United States Department of Agriculture

NRCS

Natural Resources Conservation Service
339 Busch's Frontage Road, Suite 301
Annapolis, MD 21401

Phone: 410-757-0861
FAX: 410-757-0687
www.md.nrcs.usda.gov

Maryland RUSLE2 Training Exercises

for

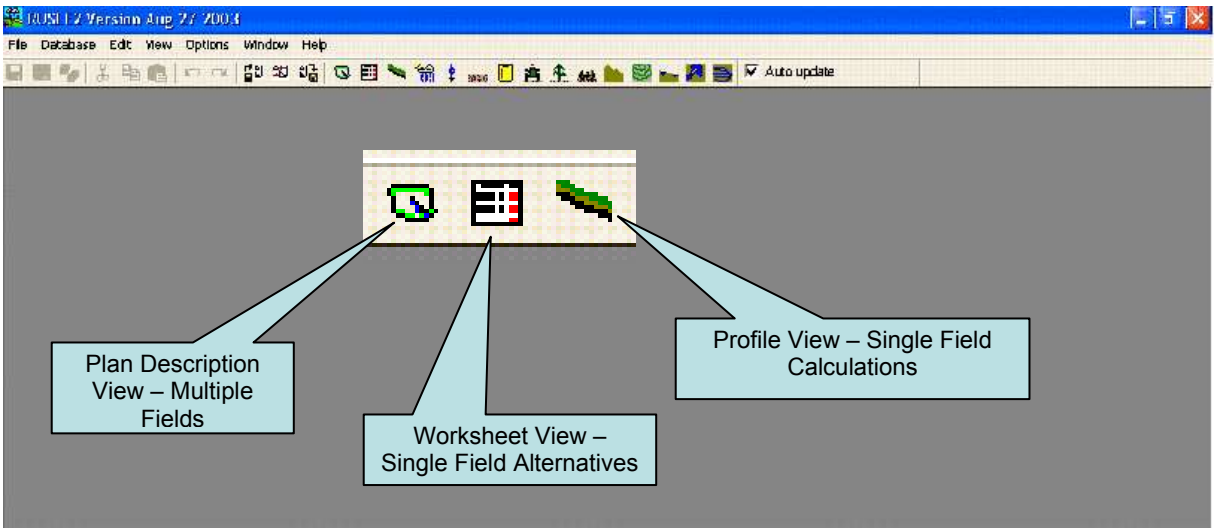
Crop Management Zone 65

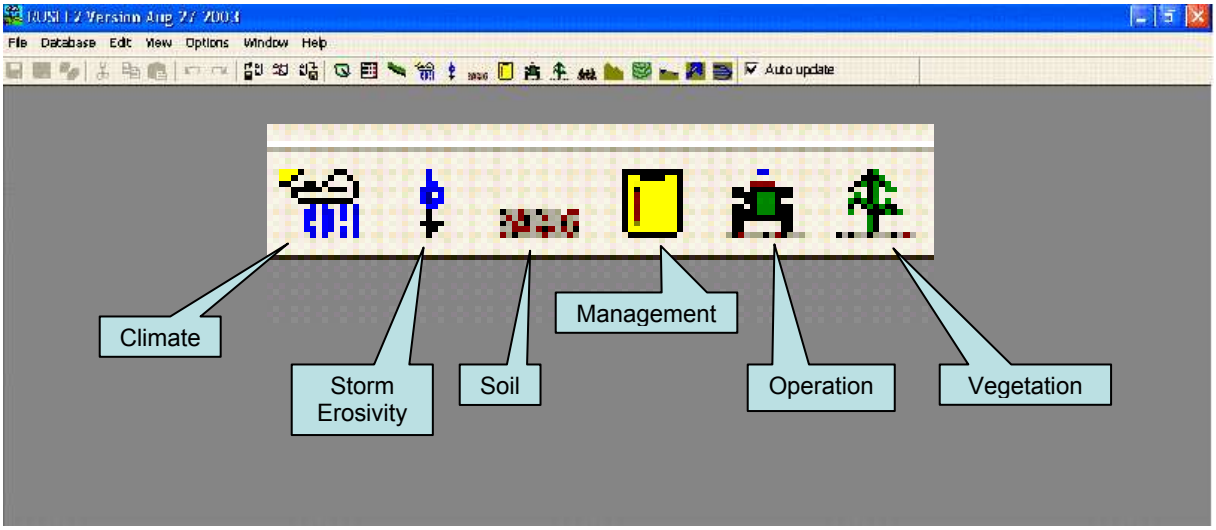
In order to complete the following exercises you will need to import the following database sets into your computer:

- **Climate - MD**
- **Soils – Carroll**
- **Crop Management – Zone 65**

February 2008

RUSLE2 Program buttons to become familiar with





MD Training Exercise 1

Task: In this exercise, you will estimate soil loss for a single hill-slope Profile. Use the NRCS simple SCI & Fuel Use 11006 user's template, and the R2_NRCS_Fld_Office access level. Use inputs specified below. Report output as specified below.

1. Locate and click on the icon for ***Profile*** on the tool bar near top of RUSLE2 screen.

2. Double-click on the ***default*** record. You are now in the ***Profile*** screen.

3. **Location**: Left-click the drop down arrow, move through the menus to select ***USA \ Maryland*** and then select ***Carroll County, MD***.

4. **Soil**: Left-click the drop down arrow and select ***Carroll MD***. Double-click ***Carroll MD***. Select the map unit component for ***CeB2 Chester silt loam, 3 to 8 percent slopes***. Click the '+' button to the left of the folder for ***CeB2 Chester silt loam, 3 to 8 percent slopes***. Double-click the map unit component, ***Chester silt loam 100%***.

5. **Topography**: Set the slope length at ***150*** feet. Set the average slope steepness at *7*%.

6. **Base Management**: Select a management record from CMZ 65 for ***Corn, grain; fctw, z65***. Follow this path to select this record: CMZ 65 \ a. Single Year/Single Crop Templates \ corn grain \ ***Corn, grain; fctw, z65***.

Check Output for this Profile:
Soil loss for conservation planning: _____ t/a/y

T value for soil map unit ***CeB2***: _____

Surface Residue Cover after planting: _____ (Hint: click yellow folder.)

7. **Save**: Save this Profile. Name it ***MD Ex 1***. (Be sure to use 'Save As', not 'Save', or you will save it as 'default'.)

MD Training Exercise 2

Task: Using inputs from Exercise 1, you will modify the ***Profile*** as indicated below with inputs for contouring and strips/barriers, and record change in output.

1. **Contouring**: Change Contouring to ***Absolute row grade of 1%***. (Note: If pop-up box appears, answer "Yes" to question.)

Output: Soil loss for conservation planning: _____ t/a/y.

2. **Strips/barriers**: Select the contour buffer strip named ***1-Cool season grass buffer midslope 15 feet wide***. (Note: If appears, answer "Yes" to question on pop-up box.)

Output: Soil Loss for conservation planning: _____ t/a/y.

Sediment Delivery: _____ t/a/y (Hint: click tab for Additional Results.)

3. **Save**: Save this Profile. Name it ***MD Ex 2***.
4. **Close the screen**

Explain:
Did the tons of soil loss change as much as you expected after the buffer strip was added? Why do you think it changed this amount?

Why is the sediment delivery value lower after adding the buffer strip?

MD Training Exercise 3

Task: In this exercise you will use the rotation builder to build a corn-soybean rotation for CMZ 65. With the rotation builder, single-crop or single-year templates are pieced together to form multi-year or multi-crop rotations. After creating the rotation, you will save it in CMZ 65, folder c. Other Local Mgt. Records.

Step-By-Step Procedure:

1. With RUSLE2 booted up, close all screens (begin with a blank screen).
2. Click on the yellow clipboard (Management) icon at top of screen.
3. Double-click on the ***default*** record.
4. Click the box to the right of the heading, "***View/edit Rotation builder used to make this management***".
5. Click on the drop-down arrow on Line 1 under ***Management***.
6. Double-click on ***CMZ 65***.
7. Click the '+' for the folder ***a. SingleYear/ Single Crop Templates***.
8. Click the '+' for the folder ***corn grain***.
9. Double-click on ***Corn, grain; sp, z65***.
10. Click the '+' button above Line 1 under Man. (for Management). Line 2 will appear.
11. Click on the drop-down arrow on Line 2 under ***Management***.
12. Click the '-' for the folder ***corn grain*** (to collapse the folder).
13. Click the '+' for the folder **s*oybeans***.
14. Click the '+' for the folder ***soybeans drilled***.
15. Double-click on ***soybeans, nr; sp, z65***.
16. Click the ***Apply/Close*** button in lower-left corner of screen.

Note: You have left the rotation builder screen and are now in the Management screen. You can review the inputs for this corn-soybean rotation. Are they correct? Notice the ***Duration, yr*** box in top-center of screen. It should say that this is a **two-year (2)** rotation.

17. Click the ***Save-As*** icon in upper-left of the RUSLE2 screen (or, click File > Save As).
18. Double-click on ***CMZ 65***.
19. Double-click on ***c. Other Local Mgt. Records***.
20. Type the name of this rotation in the box at bottom and click ***Save***.

What is the correct name for this rotation?_____
(Hint-The name of this rotation is indicated in Exercise 4)

MD Training Exercise 4

Task: In this exercise you will again use the rotation builder to build a corn-soybean rotation for CMZ 65. However, this time you will begin with a pre-built rotation, ***cg, sp; sb, nr, sp; z65***, the one you just built and placed in the c folder. After making the modifications specified below, you will again save this rotation in ***CMZ 65, folder c. Other Local Mgt. Records***.

Step-By-Step Procedure:

1. With RUSLE2 booted up, close all screens (begin with a blank screen).
2. Click on the Management icon at top of screen.
3. Double-click on ***CMZ 65***.
4. Double-click on ***c. Other Local Mgt. Records***.
5. Double-click on ***cg, sp; sb, nr, sp; z65***.
6. Click the box to the right of the heading "***View/edit Rotation builder used to make this management***".
7. Click on the drop-down arrow on Line 1 under ***Management***.
8. Double-click on ***Corn, grain; sctw, z65***.
9. Click on the drop-down arrow on Line 2 under ***Management***.
10. Double-click on ***soybeans, nr; sctw, z65***.
11. Click the ***Apply/Close*** button in lower-left corner of screen.

Note: You have left the rotation builder screen and are now in the Management screen. You can review the inputs for this corn-soybean rotation. Are they correct? Notice the ***Duration, yr*** box in top-center of screen. It should say that this is a two-year (2) rotation.

12. Click the ***Save-As*** icon in upper-left of the RUSLE2 screen (or, click File > Save As).
13. Type the name of this rotation in the box at bottom and click ***Save***.

What is the correct name for this rotation?_____

Note: Notice you are located in c. Other Mgt. Records for CMZ 65. This is where you will save rotations you have built or modified.

14. Click on the box located on the upper left of this screen ***(Yellow up arrow)*** once, then again. You will see the location you have saved your rotation.

MD Training Exercise 5

Task: In this exercise you will use the rotation builder for the third time to build a corn-soybean rotation for CMZ 65. You will again begin with a pre-built rotation, c***g, sp; sb, nr, sp; z65***, the one you built in Exercise 3 and placed in the c folder. After making the modifications specified below, you will again save this rotation in ***CMZ 65, folder c. Other Local Mgt. Records***.

Step-By-Step Procedure:

1. With RUSLE2 booted up, close all screens (begin with a blank screen).
2. Click on the Management icon at top of screen. *(yellow clipboard)*
3. Double-click on ***CMZ 65***.
4. Double-click on ***c. Other Local Mgt. Records***.
5. Double-click on ***cg, sp; sb, nr, sp; z65***.
6. Click the box to the right of the heading, "***View/edit Rotation builder used to make this management***".
7. Click on the drop-down arrow on Line 1 under ***Management***.
8. Double-click on ***Corn, grain; nt, z65***.
9. Click on the drop-down arrow on Line 2 under ***Management***.
10. Double-click on ***soybeans, nr; nt, z65***.
11. Click the ***Apply/Close*** button in lower-left corner of screen.

Note: You have left the rotation builder screen and are now in the Management screen. You can review the inputs for this corn-soybean rotation. Are they correct? Notice the ***Duration, yr*** box in top-center of screen. It should say that this is a two-year (2) rotation.

12. Click the ***Save-As*** icon in upper-left of the RUSLE2 screen (or, click File > Save As). ***Note: Again, RUSLE2 takes you directly to CMZ 65, c. Other Local Mgt. Records where you first started to build this rotation.***
13. Type the name of this rotation in the box at bottom and click ***Save***.

What is the correct name for this rotation?_____

MD Training Exercise 6

Task: In this exercise, you will use the Worksheet, which allows you to compare soil loss for several alternative management systems on the same hill-slope (or same field). Follow the steps below to estimate erosion for three alternative management systems on one hill-slope.

Step-By-Step Procedure:

1. Locate and click on the icon for Worksheet on the tool bar near top of RUSLE2 screen.
2. Double-click on the default record. You are now in the Worksheet screen.
3. Make the following inputs at the top-left of the screen: Tract #: ***555***, Owner name: ***Polly Pedon***, Field name/number: ***1***.
4. Click the drop-down arrow in the box for Location.
5. Double-click the ***USA*** folder.
6. Click the '+' for the ***Maryland*** folder.
7. Double-click ***Carroll County***.
8. Click the drop-down arrow in the box for Soil.
9. Double-click ***Carroll MD***.
10. Click the '+' button to the left of the folder for ***CeB2 Chester silt loam, 3 to 8 percent slopes***.
11. Double-click the map unit component, ***Chester silt loam 100%***.
12. Enter slope length: 150 feet, and slope steepness: 7%.
13. Click the ***Save As*** icon. Name this Worksheet ***MD Ex 6***.
14. Click the drop-down arrow under ***Management*** in the ***Management alternative table***.
15. Double-click on ***CMZ 65***.
16. Double-click on folder ***c. Other Local Mgt. Records***.
17. Double-click on ***cg, sp; sb, nr, sp; z65***.
18. Use the slider bar and move to right on this line. Click the drop-down arrow under ***Description***. Type in ***1 yr spring-plowed corn grain, 1 yr spring-plowed, narrow-row soybeans***. Click ***OK***.
19. Make sure the word 'Yes' is shown under 'Show in summary.' If shows 'No', change it to 'Yes' by clicking once on the word 'No'.
20. Adjust the contour. Click the drop down arrow next to Contouring and change to ***Absolute Row Grade, 2 percent of row grade.*** Notice how this adjusts the amount of soil loss on the field.

21. Adjust the yields. Click on the Yellow Folder next to yields. Click each box under Yield (# of units) and adjust to ***150 bushels for Corn*** and ***45 bushels for Soybeans***. Close the Yields Folder by clicking on the Red X. *Note: when you built the crop rotation, RUSLE2 only provides you with default yields. You need to adjust depending on the actual yields of the farmer.*
22. Click the '+' button under ***Temp. scenario*** on left of screen.
23. Click the drop-down arrow on the 2nd row under ***Management***.
24. Double-click on ***cg, sctw; sb, nr, sctw; z65***.
25. Use the slider bar and move to right on this line. Click the drop-down arrow under ***Description***. Type in ***1 yr spring-chisel (twisted) corn grain, 1 yr spring-chisel (twisted), narrow-row soybeans***. Click ***OK***.
26. Again, adjust the yields for this management. Adjust Corn to ***150 bushels*** and ***Soybeans to 45 bushels***.
27. Click the '+' button under ***Temp. scenario*** on left of screen.
28. Click the drop-down arrow on the 3rd row under ***Management***.
29. Double-click on ***cg, nt; sb, nr, nt; z65***.
30. Use the slider bar and move to right on this line. Click the drop-down arrow under ***Description***. Type in ***1 yr no-till corn grain, 1 yr no-till, narrow-row soybeans***. Click ***OK***.
31. Again, adjust the yields for this management. Adjust Corn to ***150 bushels*** and ***Soybeans to 45 bushels***.

Save your Worksheet (you already named it in Step 13).

Results:

Soil loss for conservation planning, Row 1 (w/ moldboard): _____ t/a/y

Soil loss for conservation planning, Row 2 (w/ twisted chisel): ____ t/a/y

Soil loss for conservation planning, Row 3 (w/ no-till): _____ t/a/y

MD Training Exercise 7

Task: In this exercise, you will use the Plan view. The Plan view allows you to compare soil loss for several alternative management systems on two or more hill-slopes (2 or more fields) on the same farm (location). Follow the steps below to estimate erosion for three alternative management systems on two different hill-slopes.

Step-By-Step Procedure:

1. Locate and click on the icon for ***Plan*** on the icon bar near top of RUSLE2 screen.
2. Double-click on the ***default*** record. You are now in the ***Plan*** screen.
3. Input Owner name: ***Polly Pedon***.
4. Click the drop-down arrow in the box for ***Location***.
5. Double-click the ***USA*** folder.
6. Click the '+' for the ***Maryland*** folder.
7. Double-click ***Carroll County***.
8. Click the ***Save-As*** icon at top of RUSLE2 screen. Name this ***MD Ex7***.
9. Right-click on Worksheet. In the pop-up box, click on ***Load from file***.
10. Double-click on the record ***MD Ex 6***.
11. Click the '+' button under ***Field*** on left side of screen. A 2nd Worksheet line will appear.
12. Click the yellow ***Worksheet*** folder icon on Line 2. You are now in the Worksheet screen.
13. Enter ***2*** (two) in the box for ***Field name*** near top of the ***Worksheet*** screen.
14. Click the drop-down arrow in the box for ***Soil***.
15. Double-click ***Carroll MD***.
16. Click the '+' button to the left of the folder for ***GlA Glenelg loam, 0 to 3 percent slopes***.
17. Double-click the map unit component, ***Glenelg loam 100%***.
18. Enter Slope length of ***200***, and Average slope steepness of ***3 %***.
19. Close the Worksheet screen by clicking the ***X*** in upper-right corner.
20. Re-***Save*** this Plan, already named ***MD Ex 7***.

Results – Soil loss for conservation planning

Field 1, alternative 1: _____ t/a/y	Field 2, alternative 1: _____ t/a/y
Field 1, alternative 2: _____ t/a/y	Field 2, alternative 2: _____ t/a/y
Field 1, alternative 3: _____ t/a/y	Field 2, alternative 3: _____ t/a/y

MD Training Exercise 8

Task: In this exercise, you will become familiar with the Print options. RUSLE2 gives you several print templates for each of the views including PROFILE, WORKSHEET and PLAN view. This allows you to customize the print record for your particular customer. After you have completed data entry and the results are displayed, you can print the results for viewing and saving as a permanent record.

Step-By-Step Procedure:

1. Using ***MD Ex 7*** , click ***File*** on the menu toolbar. Select ***Print Report.***
2. After the dialogue box appears, select the appropriate template. Notice there are several templates to choose from. For this example choose **NRCS RUSLE2 Plan Record with SCI_STIR_Fuelcost0806.pln.dot** template.
3. Click ***Open*** in the dialogue box. This will open MS Word and display your record of results.
4. At this point, you have the option of printing and/or saving the document in your file directory.
5. For this example we will only view the document. Notice the information you can view including: All rotations selected, soil loss, sediment delivery, soil conditioning index (SCI), STIR and estimated fuel use values for each field and rotation.
6. If you choose to save your document, choose ***File***, then ***Save-As***, and navigate to the customer folder. Give the document a name, then click ***Save***.

Note: Since RUSLE2 prints its results using MS Word, you can customize and change items within the document according to your preference and customer.

7. Close MS Word and return to RUSLE2.

MD Training Exercise 9

Task: In this exercise, you will become familiar with components of the Climate database.

Locate the ***Climate*** icon (Rain Cloud) and left click to open it. Open the folders and records in this order: ***USA*** > ***Maryland*** > ***Carroll County***.

What is the (annual) ***R Factor*** value? _____
What month has the highest precipitation? _____
What month has the highest ***ed*** (erosivity density)? _____

Click the ***daily*** tab.
Right-click on the heading ***Daily EI Used***.
Click ***graph*** on the pop-up box.
About when does the EI (storm energy and intensity) peak? _____
Close the graph and Climate screens.

MD Training Exercise 10

Task: In this exercise, you will become familiar with components of the Vegetation database.

Locate the ***Vegetation*** icon and click to open it.
Locate and open the record ***Corn, grain***.

What is the assumed yield for this record? _____ bu/ac
What is the above-ground biomass, in lb/ac, at maximum canopy? _____
Using the Growth Chart, in what period (Age, days) does maximum canopy occur? _____

Graph the ***root mass in top 4 in*** and the ***Canopy cover***.
Are these graphs similar? _____
How does their seasonal growth differ?

Close the graph and Vegetation screens.

MD Training Exercise 11

Task: In this exercise, you will become familiar with components of the Soils database.

Locate the Soils icon and click to open it; then click ***Carroll MD***.
Locate map unit ***CeB2 Chester silt loam, 3 to 8 percent slopes*** and open the record for map unit component ***Chester silt loam 100%***.

What is the ***erodibility*** (K) value? _____ What is the ***T*** value? _____
What is the % ***Sand?*** _____ % ***Silt?*** _____ % ***Clay?*** _____
What is the ***Hydrologic class***? _____

BONUS Question: Of the small aggregates in ***Detached particles***, what is their Portion? _____ Diameter? _____ Fall velocity? _____ SG? _____

Close the Soils database screen.

MD Training Exercise 12

Task: In this exercise, you will become familiar with components of the Operations database.

Locate the ***Operations*** icon and click to open it.
Locate and open the record, ***Drill or airseeder, double disk***.
Click the yellow folder icon by ***Process: Flatten standing residues***.

What fraction of standing corn residue is flattened by this operation? _____

Click ***cancel*** to close this window.
Click the yellow folder icon by ***Process: Disturb surface***.

What is the recommended (rec.) tillage depth? _____
What is the ridge height? _____
What is the initial (random) roughness? _____
What is the % surface area disturbed? _____
What is the fraction of corn residue buried by this operation? _____
What is the fraction of buried corn residue resurfaced? _____

Close all windows for the Operations database.

MD Training Exercise 13

Task: In this exercise, you will become familiar with components of the Residues database.

Locate the icon for ***Residues*** and click to open it; select the record for ***corn***.

This residue responds to tillage like (fill in) _____
What is this residue's half-life? _____
What is the mass at 30% cover? _____ 60% cover? _____ 90% cover? ____
Close the Residues database window.

Close all screens in RUSLE2. You have completed the RUSLE2 exercises. You can check your answers by going to the ***RUSLE2 Maryland Training Exercise (Answers) document.***