of: 104'x52'x3' if using a 3' design depth and 1.5:1 sideslopes.

VERY IMPORTANT:
In order for the spreadsheet to calculate the correct basin sizes based on the RUSLE2 information, it is very important that all of the pertinent project information be entered into Step 1 of the Reclamation Design Spreadsheet.

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Secondary Road Construction

Project Location: SR 1538 in Columbus Co

Project Description: Sta. 20+20 to 34+50 Rt., Contributing ROW is 30', and ditchline % grade of 0.53. No HQW.

Soils: Loamy Sand with low-medium organic matter.

Drainage Area: 16 acres (a berm was utilized to reduce the drainage area to 4 acres)

Disturbed Area: 0.98 acres

Step 1 Open RUSLE2 Soil Erosion Prediction Profile

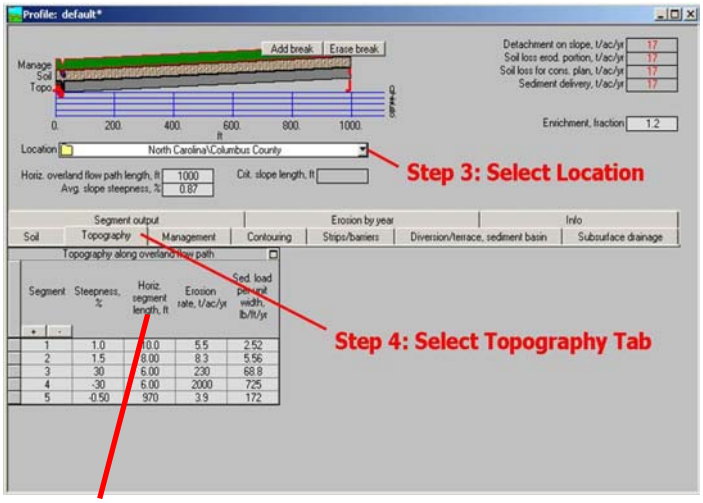
- Select on the Introduction Screen: Profile, ARS Basic Complex Slope
- Click OK

Step 2 Open Base File

- Select the *default* profile or a previously saved base file and click OPEN.

Step 3 Select Location

- Select your *Location.*
- **Example: Columbus Co.**
- See Downloading and Importing Climate Data if your county is not loaded.



Hint: Right click here and select *Show As: Horizontal Segment Length* so you can input the actual lengths of each segment.

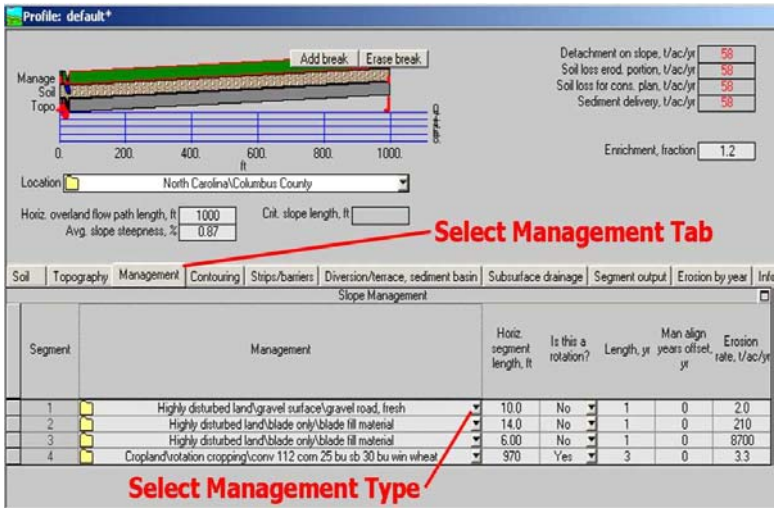
Step 4 Create Project Topography

- Select Topography Tab
- Add Segments for each change in Steepness % (**+** Slope = Downhill, **-** Slope = Uphill)
  **Starting from the left. *Maximum cross-section is 1000' wide.*

EXAMPLE:
- Segment #1: 10' of gravel roadbed with a 1% grade.
- Segment #2: 8' of disturbed shoulder with a 1.5% grade.
- Segment #3: 6' of disturbed front slope with a 30% grade.
- Segment #4: 6' of disturbed back slope with a -30% grade.
- Segment #5: 970' of agricultural field (rotation of corn, soybean, wheat) with a –0.5% grade.

Step 5 Profile Management

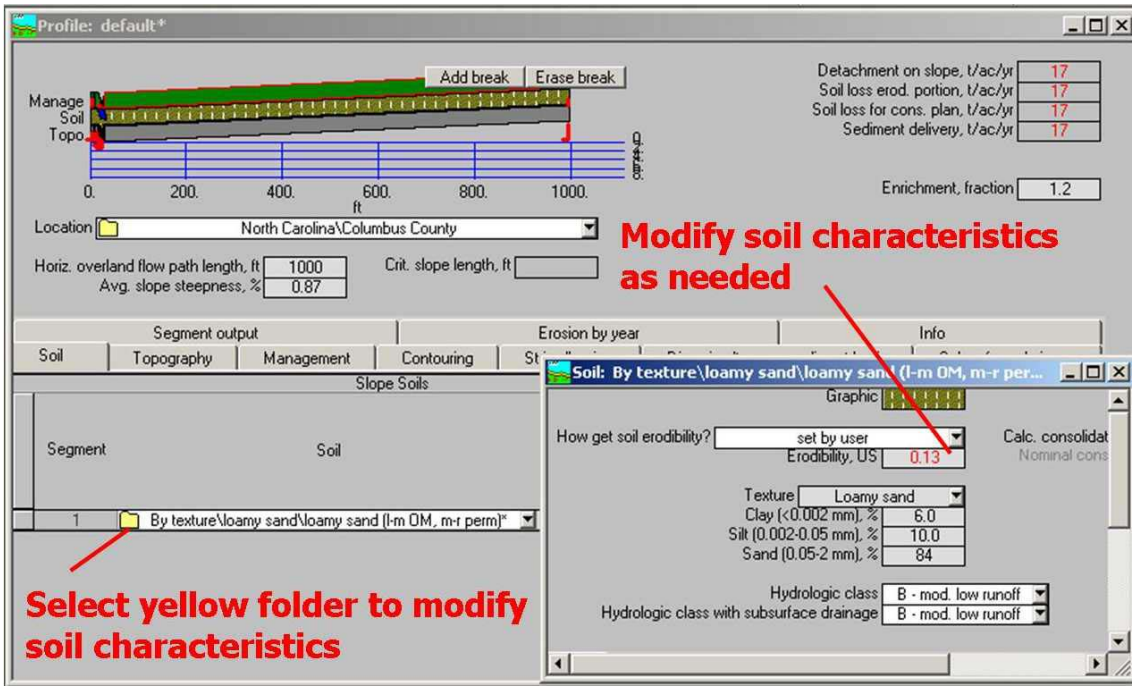
- Select Management Tab
- The "*Add break*" button above the profile diagram will allow you to divide up each segment if you want to identify different management plans. Click on Manage (green area) to add a break.
- Use the drop menu to select the management type for each segment.
- Use **Highly disturbed land\blade only\blade fill material** for worse case scenario.



Note: Be sure segment lengths are correct.

Step 6 Select Soil Type for Project

- Select the *Soil* Tab
- Select your specific soil type by county from the drop down menu.
- **EXAMPLE: Used the "By Texture" option of Loamy Sand with low-med organic matter.**
- Use the "Add Break" button and select areas within the Soils Layer on the diagram to add breaks at the approximate locations. The horizontal lengths can be adjusted in the chart below if need be. **This example only requires one soil segment.**
- See Downloading and Importing Soil Data if your county's soils are not loaded.
- Click on the yellow folder to review your specific soil characteristics. Modify them as needed to match the info provided in the NRCS Soil Survey (click OK on any pop up messages). *A link is provided for the NCSS Web Soil Survey on the REU Field Ops web page.*
  - In order to change the Erodibility Factor you must select "set by user" from the drop down.
- Close the window and select YES to save changes. You must give it a new file name.
- If you get a message saying AUTO UPDATE has been turned off, go to OPTIONS at the top and select AUTO UPDATE to turn it back on.



Step 7 Setting Remaining Tabs

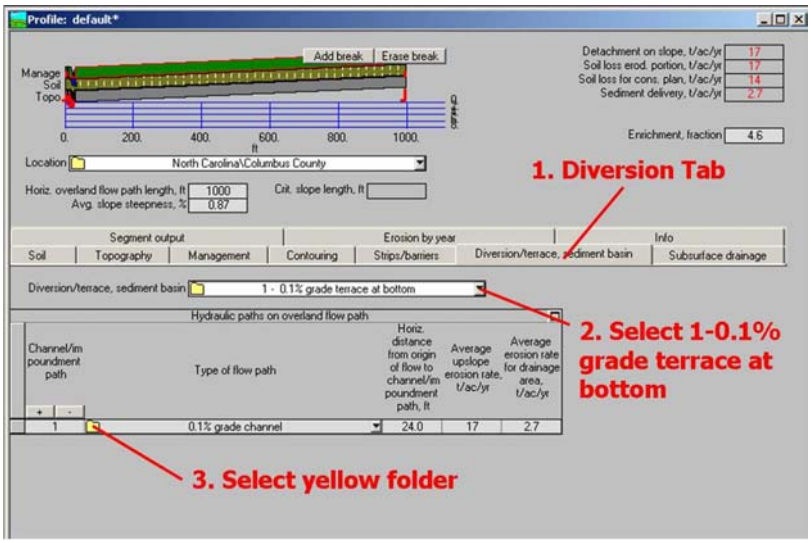
Select the following for each tab:

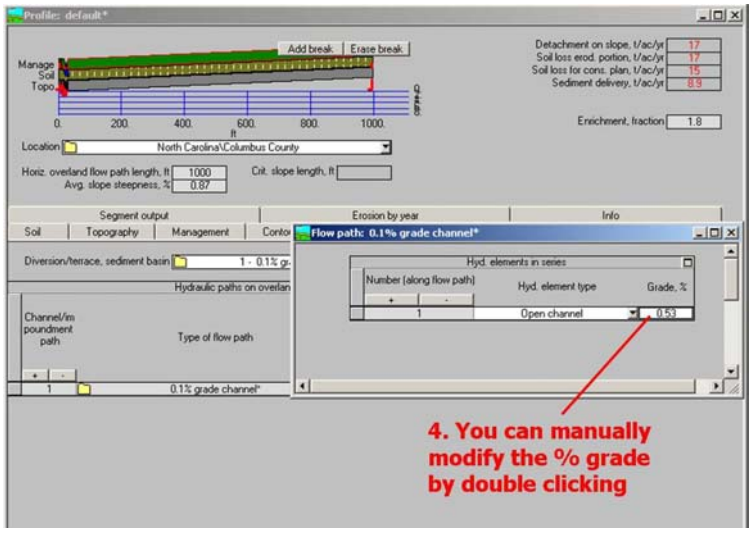
- *Contouring Tab*: "a up-and-down slope" (should be the default).
- *Strips/barriers Tab*: "none"
- *Subsurface drainage Tab*: "none"

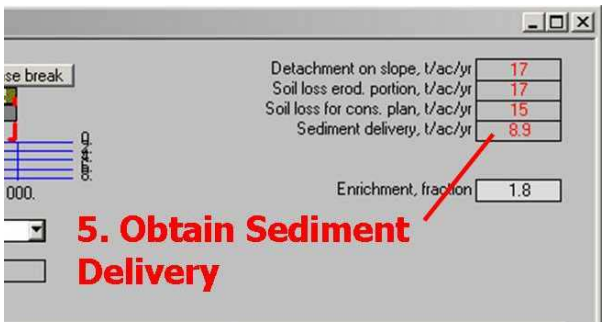
Step 8 Setup Ditchline Grades

1. Select the *Diversion/terrace, sediment basin* Tab
2. Select *1-0.1% grade terrace at bottom* from the drop down
3. Select the yellow folder
4. You will be able to manually modify the % grade in the new window. **EXAMPLE: 0.53%.** Double click on the % grade and enter in 0.53 and hit enter.
5. **Make note of the Sediment Delivery value in the upper right hand corner. EXAMPLE: 8.9 t/ac/yr**

- Close out the windows in RUSLE2 associated with the Diversion tab ***(don't close RUSLE2)***. Answer NO to the question asking if you want to save the changes. Otherwise your 0.1 % grade option may in fact be a 0.53 % grade option on future runs.
- Note: You have successfully modeled a Temporary Silt Ditch.







Step 9 Using Sediment Delivery Values

- At this point you have successfully modeled your section.
- The **Sediment Delivery** (t/ac/yr) found in Step 8 now becomes *the Required Design Storage Volume.* **EXAMPLE: 8.9 t/ac/yr**.
- **You can now save your RUSLE2 file as "base ***ANY*** County" by going to *File/Save As* and type in the filename and hit *SAVE*.**
- In order to convert from t/ac/yr to ft^3/ac/yr you must first obtain your soil's density from the NRCS Soil Survey or a link is provided for the *NCSS Web Soil Survey* on the REU Field Ops web page. Most density's run from 1.3 to 1.6 g/cm^3.
- **Conversion: Take your Sediment Delivery (t/ac/yr) and multiply by 32.02. Then divide by your density (g/cm^3). This gives you the Required Design Storage Volume (ft^3/ac/yr) to be used in the EC Plan Design. ****Not required if you move to Step 10.***

Step 10 Sizing the EC Device(s)

- **EXAMPLE:** Assuming a density of 1.4 g/cm^3 , the Design Storage Volume is **204 ft^3/ac/yr**. *Note: You do not have to make the conversion if you utilize the ERODES spreadsheet. You can enter the tons/acre/yr directly into the spreadsheet.*
- With a Disturbed acreage of 0.98 acres, the Required Storage is **200 ft^3**.

OPTIONS

- Utilize the ERODES Spreadsheet by completing all of the information in Step 1. By using a diversion berm, the drainage area was reduced to 4 acres. This is considered a Non-Typical section due to the large drainage area (>3 acres). This prohibits the use of Option 4. You will be prompted to enter the Sediment Delivery value into Option 4B and then to move to Option 5. Option 5 uses the surface area calculations and will more than likely create a basin size that is too large for your site. Move on to Option 6.
    - 30 Day Option:
        - Basin options would be 19'x2'x3', 14'x3'x3', or 11'x4'x3' if using a 3' design depth with 1.5:1 sideslopes.
        - The area must be stabilized within 30 days from the time clearing and grubbing begins due to the fact you are only using 23 % of the required RUSLE2 volume.
    - 60 Day Option:
        - Basin options would be 31'x3'x3', or 24'x4'x3' if using a 3' design depth with 1.5:1 sideslopes.
        - The area must be stabilized within 60 days from the time clearing and grubbing begins due to the fact you are only using 43 % of the required RUSLE2 volume.

VERY IMPORTANT:
In order for the spreadsheet to calculate the correct basin sizes based on the RUSLE2 information, it is very important that all of the pertinent project information be entered into STEP 1 of the ERODES Spreadsheet.

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