Idaho RUSLE2
User Guide

April 2006

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A. PURPOSE OF THE RUSLE2 USER GUIDE

RUSLE2 is a complete revision of earlier versions of RUSLE. Not only is it Windows based, but many functions within the program have changed. This user guide is an attempt to provide user friendly instructions on how to use the program. It also includes output from RUSLE2 runs used to generate effects for the Conservation Management System Guidance Documents. Guidance Document (GD) runs are provided in hard copy and electronically. It is intended that users begin evaluations of benchmark and alternatives systems by using the hardcopy printouts to compare a producer's current rotation and tillage system to a GD, and then select the electronic version of that same document and edit, if necessary.

B. WHAT'S DIFFERENT: COMPARING RUSLE2 SOIL LOSS WITH RUSLE1.05

This section was written by Glenn Weisee, Cooperating Soil Scientist, NRCS, Purdue. He worked directly with the Agricultural Research Service (ARS) in the collection of data for RUSLE2 and the development of the program. In comparison to earlier versions of this model, RUSLE2 is user friendly and easy to use, thanks to Mr. Weisee's efforts and others working closely with him; primarily Dave Lightle, Conservation Agronomist, Lincoln, Nebraska.

Introduction

With the delivery of new climate data in late September 2002 to the eastern states, state agronomists have made, or will make, comparisons between RUSLE1.05 and RUSLE2 average annual soil losses. Differences between values computed by RUSLE2 and RUSLE1.05 are showing up, and understanding differences is important and necessary to provide explanations to field users. Consideration must be given to how these differences impact clients in particular conservation programs. While differences may be disconcerting, judgment of the scientific and technical adequacy must be considered on the proper basis. The following explanation is based, in part, on a paper of the same topic prepared September 2001 by Dr. George Foster, ARS.

Differences in Climatic Data

The new climate records, developed for the RUSLE2 database, are based on climate data from the period 1961-1990, while the old (RUSLE1) climate data was based on records from the period 1935-57. Generally, (nationally) the 1961-90 period was wetter than the 1935-57 period. The result is that the new monthly and annual precipitation values typically are higher, and monthly and annual R factor values are higher. The R value reflects not only the amount of precipitation but also storm intensity. Another difference in climate records at the county level is that RUSLE2 climate records are county-specific in eastern states. Also, multiple climate records per county are developed for western states and for counties in the Appalachians. In contrast, RUSLE1.05 climate records used data that was more regionalized.

RUSLE2 county-based climate records use monthly temperature and precipitation values on a 4-km grid, based on output from the PRISM model. Because of variability in the data, variability in the RUSLE2 climate records is encountered occasionally. Variability from county to county is the result of using local weather station records in the PRISM model. No effort was made to smooth these data, as was apparently done in the climate data used in USLE and RUSLE1.05.

Differences in Technology

Not all differences in soil loss between RUSLE2 and RUSLE1.05 can be explained by the differences in climate data. The following section lists key differences between the two technologies:

Mathematical Integration of Temporal Variables

The mathematics in RUSLE2 differs from that in RUSLE1.05 in two ways. One way is that an average, annual daily time step is used in RUSLE2 while an average, annual half-month time step is used in RUSLE1.05. The other difference is that RUSLE1.05 first obtains weighted values for K and C and then multiplies these weighted values. The factor values are weighted by the erosivity distribution. RUSLE2 forms a product of all the factor values for each day first and then does the weighting. In effect, RUSLE2 computes average, annual soil loss for each day and then sums the average, annual daily values to obtain an average, annual total value. The effect of the mathematical difference in the above approaches varies by location, crop and conservation tillage system. The approximate procedure used in RUSLE1.05 was necessary so that RUSLE1.05 could be used in a "paper version." The mathematical approach in RUSLE2 is superior to that in RUSLE1.05.

Temporal Soil Erodibility:

The equations used to compute the temporal variability of the soil erodibility factor in RUSLE2 are different from those used in RUSLE1.05. In RUSLE1.05, an effective K factor value is used directly to compute soil loss. In contrast, RUSLE2 uses equations that reflect the effects of temperature and moisture (precipitation). The effective K value in RUSLE2 is usually close to the base K value.

Burial of Residue by Mass (weight):

RUSLE2 buries residue based on mass (weight) while RUSLE1.05 is based on percent cover. These two approaches for describing residue burial cannot give the same result. The approach based on mass (weight) is better for large amounts of residue like high yielding corn and wheat.

Resurfacing Residue:

RUSLE2 resurfaces residue whereas RUSLE1.05 does not.

Distribution of Residue in Soil:

RUSLE2 distributes residue in the soil based on the type of implement, whereas RUSLE1.05 assumes that the residue is uniformly distributed in the soil. For example, in RUSLE2, a moldboard plow places most residue in the lower one half of the tillage depth, and implements like a chisel plow or tandem disk place most of the residue in the upper one half of the tillage depth.

Standing Residue:

RUSLE2 assumes a standing residue pool that RUSLE1.05 does not include. This additional residue pool means that RUSLE2 and RUSLE1.05 cannot give the same results unless the input data for RUSLE2 are set up to flatten all standing residue. For example, the core "harvest" data record for RUSLE2 assumes that 15% of corn residue at harvest is left as standing stubble, whereas RUSLE1.05 places all of that residue on the soil surface.

Slope Length Effect:

RUSLE2 computes a slope length effect that is a function of cover-management condition. In RUSLE1.05, this effect was considered by selecting a particular LS "table," but the proper LS table was not always selected when applying RUSLE1.05 to cover-management systems. RUSLE2 shows more variation from no-till to clean till and for other factors than is typically considered in application of RUSLE1.05, although the intent was for these factors to be considered in application of RUSLE1.05. By design, RUSLE2 gives lower slope length (L) values than does RUSLE1.05 for conservation tillage systems, especially no-till. The same equation is used to compute the slope steepness factor values for both RUSLE2 and RUSLE1.05. When comparing values between the two models, the LS in RUSLE1.05 for a mulch till system is 1.45 while it is 1.33 for RUSLE2 (essentially no difference). The LS in RUSLE1.05 for a no-till system is 1.23 while it is 0.98 for RUSLE2, a significant difference that is by design.

Ground Cover Effect:

RUSLE2 computes a “b” value for the effect of ground cover as a function of cover-management, whereas the user chooses a “b” value in RUSLE1.05 based on rill erosion relative to inter-rill erosion.

Canopy-Ground Cover Interaction:

A "live surface cover" component was added in RUSLE2 to better represent pasture conditions. An interaction between canopy and ground cover, like that used in the USLE, was added to RUSLE2 to properly describe soil loss when the canopy comes close to the ground.

Distributions of Roots in the Soil:

RUSLE2 considers the distribution of roots in the soil, whereas RUSLE1.05 assumed that the roots in the upper four inches were uniformly distributed and that the roots in the next four inches were about 75% of those in the upper four inches.

Roughness Residual:

Roughness in RUSLE2 is a function of the roughness before tillage, whereas the roughness used in RUSLE1.05 did not consider the roughness before the time of the operation. The two models give similar but not the same result.

Senescence:

Senescence is handled differently in RUSLE2 than in RUSLE1.05. While the two models give similar results, the results will not be exactly the same.

Ridge Effect:

When ridges run up and down slope, RUSLE2 computes soil loss as a function of ridge height, an effect that was not considered in RUSLE1.05.

P factor Differences:

RUSLE2 computes P factor effects different from RUSLE1.05.

SUMMARY

How values from RUSLE2 compare with values from RUSLE1.05 is not a measure of the validity of RUSLE2. That is, the adequacy of RUSLE2 is not to be judged on whether or not it estimates values that are sufficiently close to those from RUSLE1.05. RUSLE1.05 was based on data analysis and scientific and technical judgments by those involved, based on the information available at the time. Just as RUSLE1.05 represented improved science over the USLE, RUSLE2 represents improved science over that of RUSLE1.05. RUSLE2 is also based on additional analysis and information that were not available when RUSLE1.05 was developed. We learned things from RUSLE1.05 that were incorporated into RUSLE2. RUSLE2 is based on science and judgment that is superior to that of RUSLE1.05.

C. PROGRAM INSTALLATION & LOCATION

RUSLE2 can only be installed by a person with administrative privileges. If new versions of the program are released, an ITC person will install the program on your system(s).

Program Location: The RUSLE2 program is located at C:/Program Files/USDA.

D. INSTALLATION OF RUSLE2 DATA BASES

Database Name: The name of the database used in RUSLE2 is **moses(ID)** "date". Moses is the base name of the database that RUSLE2 looks for. (ID) identifies it as the database customized for Idaho. The date is the current version of the database. There will be periodic updates of the database. The date will be critical to tracking the current version. The moses(ID) database has been customized in two ways. ARS developed data used in the crop and vegetative files which are based on Pacific Northwest growing conditions. Idaho, Washington, Oregon and parts of Utah and Wyoming use these files. Using this data, crop rotations and tillage sequences were built that reflect Idaho's Crop Management Zones (CMZ). These rotations came from previous RUSLE1 runs and the development of the Guidance Documents in 2004. If RUSLE2 is downloaded by individuals (consultants or other agency staff) from the national website, but they do not download moses(ID) at the same time, their calculations will be incorrect.

Location : There are two locations where the database can be placed. There are advantages and disadvantages to both so some thought needs to be given to best meet your office's needs.

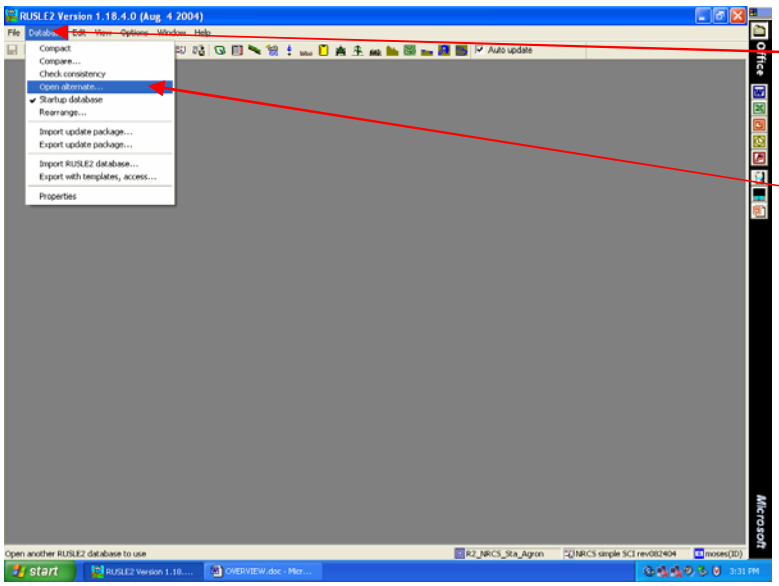
Default location: The moses(ID) database was placed in the "F" drive of each office's server by the system administrator when RUSLE2 was installed. It is located at F:RUSLE2. The program was configured to load moses(ID) automatically upon startup.

- Advantage: Placing the data base at this location makes it easy to update when new versions are distributed. The person loading the program only needs to place the database in one computer for each office. Each employee's computer is then mapped to that location.
- Disadvantage: The database can only be accessed by one person at a time. If you are in a large office, there is the potential that more than one person will attempt to access the database at the same time. Only one person will succeed. The solution to this problem is to place the database on each individual's computer.

Alternative location: The moses(ID) database can be placed directly in the program folder. It should be located at C: Program Files/USDA/RUSLE2. **If this option is chosen, the District Conservationist is responsible for keeping the database on each individual's computer updated when new databases are distributed.**

E. MAPPING MOSES(ID) ON THE F: DRIVE OF MY OFFICE COMPUTING SYSTEM TO RUSLE2 IN C: PROGRAM FILES/USDA/RUSLE2.

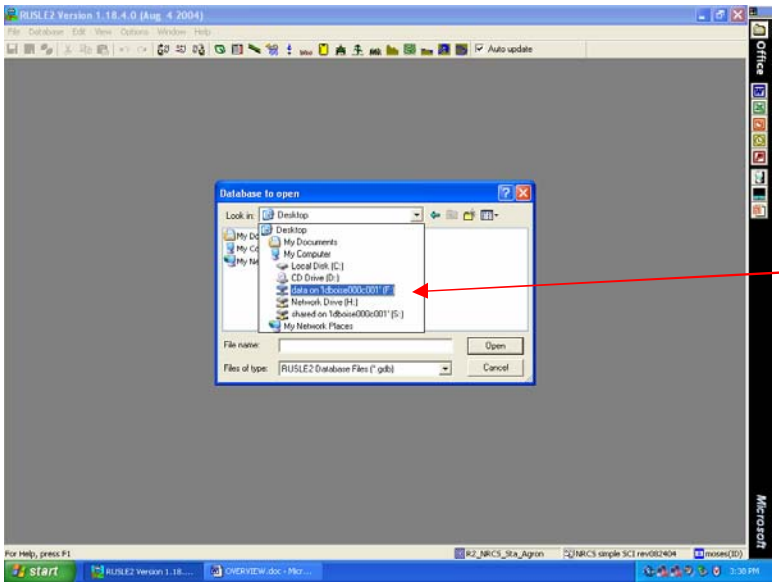
1. Open RUSLE2. If the default profile screen opens automatically, close it. Begin with the opening screen of RUSLE2 blank.
2. Click on "Database," then "Open Alternate."



1. Click on "Database."

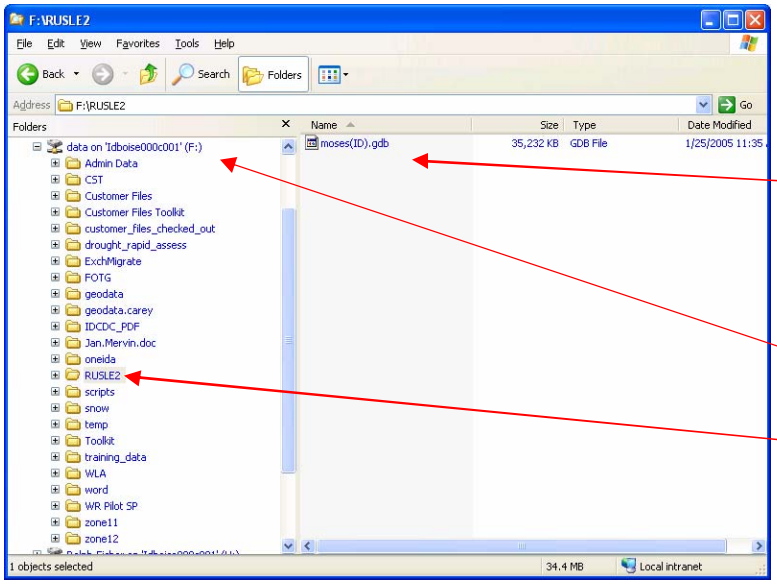
2. Click "Open Alternate."

3. Navigate to the "F" drive of your FO computing system.



Navigate to the "F" drive on your Field Office computing system.

3. Locate "RUSLE2 on the "F" drive, click on it, then "Open."

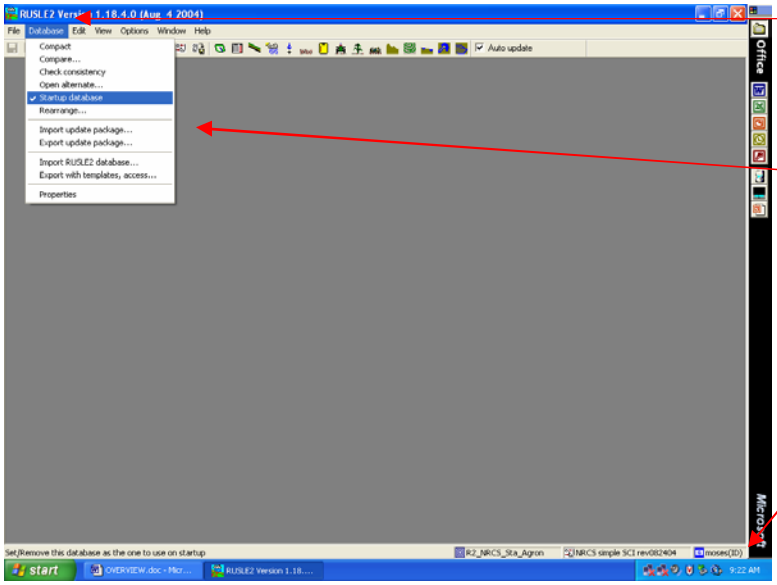


Moses (ID) date.gdb database

"F" Drive

RUSLE2

4. Return to the RUSLE2 main screen and again click on "Database," then click on "Startup Database." This will make moses(ID) located on the F: drive the default database. RUSLE2 will automatically open to that location until the "map" is changed.



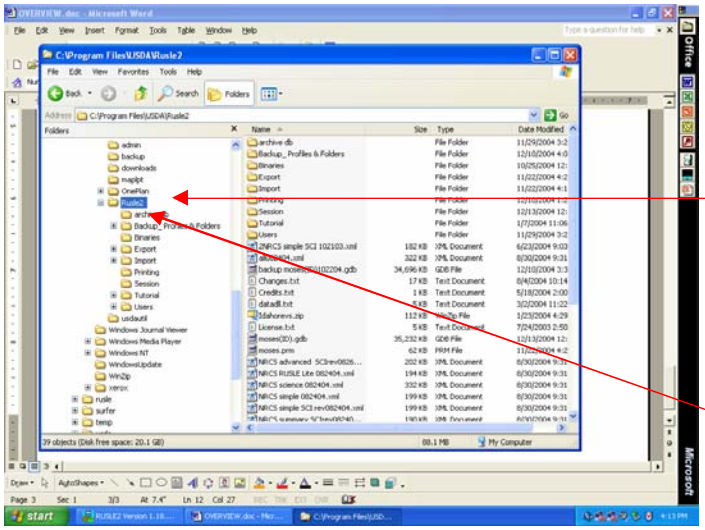
Step 1: Click on "Database."

Step 2: Click on "Startup Database."

The name of the database that RUSLE2 will open to is shown here.

F. LOADING MOSES(ID) ON OTHER USER'S COMPUTERS

1. Make sure that the RUSLE2 program has been loaded on the computer to be used. Create a RUSLE2 folder at the location shown below if it has not been:
    a. C:
    b. Program Files
    c. USDA
2. Navigate to the RUSLE2 folder on the "F" drive as shown in step 3 above.
3. Click on moses(ID) and copy the file.
4. Navigate to the RUSLE2 folder located as shown in step 1 above and paste moses(ID) "date" in that folder.



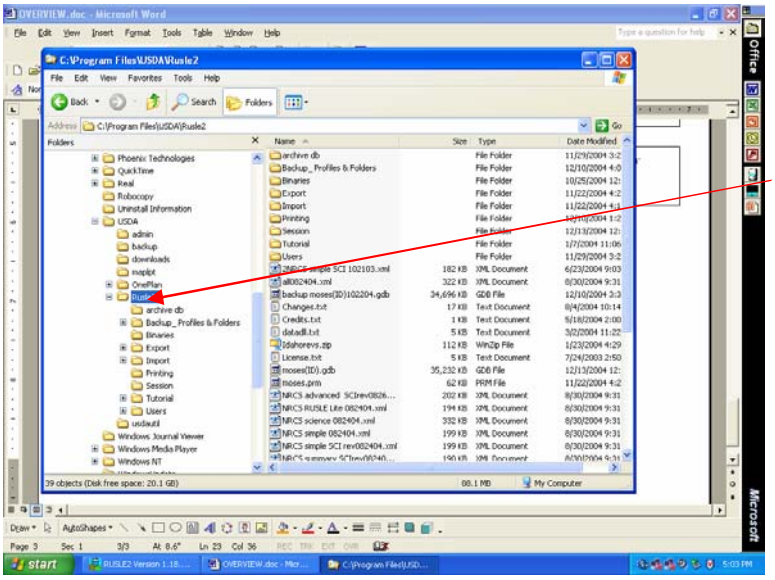
RUSLE2 is located at:
C:
Program Files
USDA
RUSLE2

Paste moses(ID) in "RUSLE2".

5. Repeat the steps described above to "map" RUSLE2 on your computer to moses(ID) which is now located in RUSLE2 on your computer.

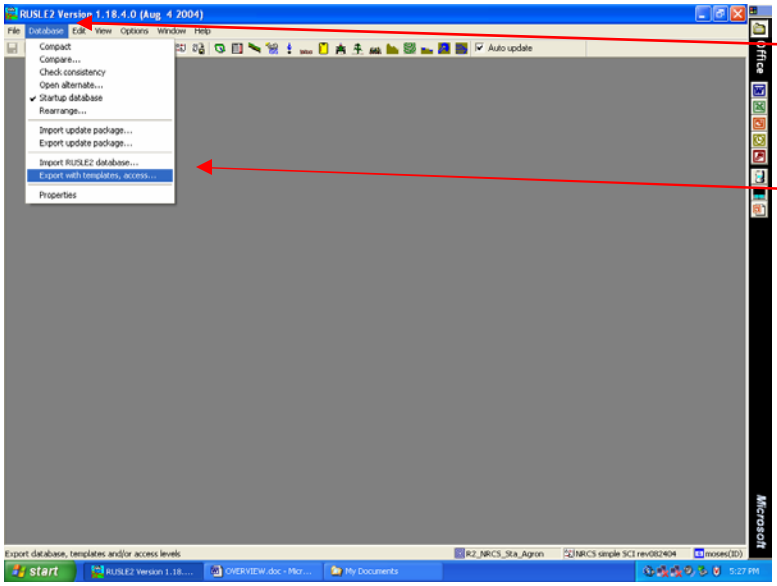
G. IMPORTING AND EXPORTING FILES

Occasionally, individual files generated by one person need to be moved to another person's computer within the office or to other offices. In this case, the file(s) to be moved are exported from the computer they currently reside in, and imported into the target computer(s). To accomplish this task use the Import/Export function of RUSLE2.



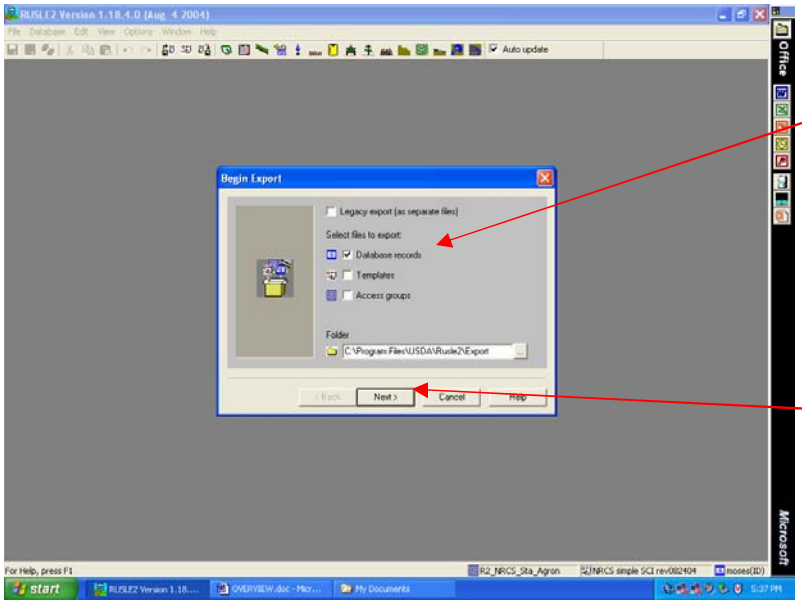
The Import:
C:
Program Files,
USDA,
RUSLE2
Import
Export

To Export a File



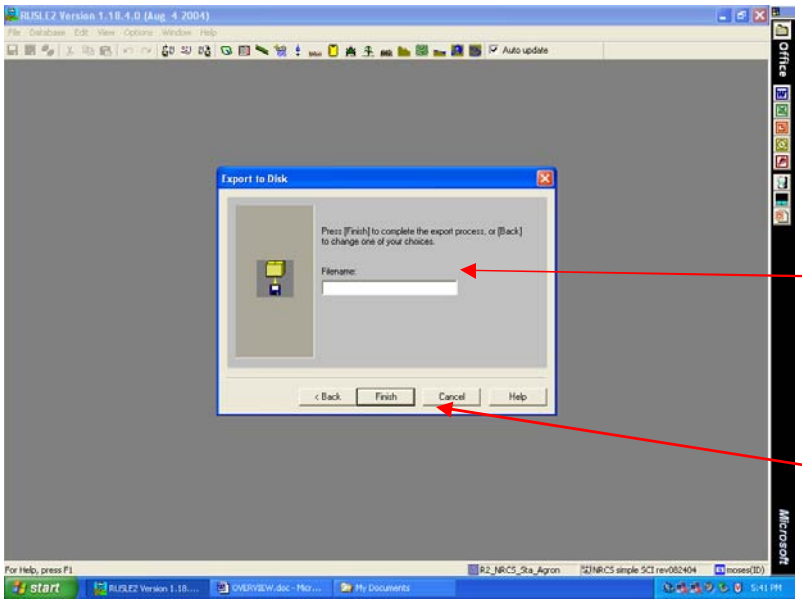
Step 1: Click on "Database."

Step 2: Click on "Export Templates."



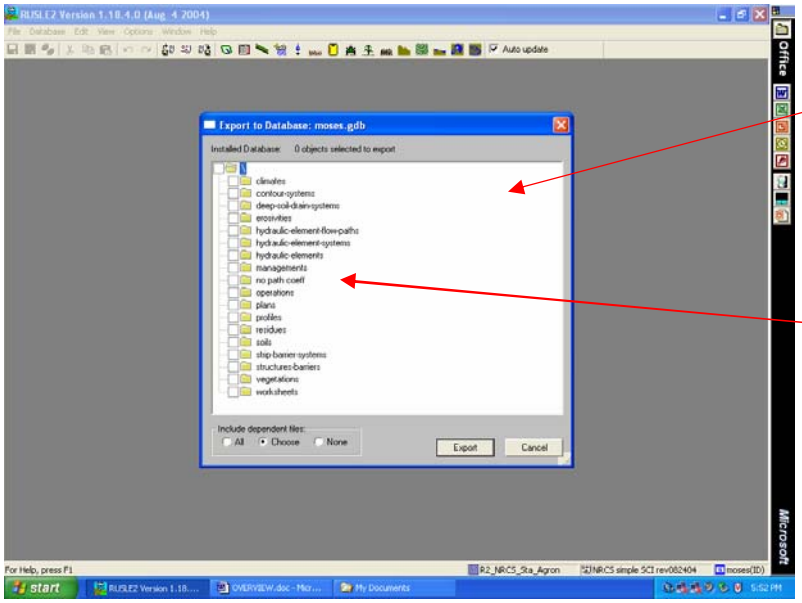
Step 3: Click on Database Records.

Step 4: Click "Next."



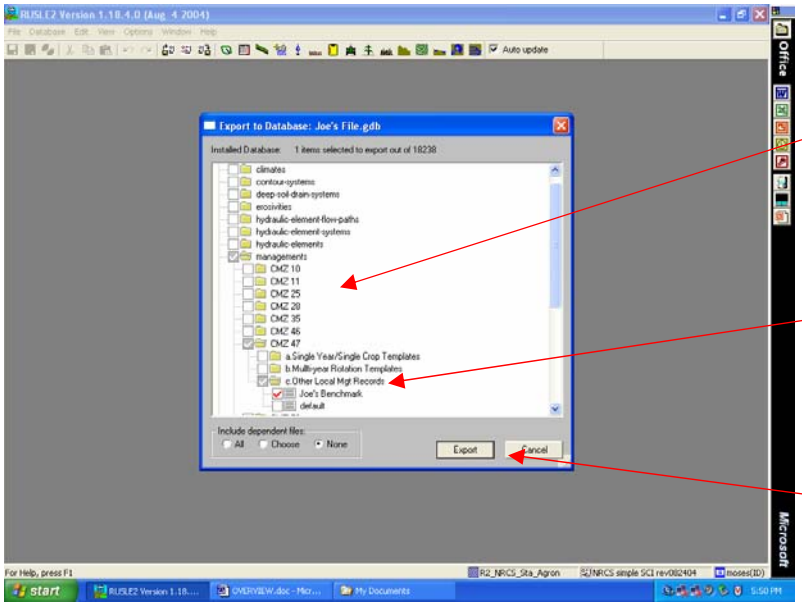
Step 5: Name the file, i.e., Joe's Benchmark.

Step 6: Click "Finish."



A file tree is displayed.

Double click on "Managements." **DO NOT** click in the box. Clicking the box selects ALL management scenarios in all CMZ in the state.

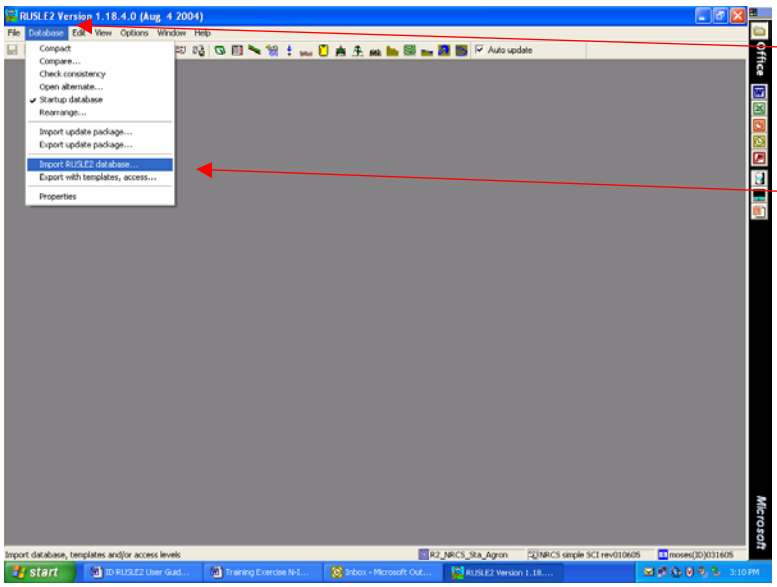


All the CMZs are displayed. Click on the CMZ in which Joe's Benchmark is located.

Click on "Other Management Records." All records saved in this folder are displayed. Click on Joe's Benchmark.

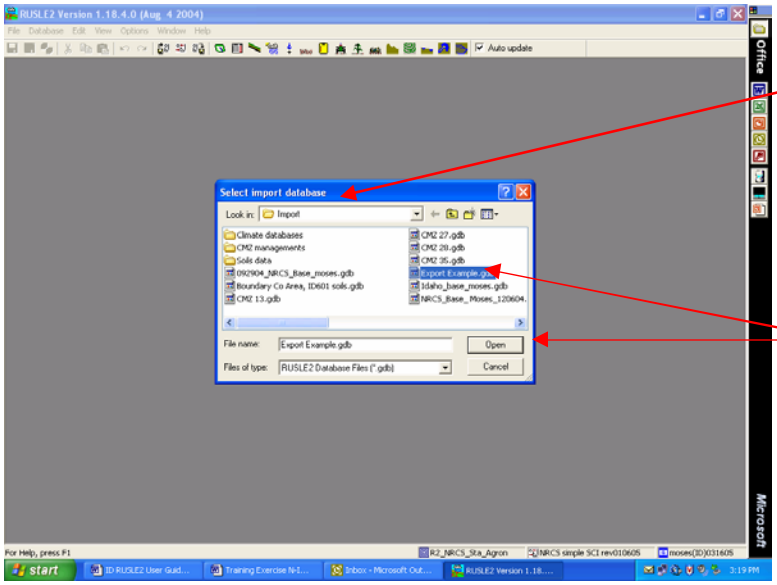
Click on "Export."

To Import a File



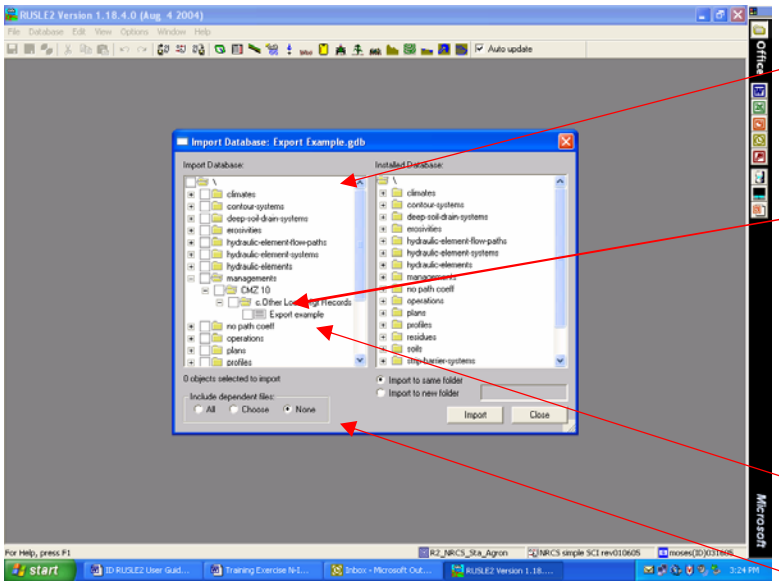
Step 1: Click on "Database."

Step 2: Click on "Import RUSLE2 Databases."



Step 3: The file should be located in the Import file in C: Program Files/USDA/RUSLE2. If it isn't, navigate to its location.

Step 4: Highlight the file to be imported, press "Open."



The file tree is displayed.

Step 5: Navigate to the location where the imported file is to be placed. The program recognizes the file name, and where it should go.

Step 6: Click in the box at the location where the file is to be imported.

Step 7: Click "None," then "Import." The file is imported. The program tells you when the import is complete.

H. IMPORTING RUSLE2 UPDATES

Specific files within the RUSLE2 database are occasionally updated at the national level. When it is updated, the State Agronomist is notified. He downloads and distributes the file to all Field Offices. The National updates include only the files which have been edited. When they are imported into RUSLE2, they edit only those files. Files distributed in that manner typically include the Single Crop templates (vegetative files), tillage or operation files and the Multi-year Rotation Templates. They do not include or edit files saved within "Other Local Rotation Templates".

"Other Local Rotation Templates" are the management scenarios and/or rotations which have been saved by the Field Office staff. Remember that Field Office staff can not save files in the Single year or the Multi-year template files, so overwriting these field office level files should not be an issue.

Updates are distributed one of two ways depending upon their size; either attached to an email or placed on the Field Office "S" drive. In either case, the file is imported following the same procedure for importing files as described earlier.

It is highly recommended that the current moses database be copied and archived before updates or database management operations are to be performed.

I. HOW TO ARCHIVE MOSES(ID) DATE

Step 1. Access RUSLE2 through Explorer. RUSLE2 is located at C: Program Files/USDA/RUSLE2.
Step 2. Create a new folder in RUSLE2 named "Archive".
Step 3. Copy the current moses(ID)date and paste it into "Archive." If desired, the "date" can be changed to reflect the time period the database represented.

J. CONTENT OF THE RUSLE2 DATABASE

When RUSLE2 was loaded on your system, the complete database package was installed. There are numerous databases included in the program, not all of which are accessed by the user when making RUSLE2 runs. Three of them, customized for Idaho, are accessed by the user each time a RUSLE2 run is made. They are:

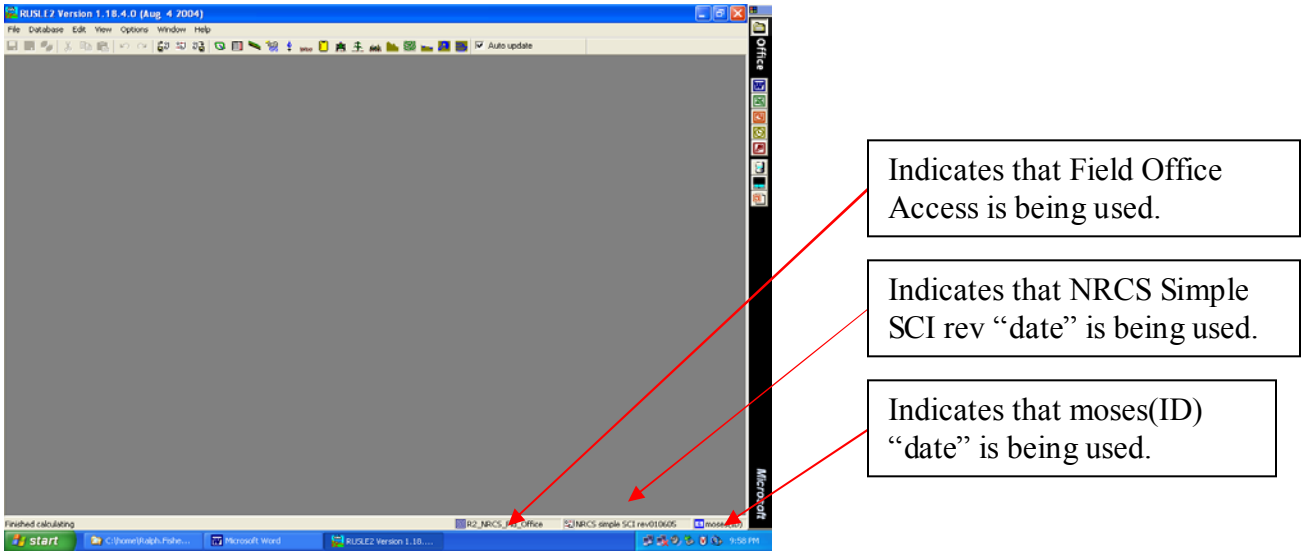
- **Climate**. The climate data is the 30 NOAA average displayed on a county by county basis. The precipitation values displayed in RUSLE2 correspond with the PRISM maps distributed by IDAHO TECHNICAL GUIDE NOTICE 257, dated June 29, 2006. There are two values displayed when the climate data base is opened, an "R" value and a "Req" value. **ALWAYS USE the "Req" value.**
- **Soils**. This file includes the NASIS soils databases for Idaho, northern Utah and western Washington. For counties that do not have published soil surveys, a file named "Generic Soils" contains appropriate values by soil texture. If you are in a county without a published soil survey, determine what soil texture is predominate in the planning unit, click on Generic Soils and chose the appropriate file.
- **Base Management**. Each Crop Management Zone (CMZ) in the state is included in the Base Management database. A CMZ is an area in which the same crops are grown and planting and harvest dates are approximately the same. **Reference Section II, Crop Management Zone Map.** Each CMZ includes five sub-folders:
  - Single Year/ Single Crop Templates: Single Year Crop Templates include typical tillage scenarios for the Benchmark and at least two higher levels of residue management (mulch tillage and no-till) for each individual crop.
  - Multi-year Rotation Templates: Single Year Crop Templates have been used to generate the typical crop rotations for each Crop Management Zone in the state where sheet and rill erosion occurs. This includes surface and sprinkler irrigated cropland and non-irrigated cropland.
    Important: **Reference Section IV**, **Accessing eFOTG Guidance Documents** for a detailed description of how guidance documents are organized in RUSLE2.
    - Guidance Document: The "Guidance Document" subfolder under Multi-year Rotations includes the RUSLE2 runs used to generate effects for Conservation Management System Guidance Documents used in Toolkit and the Progress Reporting System (PRS). Reference this folder to access RUSLE2 runs whenever guidance documents will

be used. Files which are edited must be saved to the "Other Local Management Records" folder.

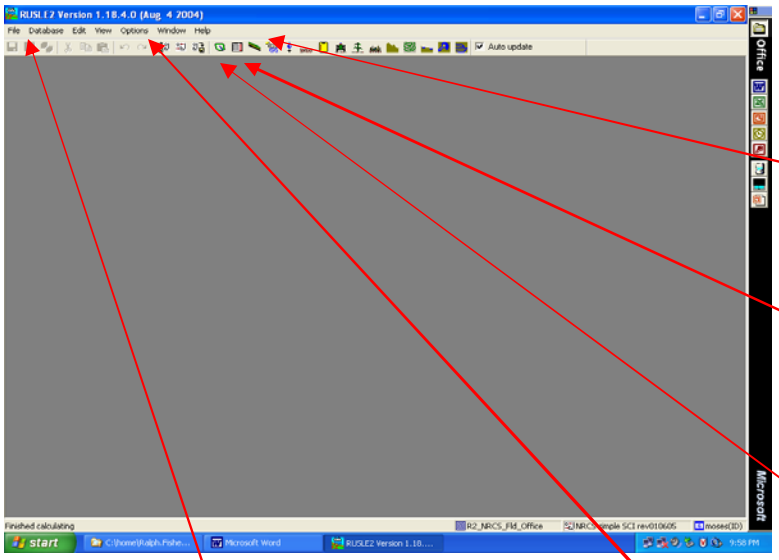
- Other Local Management Records: When guidance documents are accessed in the Multi-year Rotations or Guidance Document folders, they are saved to this folder, named for the producer being assisted.
- Construction Site Templates: These include typical sequences of operations and surface conditions found around construction sites.

K. OVERVIEW OF RUSLE2 FUNCTIONS

What you should see: When RUSLE2 is opened, the first screen should look like the one shown below. There are three (3) components accessed by the program that must be present for proper calculations to be made. In the lower, right-hand corner are displayed the access level, the version of Soil Condition and the moses database being accessed.



Icons used most frequently when generating runs in RUSLE2. There are five (5) icons you will access and use on a regular basis.



Profile: Evaluates one field and one crop & tillage scenario (benchmark or alternative).

Worksheet: Compares several crop &/or tillage scenarios on one field (several alternatives, one field).

Plan: Compares several alternatives on several fields.

File: Includes Open, Save, Save As, Print to MS Word.

Database: Includes Startup Database, Import/Export, Rearrange, Open Alternate.

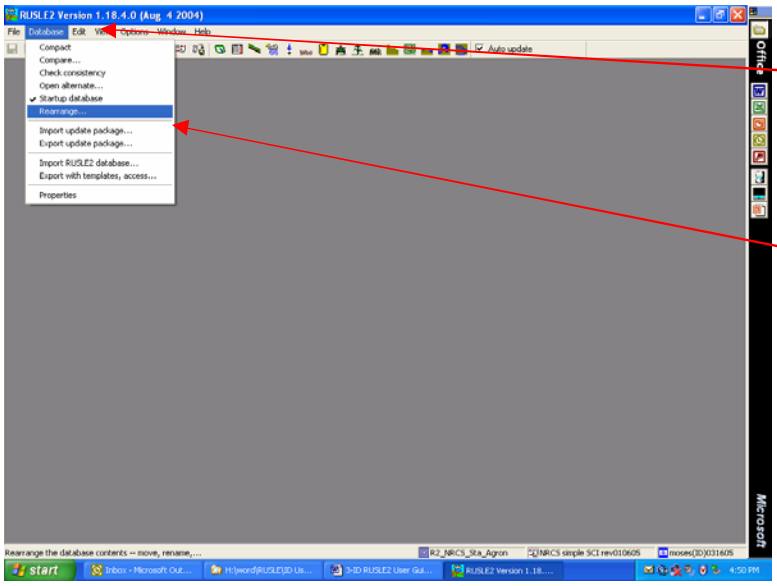
RUSLE2 Inputs: The user either loads an existing template or profile and edits it or creates a run by inputting specific, on-site data. **Reference Section VIII, RUSLE2 Exercise Index** of this User Guide for detailed explanations of data input.

L. DATABASE ORGANIZATION

Several subfolders have been created in an attempt to organize RUSLE2 Profiles and Base Management templates. The subfolders contain files which relate to the development of guidance documents included in the eFOTG Conservation Management System. The basic difference between the subfolders is the naming convention. Multi-year templates are named based upon the crops in the rotation and intensity of tillage, i.e., Wheat, winter, fallow, black, conv. CMZ10. Using that same rotation and tillage scenario in an eFOTG Conservation Management System (CMS), the guidance documents have been named Drycrop1. Both scenarios exist in the database. The naming convention used for the Conservation Management System is easy to follow because it relates directly to eFOTG, but does not provide any indication of the included rotation or tillage scenario. The user will have to access the Conservation Management System in eFOTG, then the appropriate Guidance Document to see a description of the system being used. Both "Profiles" and "Base Management" folders follow the same eFOTG naming convention.

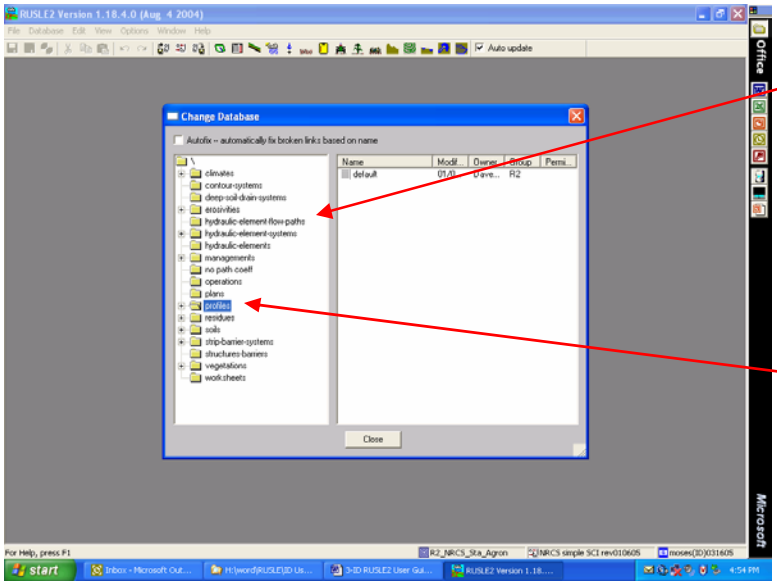
Creating Subfolders in RUSLE2.

There may be an occasion to create or delete a subfolder in RUSLE2, i.e., create a subfolder in Profiles for your personal profile runs.



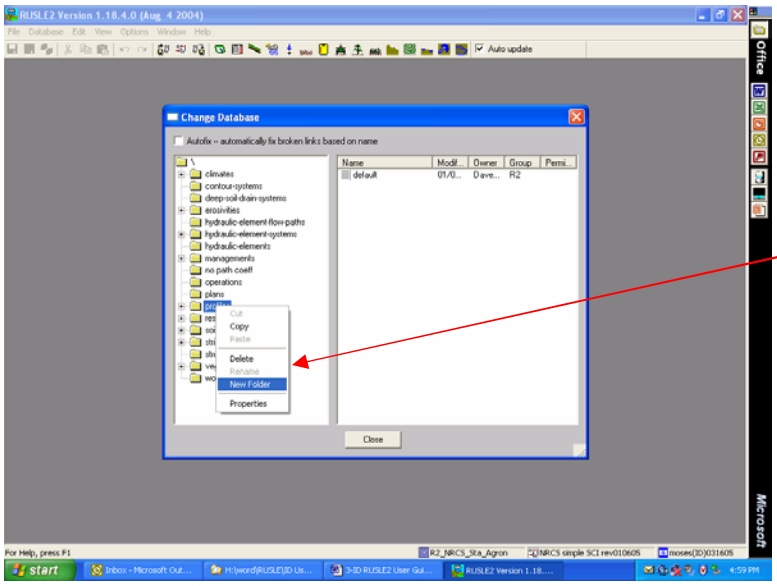
Click on "Database."

Click on "Rearrange."

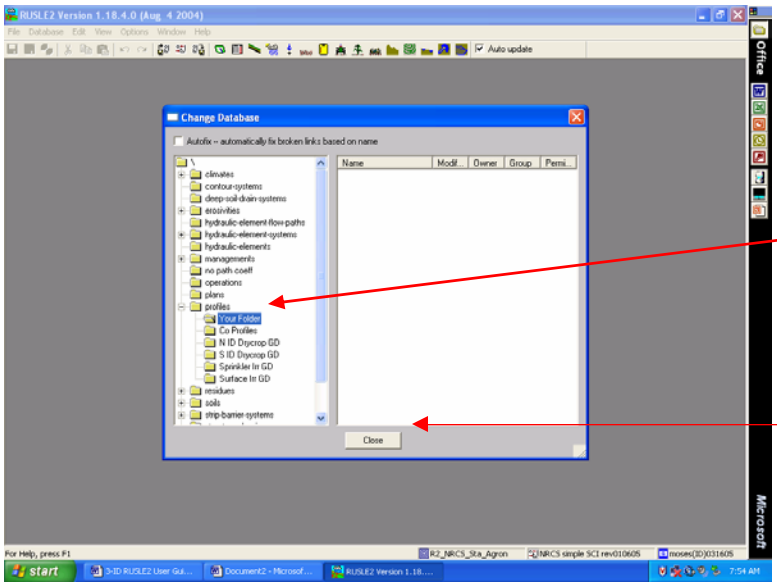


The RUSLE2 file list appears.

Highlight the folder in which a subfolder is to be created. In this example, "Profile".



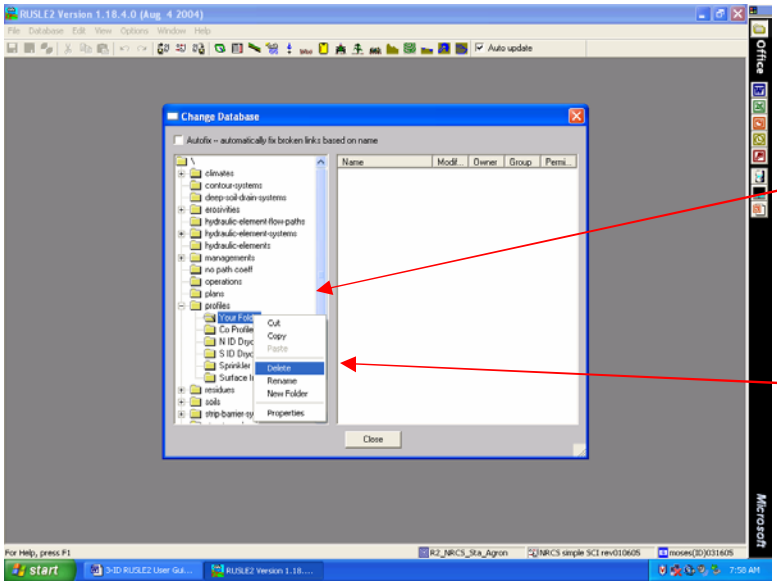
Click on "New Folder."



Name the subfolder.

Click on "Close." The new subfolder has been created.

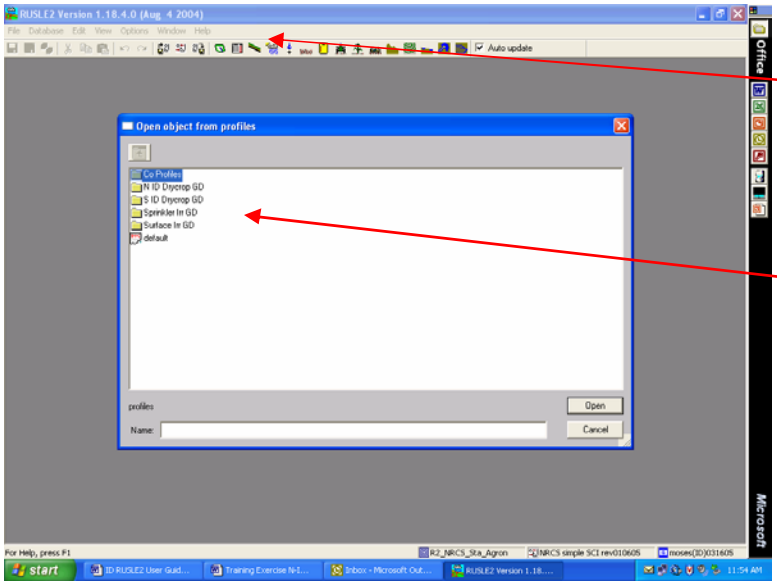
Deleting Folders or Subfolders you have created.



Locate the folder or subfolder you created by repeating the above steps.

Highlight the folder to be deleted. Right click, then select "Delete." Click "Close." The selected file is deleted.

Database Organization: Profiles. Profiles are organized as shown:

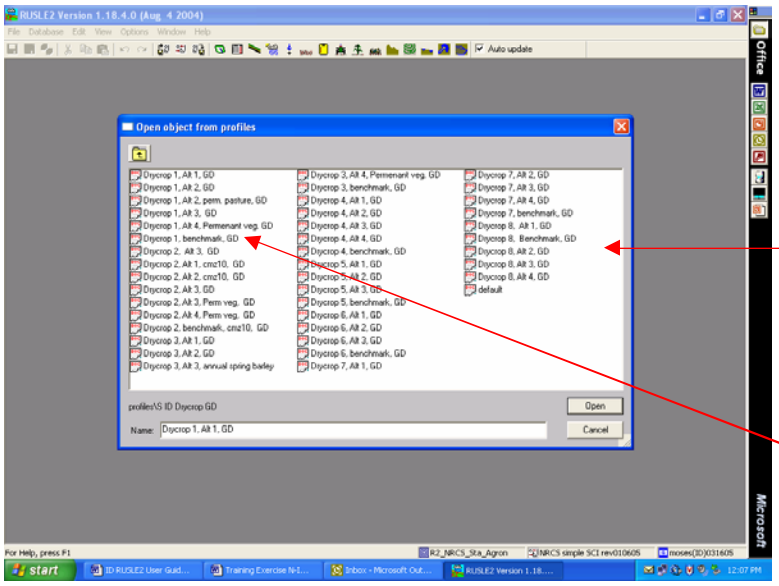


Click on "Profiles."

Five subfolders are displayed:

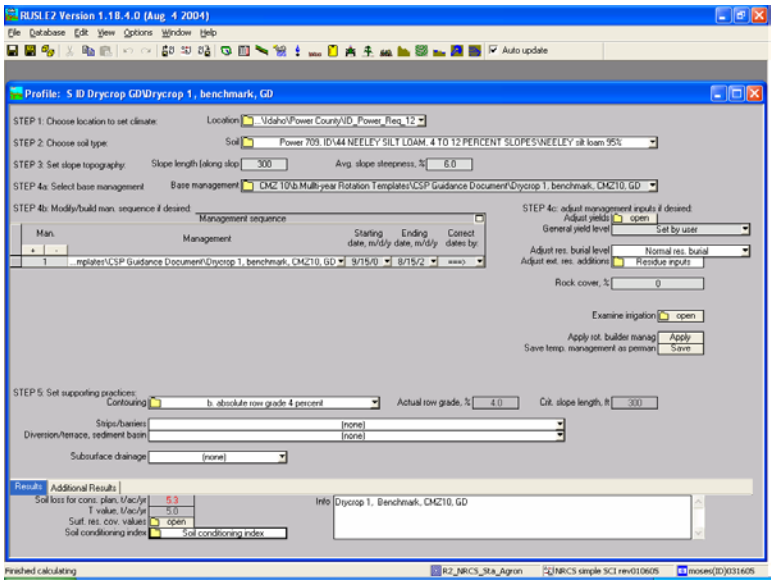
- Co Profiles: Save local profiles here.
- N ID Drycrop GD
- S ID Drycrop GD
- Surface Irr GD
- Sprinkler Irr GD

Each subfolder includes the Benchmark and each Alternative for all the guidance documents found in that land use and/or location. Each Guidance Document includes the RUSLE2 variables used to generate the "affects" displayed in the eFOTG Conservation Management System. Each was saved as a "Profile". The screen below lists all the Guidance Documents included in the S ID Drycrop Profile subfolder. If the user wants to access and use the Drycrop 1 benchmark profile, highlight and press "Open."



All the guidance documents in southern Idaho are listed in this subfolder.

Click on the desired guidance document to open it.



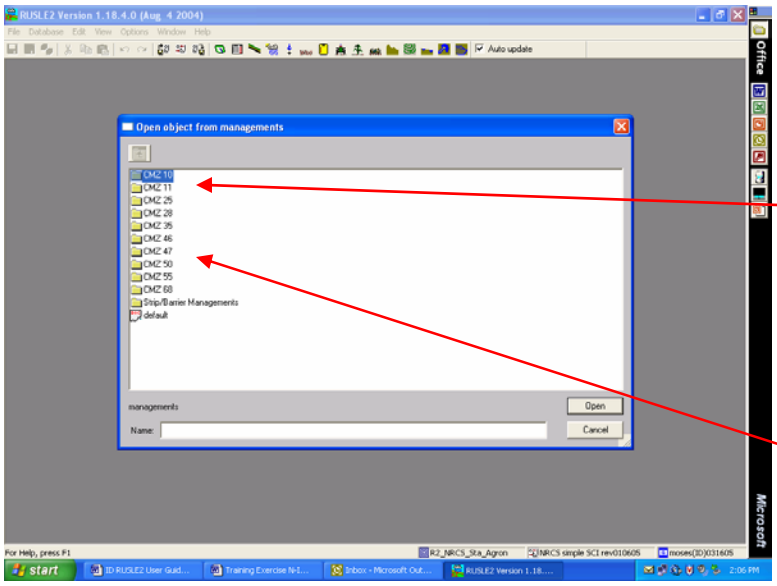
The desired Guidance Document "Profile" is opened. The Profile includes all the variables used to generate the affects included in the guidance documents in eFOTG.

Using the Profile template. Once the Profile template is open and edited, it can be saved and/or printed as desired.

Management Templates. Multi-year templates are organized by Crop Management Zones with two exceptions. **All** the Conservation Guidance Documents for **South Idaho** are located in the CMZ10 folder. **All** the Conservation Guidance Documents for **North Idaho** are located in CMZ47. **Reasoning:** The Guidance Documents have been developed based upon Common Resource Areas by land use, not by Crop Management Zones.

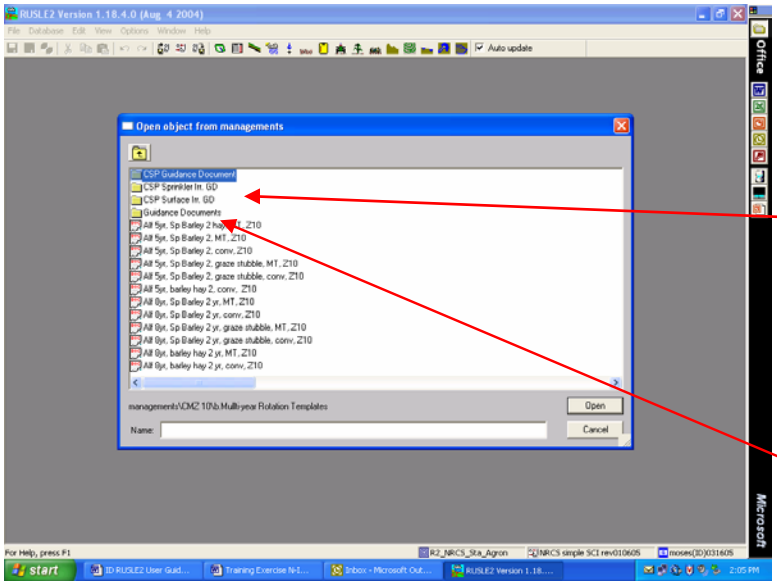
The South Idaho folder includes:

- "CSP Guidance Documents" which include all the Drycrop ones.
- CSP Surface Irr GD. CSP guidance documents on surface irrigated cropland do not include irrigation induced erosion.
- CSP Sprinkler Irr GD. Most of the wind erosion resource concerns are associated with sprinkler irrigated land.



CMZ10 includes all CSP guidance documents for South Idaho.

CMZ47 includes all CSP guidance documents for North Idaho.



CMZ10 includes all the Drycrop, Sprinkler Irr. and Surface Irr. guidance documents. Each file within the folder relates to eFOTG, i.e., Drycrop 1, benchmark.

The "Guidance Document" folder includes the same templates as those in the Sprinkler, Surface or Drycrop files but the original naming convention is used.

M. DATABASE MANAGEMENT

RUSLE2 users will occasionally want to delete files from their database. Files which can be deleted by Field staff are located in:

- "Other Local Management Template" or the "Other Local Rotation Template"
- Profiles
- "Worksheets"
- "Plans"

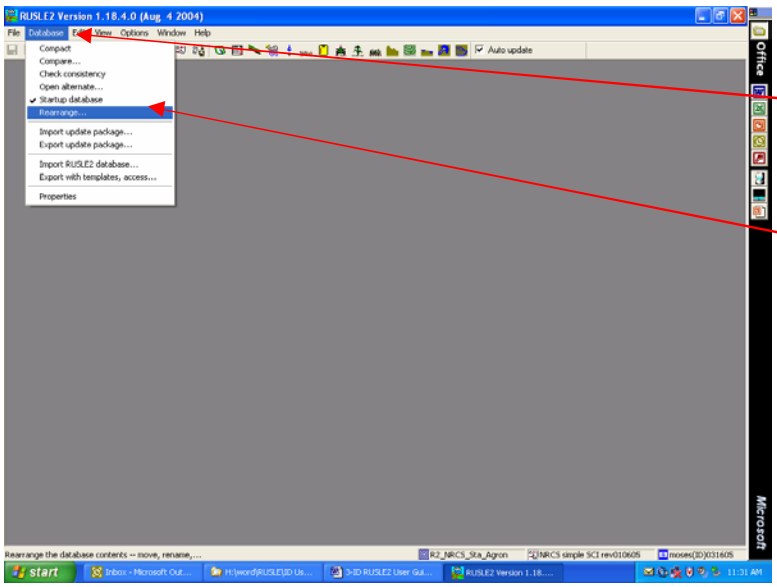
Files are "linked" within RUSLE2. A Single year crop file used in the development of an "Other Local Multi-year Rotation Template" is linked to that template. If it is used in a saved "Profile," "Worksheet" or "Plan," it is linked to each of those. If a user desires to delete any of these saved files, it must be done in the reverse order in which they were generated. Generally, the order they are created is:

- Management template
- Profile (if saved)
- Worksheet
- Plan

To delete files successfully, they must be deleted in the reverse order in which they were generated:

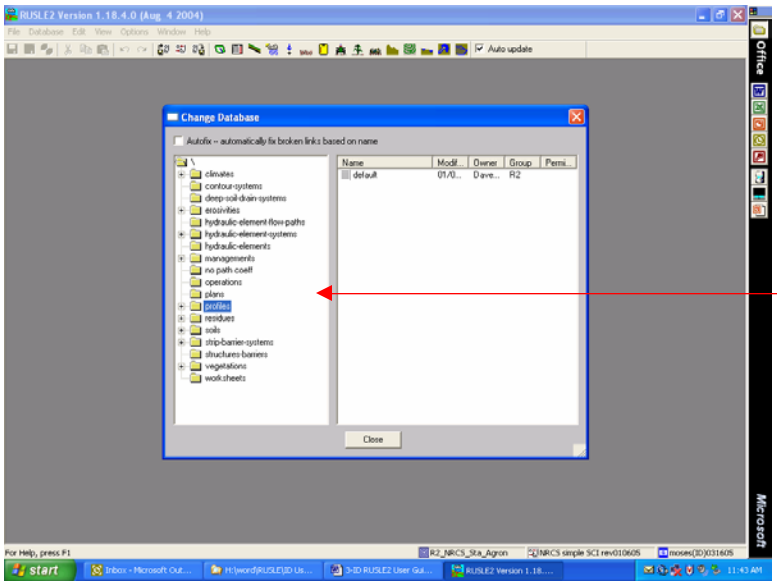
- Plan
- Worksheet
- Profile (if saved)
- Management template

The process is:

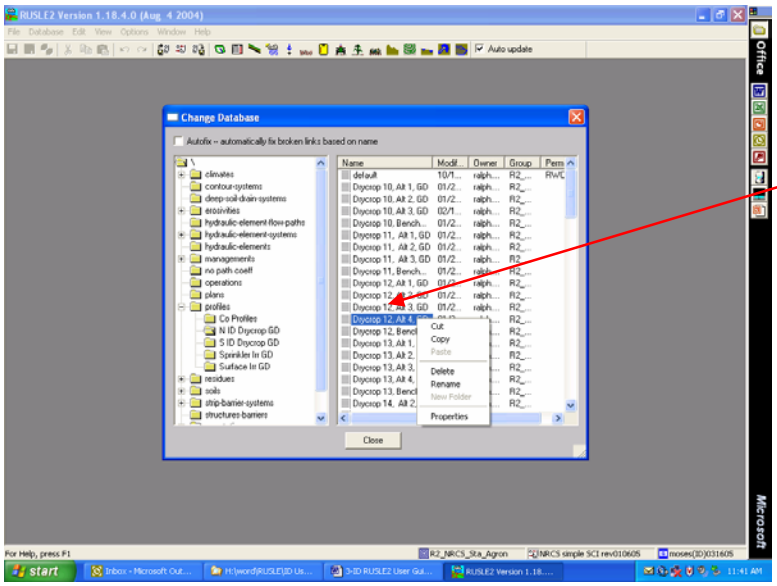


Step 1: Click on "Database."

Step 2: Click on "Rearrange."



Step 3: Click on the folder from which the file is to be deleted.

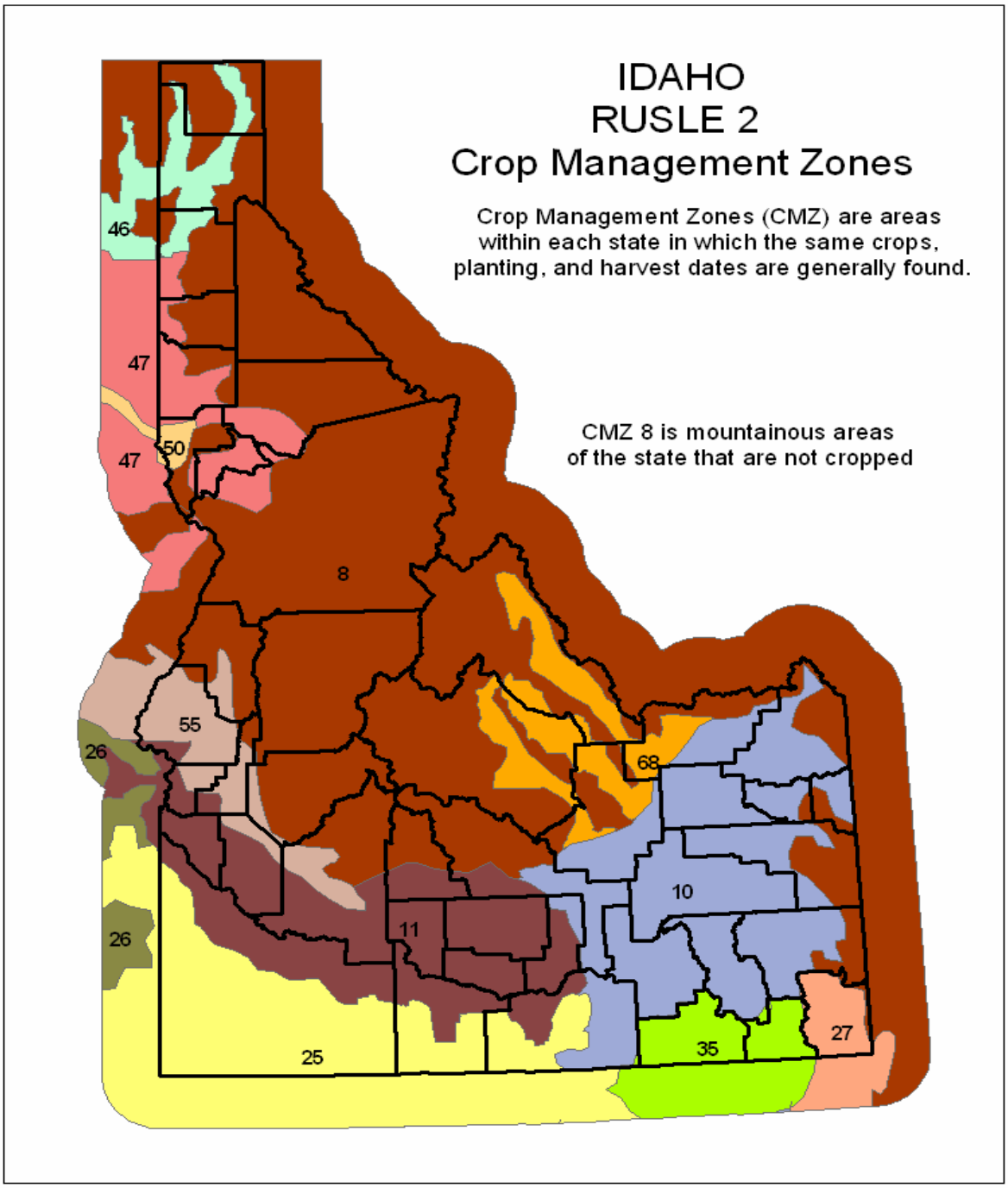


Step 4: Click on the folder to be deleted, right click and select "Delete." The highlighted folder will be deleted.

After deleting the desired files, press "Close." RUSLE2 will perform a consistency check. If a file was deleted which was linked to another file, the consistency check will indicate that the deleted file cannot be found and ask the user to replace it with another. Follow the instructions on the display window, locate and replace the deleted file with another one.

CROP MANAGEMENT

ZONE MAP


IDAHO
RUSLE 2
Crop Management Zones
Crop Management Zones (CMZ) are areas within each state in which the same crops, planting, and harvest dates are generally found.
CMZ 8 is mountainous areas of the state that are not cropped
46
47
47
50
8
55
26
68
10
11
26
25
35
27

SOIL SURVEY DATA

Using Current NASIS Soils Databases

Soils data was originally loaded into RUSLE2 grouped by county. Several counties in Idaho had several soil survey areas within its boundaries. The August 2006 version has converted all the soils databases to the current NASIS soil survey names. This change makes RUSLE2 consistent with all other programs or tools which reference the Soils Data Mart. It does force the user to reselect the correct soil survey area. This procedure is outlined in the User Notes section of this guide in a file named "Updating Existing Profiles".

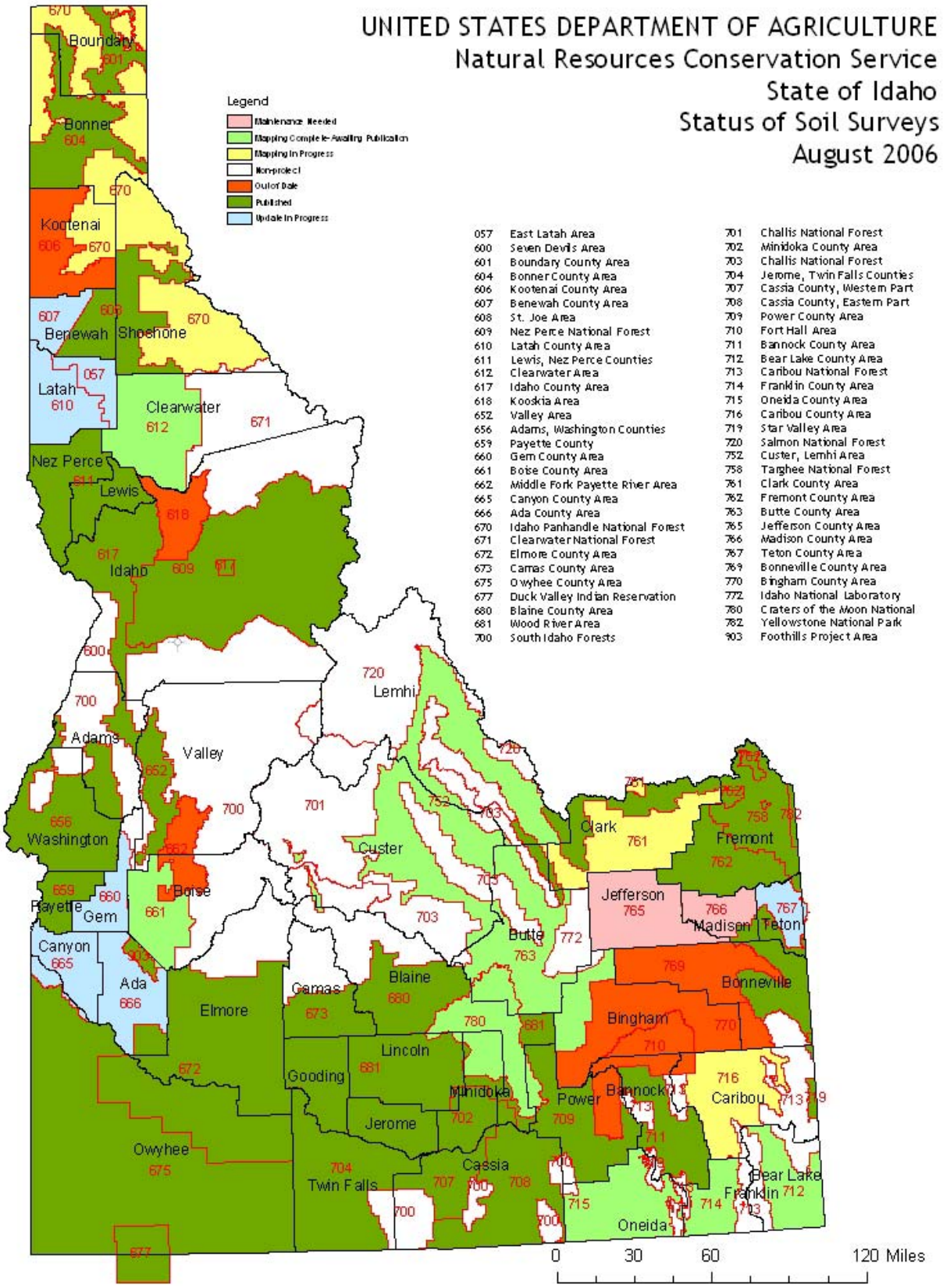
The current list of SSURGO Certified NASIS Soil Databases is listed below along with the corresponding State of Idaho Status of Soil Surveys map which shows the boundaries of each Soil Survey Area.

CERTIFIED IDAHO SOIL SURVEY LEGENDS

July, 2006

SSAID	SOIL SURVEY AREA NAME
ID601	Boundary County Area, Idaho
ID604	Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
ID606	Kootenai County Area, Idaho
ID607	Benewah County Area, Idaho
ID608	St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
ID610	Latah County Area, Idaho
ID611	Lewis and Nez Perce Counties, Idaho
ID612	Clearwater Area, Idaho
ID617	Idaho County Area, Idaho, Western Part
ID618	Kooskia Area, Idaho County, Idaho
ID652	Valley Area, Idaho, Parts of Adams and Valley Counties
ID656	Adams-Washington Area, Parts of Adams and Washington Counties, Idaho
ID659	Payette County, Idaho
ID660	Gem County Area, Idaho
ID661	Boise County Area, Idaho, Parts of Ada and Boise Counties
ID662	Middle Fork Payette River Area, Idaho, Parts of Valley and Boise Counties
ID665	Canyon Area, Idaho
ID666	Ada County Area, Idaho
ID672	Elmore Area, Idaho, Parts of Elmore, Owyhee and Ada Counties
ID673	Camas County Area, Idaho
ID675	Owyhee County Area, Idaho
ID677	Duck Valley Indian Reservation, Idaho and Nevada

ID680	Blaine County Area, Idaho
ID681	Wood River Area, Idaho, Gooding County and Parts of Blaine, Lincoln and Minidoka Counties
ID702	Minidoka Area, Idaho, Parts of Minidoka, Blaine, and Lincoln Counties
ID704	Jerome County and Part of Twin Falls County, Idaho
ID707	Cassia County, Idaho, Western Part
ID708	Cassia County, Idaho, Eastern Part
ID709	Power County Area, Idaho
ID710	Fort Hall Area, Idaho, Parts of Bannock, Bingham, Caribou, and Power Counties
ID711	Bannock County Area, Idaho, Parts of Bannock and Power Counties
ID714	Franklin County Area, Idaho
ID715	Oneida County Area, Idaho
ID752	Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties
ID762	Fremont County, Idaho, Western Part
ID763	Butte County Area, Idaho, Parts of Butte and Bingham Counties
ID765	Jefferson County, Idaho
ID766	Madison County Area, Idaho
ID767	Teton Area, Idaho and Wyoming
ID769	Bonneville County Area, Idaho
ID770	Bingham Area, Idaho
ID780	Craters of the Moon National Monument and Preserve, Idaho
WY623	Star Valley Area, Idaho-Wyoming

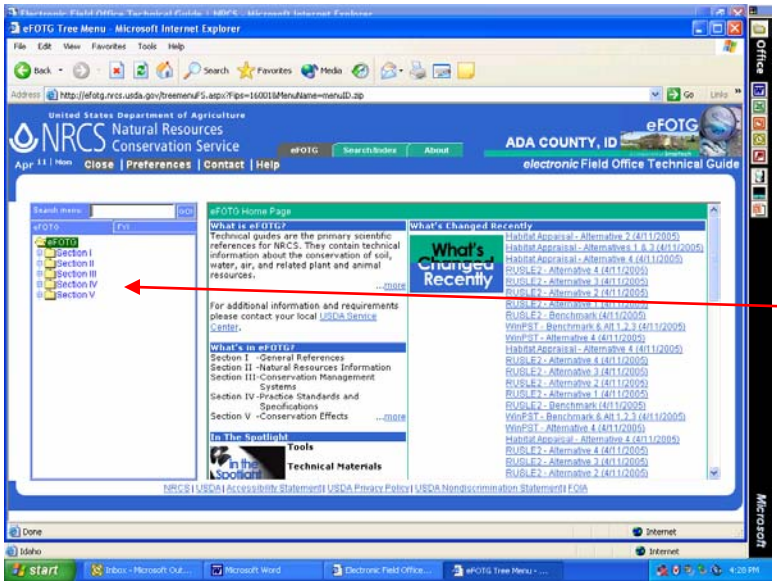

UNITED STATES DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
State of Idaho
Status of Soil Surveys
August 2006
Legend
Maintenance Needed
Mapping Complete-Awaiting Publication
Mapping In Progress
Non-project
Out of Date
Published
Update In Progress
057 East Latah Area
600 Seven Devils Area
601 Boundary County Area
604 Bonner County Area
606 Kootenai County Area
607 Benewah County Area
608 St. Joe Area
609 Nez Perce National Forest
610 Latah County Area
611 Lewis, Nez Perce Counties
612 Clearwater Area
617 Idaho County Area
618 Kooskia Area
652 Valley Area
656 Adams, Washington Counties
659 Payette County
660 Gem County Area
661 Boise County Area
662 Middle Fork Payette River Area
665 Canyon County Area
666 Ada County Area
670 Idaho Panhandle National Forest
671 Clearwater National Forest
672 Elmore County Area
673 Camas County Area
675 Owyhee County Area
677 Duck Valley Indian Reservation
680 Blaine County Area
681 Wood River Area
700 South Idaho Forests
701 Challis National Forest
702 Minidoka County Area
703 Challis National Forest
704 Jerome, Twin Falls Counties
707 Cassia County, Western Part
708 Cassia County, Eastern Part
709 Power County Area
710 Fort Hall Area
711 Bannock County Area
712 Bear Lake County Area
713 Caribou National Forest
714 Franklin County Area
715 Oneida County Area
716 Caribou County Area
719 Star Valley Area
720 Salmon National Forest
752 Custer, Lemhi Area
758 Targhee National Forest
761 Clark County Area
762 Fremont County Area
763 Butte County Area
765 Jefferson County Area
766 Madison County Area
767 Teton County Area
769 Bonneville County Area
770 Bingham County Area
772 Idaho National Laboratory
780 Craters of the Moon National
782 Yellowstone National Park
903 Foothills Project Area
Boundary
Bonner
Kootenai
Benewah
Shoshone
Latah
Clearwater
Nez Perce
Lewis
Idaho
Lemhi
Adams
Valley
Washington
Payette
Gem
Boise
Canyon
Ada
Elmore
Camas
Blaine
Custer
Clark
Fremont
Jefferson
Madison
Teton
Butte
Bonneville
Bingham
Lincoln
Gooding
Minidoka
Power
Bannock
Caribou
Jerome
Owyhee
Twin Falls
Cassia
Bear Lake
Franklin
Oneida
0 30 60 120 Miles

ACCESSING eFOTG

GUIDANCE DOCUMENTS

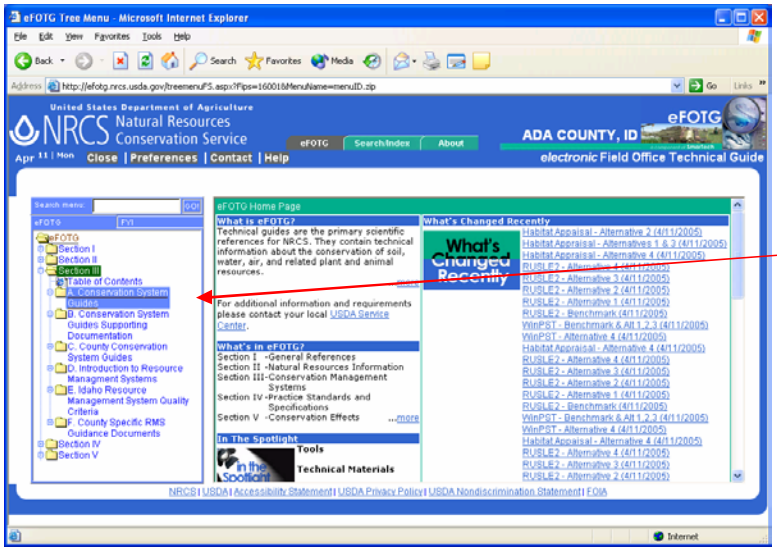
ACCESSING GUIDANCE DOCUMENTS IN THE FIELD OFFICE TECHNICAL GUIDES

1. Access the Idaho NRCS Home Page, then eFOTG



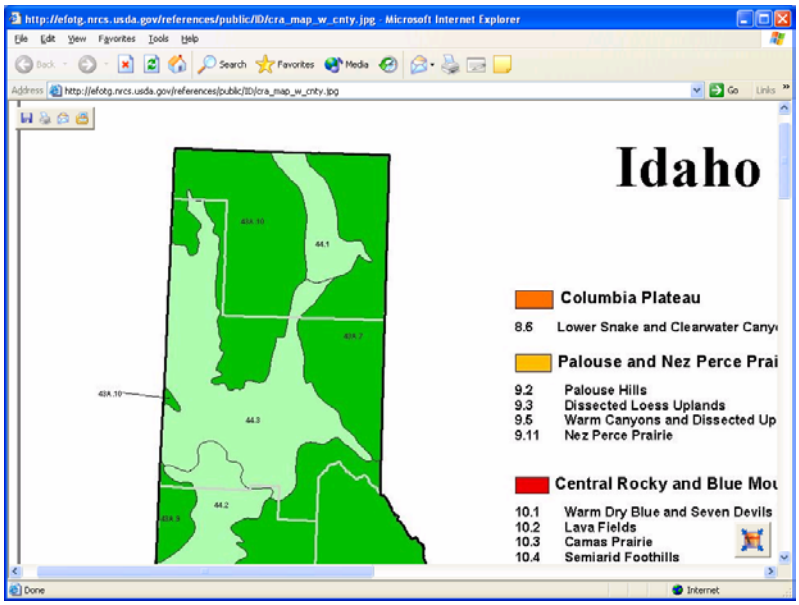
Click on "Section III."

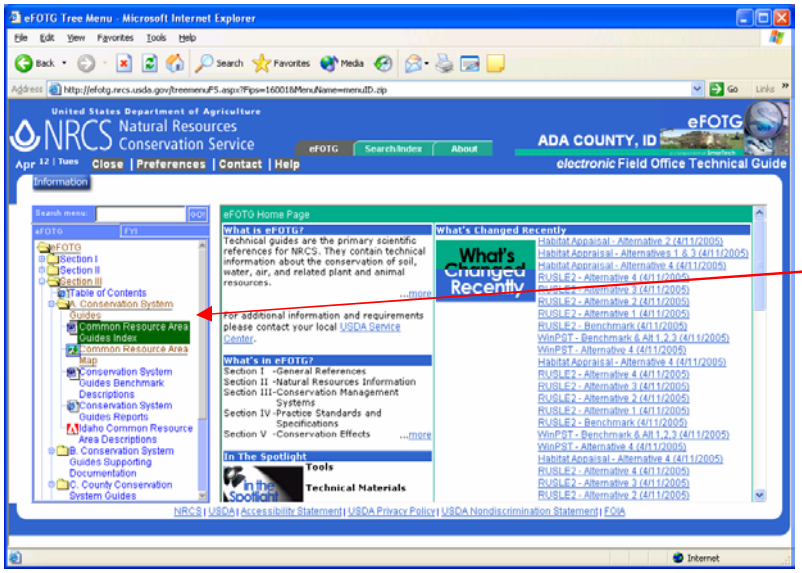
2. The Table of Contents section of eFOTG is displayed. Select Section A "Conservation System Guides".



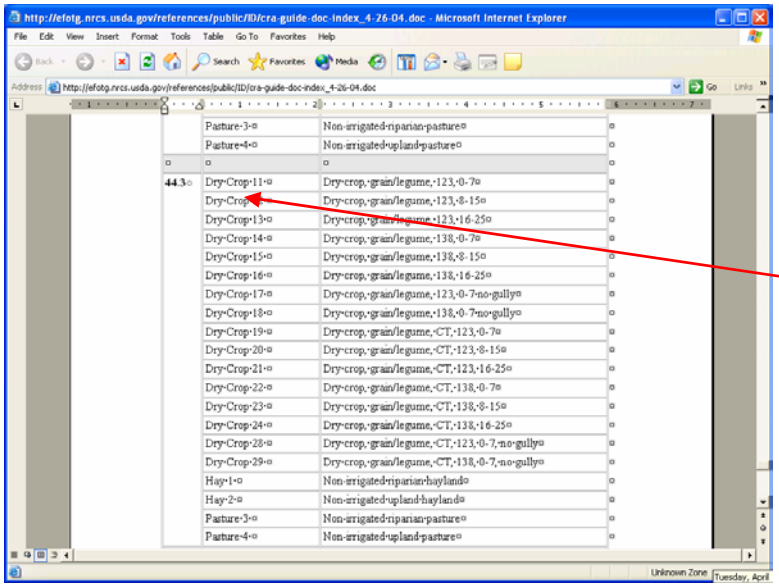
Select A: "Conservation System Guides."

3. The “Conservation System Guides” section includes several sections specific to guidance documents. Start by selecting the Common Resource Area Map, locate the county you are working in and identify the Common Resource Area, i.e., CRA 44.3. Close this screen.

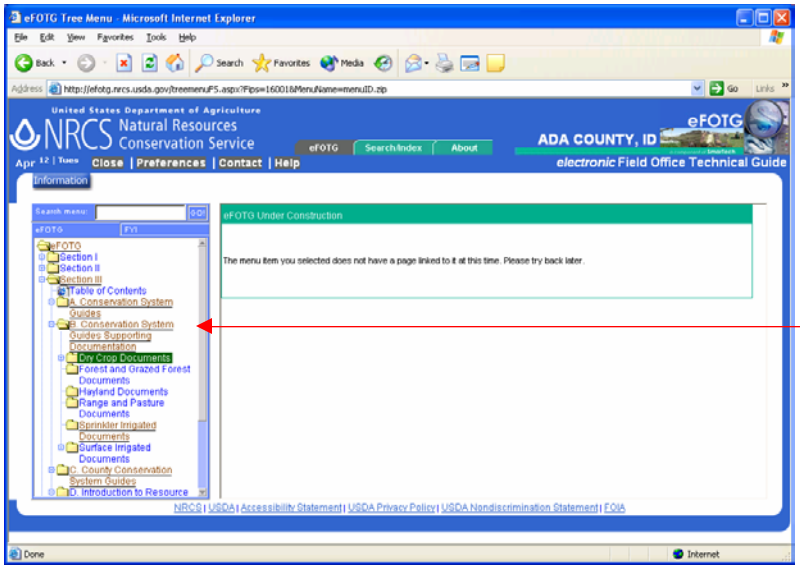




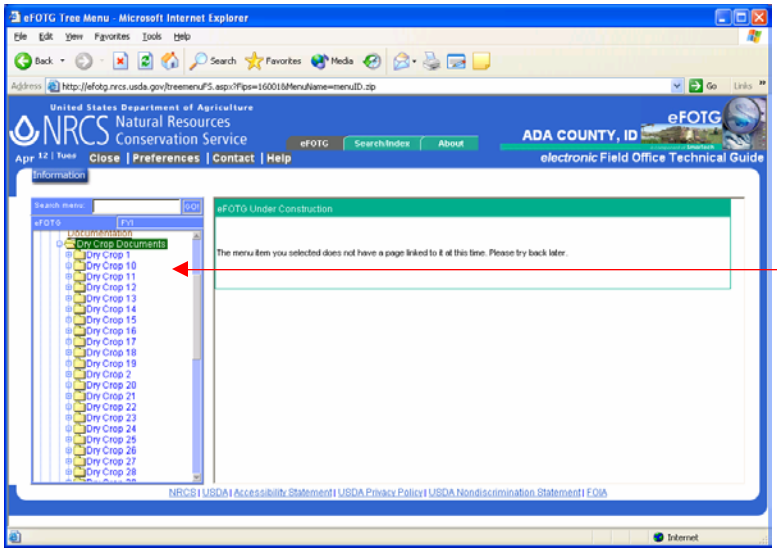
Click on “Common Resource Area Conservation Guides Index.”



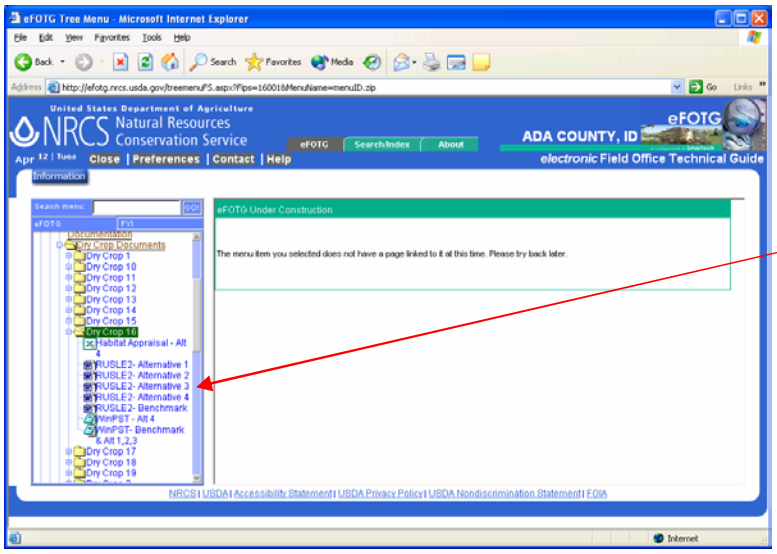
Scroll through the Index to locate the desired "CRA." Review the available guidance documents and choose the one closest to your scenario. Close this screen.



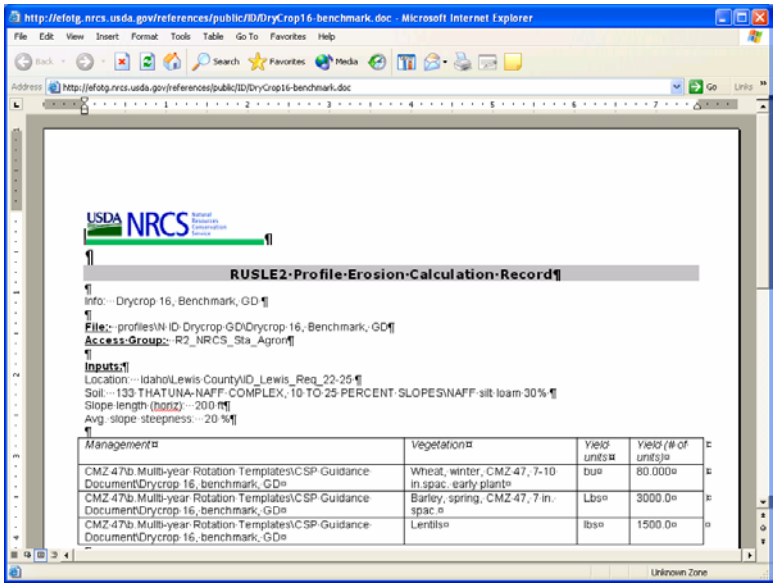
Click on "B: Conservation System Guides Supporting Documentation." The land use selections are displayed. Select the desired land use, i.e., Drycrop.



All the Drycrop guidance documents are displayed. Scroll through the list to locate and select the desired guidance document.



The "Benchmark" and all evaluated alternatives are displayed. Select the desired scenario.



Output from RUSLE2 is displayed for the selected Guidance Document. It can be printed and/or saved.

Once the planner knows which guidance document represents the area being planned, he/she can go to RUSLE2 and locate the mirror file. It can be opened, edited and resaved or used as is.

DEFAULT SLOPE RANGES

Crop Management Zones (CMZ)
&
Common Resource Areas (CRA)

The boundaries for Crop Management Zones (CMZ) used in RUSLE2 and Common Resource Areas (CRA) used to group areas with common resources and treatment needs into Guidance Documents do not overlap perfectly. If one map layer is geospatially laid over the other, they do not match. They were developed by different people at different times for different purposes. Now, they have a common use. Guidance Documents (GD) display evaluations made using RUSLE2 to determine before (benchmark) and after (alternative) effects of applied cropping systems. IN GENERAL, cropland CMZs and CRAs are associated as shown below. When in question, use your best judgment to match a CRA to a CMZ when selecting crop rotations for evaluation in RUSLE2.

CMZ	CRA
10	11.3, 11.4, 13.1
11	10.4, 10.3, 10.7, 11.1, 11.4, 11.5, 11.6, 11.7, 11.8, 25.6
25	25.1, 25.5
27	13.6, 13.6, 47.2
35	13.4, 13.6, 28A.3, 28A.5
46	44.1, 44.2, 44.3
47	9.2, 9.11, 43A.1, 43A.3, 43A.4, 43A.8, , 43C.8, 8.6
50	9.3
55	10.3, 43B.5, 43B.7
68	12.1, 12.2

Default % Slope (S), and Length of Slope (L) for RUSLE2 Calculations

The following slope range and length of slope applies to CMZs 10, 11, 25, 27, 35, 46, 55 and 68.

Slope Range - %	Length of Slope - Ft
0 – 2	450
3 - 5	425
6 - 10	300
11 – 15	275
16 – 20	225
21 – 25	175
26 – 35	150
36 – 45	125

The following slope range and length of slope applies to CMZs 47 and 50 (North Idaho Palouse and Prairie).

Slope Range - %	Length of Slope - Ft
2 – 5	350
6 – 10	275
11 – 15	225
16 – 20	175
21 – 25	150
26 – 35	125
36 – 45	100

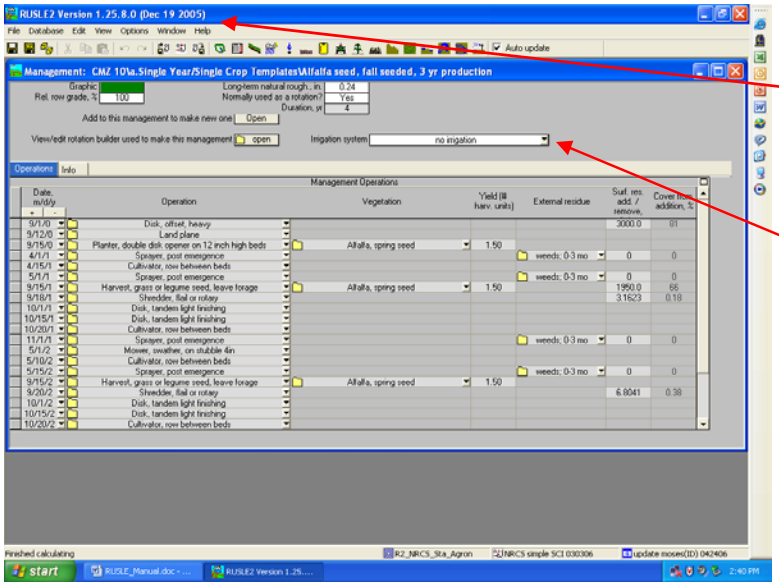
IRRIGATION WATER INPUT

Examine Irrigation

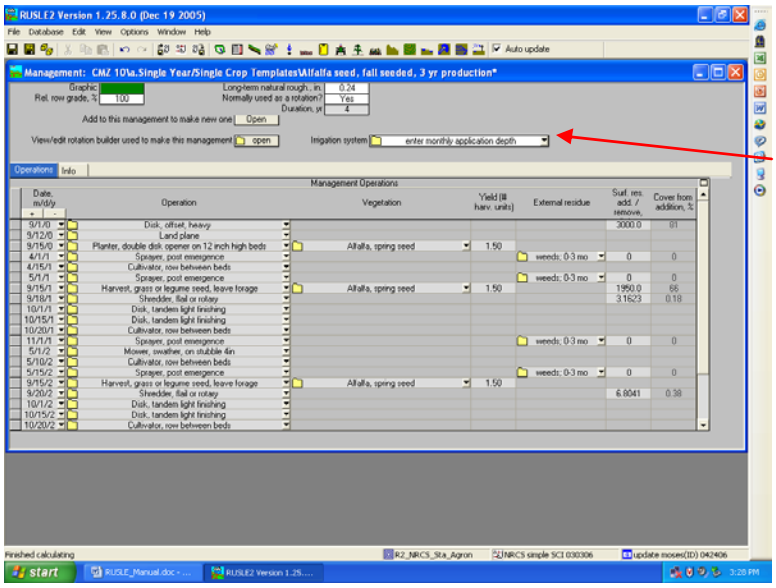
RUSLE2 accounts for the decomposition of biomass during the irrigation season on irrigated cropland and adjusts the Soil Condition Index to reflect that change. "Monthly application depth" values have been generated using the Irrigation Water Requirements program and data from the NATIONAL ENGINEERING HANDBOOK, Part 652 - IRRIGATION GUIDE. If the unit being evaluated is irrigated, then:

1. Use the map included in this section to identify the Climatic Area that you are working in. Locate that table in the attached material. For purposes of residue decomposition in RUSLE2, the same values are used for Climatic Areas I and II.
2. In each climatic area there are 5 scenarios:
    a. Benchmark Surface Irrigation without irrigation water management (IWM).
    b. Improved Surface Irrigation which meets quality criteria for IWM.
    c. Improved Surface Irrigation with a surge or border irrigation system which also meets quality criteria for IWM.
    d. Sprinkler wheelline or handline systems which meet quality criteria.
    e. Sprinkler center pivot system which meets quality criteria.

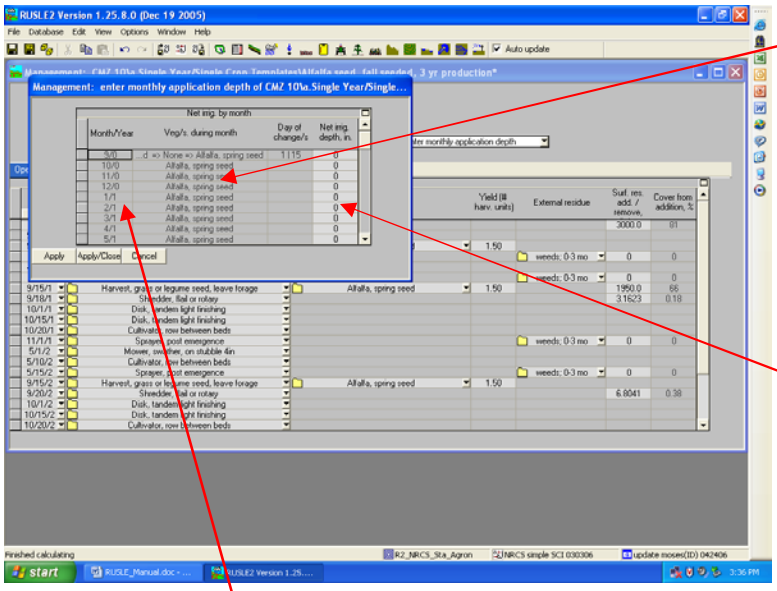
Where To Input Irrigation Data. Irrigation data is entered in the "Single Crop Year or the Multi-yr Crop Year Management screens.



How to input this data. Reference Irrigated Cropland Training Exercise 3, step 19 for this specific exercise.



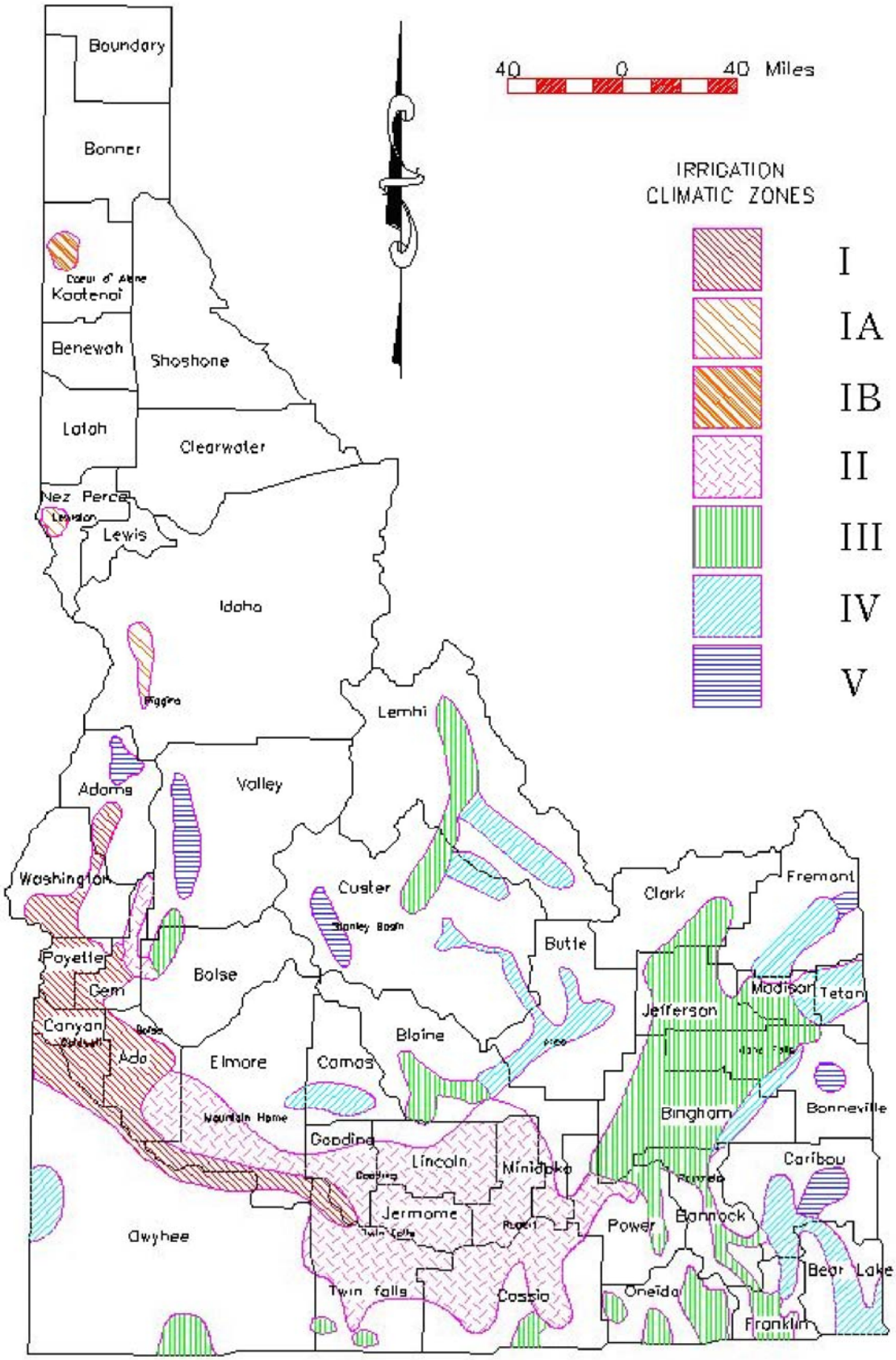
Enter Irrigation Data here. Begin by clicking on the drop down menu and selecting "Enter Monthly Application Depth."



Each crop in the rotation is displayed.

Locate the appropriate input value from the tables below, scroll down the list and locate the appropriate month and crop, and then input the irrigation value.

Each month for each crop is listed. Scroll to the month when irrigation water is applied.


40 0 40 Miles
IRRIGATION
CLIMATIC ZONES
I
IA
IB
II
III
IV
V
Boundary
Bonner
Kootenai
Benewah
Shoshone
Latah
Clearwater
Nez Perce
Lewis
Idaho
Lemhi
Adams
Valley
Washington
Custer
Clark
Fremont
Payette
Gem
Boise
Butte
Madison
Teton
Canyon
Ada
Elmore
Camas
Blaine
Jefferson
Bingham
Bonneville
Caribou
Gooding
Lincoln
Minidoka
Jerome
Power
Bannock
Owyhee
Twin falls
Cassia
Oneida
Bear Lake
Franklin

IRRIGATED CROPLAND, IRRIGATION WATER DISTRIBUTION FOR RUSLE2, SCI

Climatic Area I

Irrigation System	Crop	April	May	June	July	August	Sept	Sum	Gross	Infil
Bench Mark	Alfalfa	3.0	7.8	11.0	13.8	11.2	6.6	53.4	81.0	56.7
Surface Irrigation	Alf Seed	3.0	7.8	11.0	6.0			27.8	40.0	28
35% Irrig Effic	Hops	1.7	5.0	7.8	10.3	9.1		33.9	48.6	34.02
Approx 30% runoff	Beans		2.0	6.9	14.0	10.6		33.5	49.0	34.3
	Corn		4.0	6.0	13.0	12.0	3.0	38	56.0	39.2
	Mint	3.0	7.8	11.0	13.5	10.0		45.3	66.0	46.2
	Onions	1.0	5.0	8.0	12.2	8.9		35.1	51.0	35.7
	Pasture	4.0	6.0	8.9	11.8	9.0	5.0	44.7	70.0	49
	Potatoes		3.0	9.0	15.0	14.0	2.0	43	63.0	44.1
	Sm Grain	4.0	10.2	13.0	5.0			32.2	46.0	32.2
	Sugar Beet	2.0	3.6	9.0	15.7	14.0	6.0	50.3	75.0	52.5
	Truck Gar		4.7	11.5	15.5	2.5		34.2	51.0	35.7
Improved Surface	Alfalfa	3.0	6.4	9.0	12.0	11.0	5.0	46.4	66.5	46.55
Meets Quality	Alf Seed	3.0	6.4	9.0	5.0			23.4	32.8	22.96
Criteria	Hops	1.3	4.0	6.5	8.5	7.4		27.7	39.6	27.72
43% Irrig Effic	Beans		1.5	6.0	11.4	9.0		27.9	39.6	27.72
Approx 30% runoff	Corn		3.5	4.5	10.5	10.0	3.0	31.5	45.3	31.71
	Mint	2.6	6.3	9.1	10.9	7.8		36.7	54.2	37.94
	Onions	1.0	4.5	7.0	9.8	7.0		29.3	41.9	29.33
	Pasture	4.0	5.0	7.5	9.6	8.9	4.8	39.8	57.1	39.97
	Potatoes		2.5	7.0	13.2	13.0	2.0	37.7	51.2	35.84
	Sm Grain	4.0	10.2	13.0	5.0			32.2	37.2	26.04
	Sugar Beet	2.0	3.2	8.0	11.9	11.2	5.5	41.8	60.9	42.63
	Truck Gar		4.3	9.3	13.6	2.3		29.5	41.8	29.26
Improved Surface Surgesystem,	Alfalfa	2.6	5.5	7.5	9.5	8.4	4.4	37.9	47.7	38.16
Border	Alf Seed	2.6	5.5	7.5	3.5			19.1	23.5	18.8
Typical type sys	Hops	1.3	4.0	5.2	6.9	5.3		22.7	28.4	22.72
60% Irrig Effic	Beans		1.5	5.0	9.4	6.9		22.8	28.4	22.72

Approx 20% runoff	Corn		3.5	4.0	8.6	8.0	2.0	26.1	32.5	26
	Mint	2.5	5.5	7.4	8.9	6.4		30.7	38.9	31.12
	Onions	1.0	3.5	5.5	8.1	6.0		24.1	30.0	24
	Pasture	3.5	4.5	6.0	7.8	7.3	3.6	32.7	40.9	32.72
	Potatoes		1.5	5.5	10.8	10.7	2.0	30.5	36.7	29.36
	Sm Grain	3.0	7.0	8.7	2.6			21.3	26.7	21.36
	Sugar Beet	2.0	3.0	6.3	9.7	9.2	4.8	35	43.7	34.96
	Truck Gar		4.0	8.0	11.1	1.0		24.1	30.0	24
Sprinkler	Alfalfa	3.0	6.0	8.6	11.0	9.7	5.0	43.3	52.0	44.2
Wheel/Hand Line	Alf Seed	3.0	6.0	8.6	4.5			22.1	25.6	21.76
Typical type sys	Hops	1.5	4.0	6.0	8.0	6.5		26	30.9	26.265
55% Irrig Effic	Beans		2.0	5.3	10.8	8.0		26.1	30.9	26.265
Approx 15% evap	Corn		3.5	4.5	10.0	9.5	2.6	30.1	35.5	30.175
	Mint	3.0	6.0	8.6	10.4	7.4		35.4	42.4	36.04
	Onions	1.0	3.5	6.2	9.4	6.7	0.9	27.7	32.7	27.795
	Pasture	3.5	5.0	7.0	9.1	8.5	4.6	37.7	44.6	37.91
	Potatoes		1.5	6.0	12.5	12.4	2.0	34.4	40.0	34
	Sm Grain	3.2	7.5	10.0	4.0			24.7	29.1	24.735
	Sugar Beet	2.5	3.5	7.3	11.3	10.7	5.0	40.3	47.6	40.46
	Truck Gar		4.0	9.0	12.9	1.8		27.7	32.7	27.795
Sprinkler Center	Alfalfa	2.0	5.0	7.0	8.0	8.0	4.0	34	39.7	33.745
Pivot/Linear	Alf Seed	2.0	5.0	7.0	3.0			17	19.6	16.66
Typical type sys	Beans		1.0	5.0	8.0	6.0		20	23.6	20.06
72% Irrig Effic	Corn		2.0	4.0	7.7	7.3	2.0	23	27.1	23.035
Approx 15% evap	Mint	2.0	5.0	7.0	8.0	5.5		27.5	32.4	27.54
	Onions	1.0	3.0	5.0	7.0	5.0	0.3	21.3	25.0	21.25
	Pasture	3.0	4.0	6.0	6.9	6.5	2.6	29	34.1	28.985
	Potatoes		1.0	5.5	9.6	9.4	0.5	26	30.6	26.01
	Sm Grain	3.0	7.0	7.7	1.5			19.2	22.2	18.87
	Sugar Beet	1.5	2.5	6.0	8.6	8.0	4.5	31.1	36.4	30.94
	Truck Gar		3.5	7.5	9.8	0.8		21.6	25.0	21.25

IRRIGATED CROPLAND, IRRIGATION WATER DISTRIBUTION FOR RUSLE2, SCI

Climatic Area IA

Irrigation System	Crop	April	May	June	July	August	Sept	Sum	Gross	Infil
Bench Mark	Alfalfa	2.0	8.0	12.0	14.0	12.0	6.0	54	87.0	60.9
Surface Irrigation	Sm Grain	2.5	9.5	11.2	2.0			25.2	36.1	25.27
35% Irrig Effic	Truck Gar		3.0	8.0	11.0	10.0	2.0	34	50.3	35.21
Approx 30% runoff										
Improved Surface	Alfalfa	2.0	7.5	10.1	12.3	11.6	5.0	48.5	70.8	49.56
Meets Quality	Sm Grain	2.5	8.0	9.0	1.0			20.5	29.4	20.58
Criteria	Truck Gar		2.5	7.0	9.1	8.1	1.6	28.3	40.9	28.63
43% Irrig Effic										
Approx 30% runoff										
Sprinkler	Alfalfa	2.0	6.5	9.6	11.7	11.1	5.0	45.9	55.4	47.09
Wheel/Hand Line	Sm Grain	3.2	7.5	10.0	4.0			24.7	23.0	19.55
Typical type sys	Truck Gar		2.5	6.5	8.6	7.7	1.5	26.8	32.0	27.2
55% Irrig Effic										
Approx 15% evap										
Sprinkler	Alfalfa	2.0	5.0	7.0	8.0	8.0	4.0	34	42.3	35.955
Center Pivot/Linear	Sm Grain	3.0	7.0	7.7	1.5			19.2	17.6	14.96
Typical type sys	Truck Gar		2.5	5.0	6.6	5.9	1.0	21	24.4	20.74
72% Irrig Effic										
Approx 15% evap										
Microirrig	Truck Gar		2.2	4.7	6.2	5.6	1.0	19.7	20.7	19.665
85% irrig effic										
5% evap										

IRRIGATED CROPLAND, IRRIGATION WATER DISTRIBUTION FOR RUSLE2, SCI

Climatic Area IB

Irrigation System	Crop	April	May	June	July	August	Sept	Sum	Gross	Infil
Bench Mark	Alfalfa		8.8	9.4	14.0	10.0	3.0	45.2	69.1	48.37
Surface Irrigation	Sm Grain		5.0	12.0	14.0			31	49.8	34.86
35% Irrig Effic	Blue Grass		10.0	10.4	2.0			22.4	34.1	23.87
Approx 30% runoff										
Sprinkler	Alfalfa	0.0	7.0	8.0	10.9	8.3	2.5	36.7	44.0	37.4
Wheel/Hand Line	Sm Grain	0.0	4.5	9.5	11.0			25	31.7	26.945
Typical type sys	Blue Grass		2.5	6.5	8.6	7.7	1.5	26.8	21.7	18.445
55% Irrig Effic										
Approx 15% evap										
Sprinkler	Alfalfa		5.5	6.5	8.3	6.0	2.0	28.3	33.6	28.56
Center										
Pivot/Linear	Sm Grain		3.5	7.5	8.6			19.6	24.2	20.57
Typical type sys	Blue Grass		2.5	5.0	6.6	5.9	1.0	21	16.6	14.11
72% Irrig Effic										
Approx 15% evap										

Climatic Area III

Irrigation System	Crop	April	May	June	July	August	Sept	Sum	Gross	Infil
Bench Mark	Alfalfa		5.0	8.0	11.0	9.5	4.0	37.5	54.3	38.01
Surface Irrigation	Beans			4.5	10.3	8.6	1.5	24.9	35.7	24.99
35% Irrig Effic	Corn		2.0	3.5	8.9	9.6	1.5	25.5	36.6	25.62
Approx 30% runoff	Pasture	2.0	5.0	6.0	9.1	8.1	3.5	33.7	48.3	33.81
	Sm Grain		5.0	9.7	10.0			24.7	37.1	25.97
	Sugar Beet		4.0	7.0	12.0	11.0	4.0	38	54.3	38.01
Improved Surface	Alfalfa		4.5	7.0	9.0	7.5	3.0	31	44.2	30.94
Meets Quality	Beans			3.5	8.5	7.0	1.0	20	29.1	20.37
Criteria	Corn		2.0	3.0	7.5	8.0		20.5	29.8	20.86
43% Irrig Effic	Pasture	2.0	4.0	5.0	7.4	6.6	2.5	27.5	39.3	27.51

Approx 30% runoff	Potatoes		2.0	5.5	11.1	10.0		28.6	41.4	28.98
	Sm Grain		4.5	8.0	8.5			21	30.2	21.14
	Sugar Beet		3.5	6.0	9.6	9.0	3.0	31.1	44.2	30.94
Improved Surface	Alfalfa		3.0	5.0	7.0	6.0	3.0	24	26.0	23.4
Border	Pasture		3.0	4.5	5.5	5.0	3.0	21	22.5	20.25
Typical type sys	Sm Grain		4.0	6.0	5.5			15.5	17.3	15.57
75% Irrig Effic										
Approx 10% runoff										
Sprinkler	Alfalfa		4.0	6.5	8.5	7.4	3.0	29.4	34.5	29.325
Wheel/Hand Line	Beans			3.5	8.0	7.0		18.5	22.7	19.295
Typical type sys	Corn		1.5	3.0	7.0	7.5	1.0	20	23.3	19.805
55% Irrig Effic	Pasture	1.0	3.5	5.0	7.0	6.3	3.5	26.3	30.7	26.095
Approx 15% evap	Potatoes		1.5	4.0	10.5	9.5	2.0	27.5	32.4	27.54
	Sm Grain		4.5	7.5	7.3			19.3	23.6	20.06
	Sugar Beet		3.0	5.0	9.1	8.5	3.7	29.3	34.5	29.325
Sprinkler	Alfalfa		3.0	5.0	6.5	5.6	2.0	22.1	26.4	22.44
Center										
Pivot/Linear	Beans			2.0	6.1	5.1		13.2	17.4	14.79
Typical type sys	Corn		1.0	2.5	6.0	5.6	1.0	16.1	17.8	15.13
72% Irrig Effic	Pasture	4.0	6.0	8.9	11.8	9.0	5.0	44.7	23.5	19.975
Approx 15% evap	Potatoes		1.0	3.5	8.1	7.2	1.0	20.8	24.7	20.995
	Sm Grain	1.0	3.0	6.0	5.6			15.6	18.0	15.3
	Sugar Beet		2.5	4.0	6.9	6.5	2.5	22.4	26.4	22.44

Climatic Area IV and V

Irrigation System	Crop	April	May	June	July	August	Sept	Sum	Gross	Infil
Bench Mark	Alfalfa		4.5	7.0	10.8	8.0	1.5	31.8	45.8	32.06
Surface Irrigation	Pasture		4.0	5.5	9.0	7.5	4.0	30	48.3	33.81
35% Irrig Effic	Sm Grain		3.5	9.7	10.3			23.5	33.3	23.31
Approx 30% runoff										
Improved Surface	Alfalfa		4.0	6.0	8.8	6.5		25.3	37.3	26.11

Meets Quality Criteria	Pasture	3.5	5.0	7.3	6.6	3.0	25.4	39.3	27.51
43% Irrig Effic	Sm Grain	3.0	8.0	8.0			19	27.1	18.97
Approx 30% runoff								29.1	20.37
Improved Surface	Alfalfa	3.0	5.0	8.0	6.2	1.5	23.7	26.7	24.03
Border	Pasture	3.0	4.5	6.0	5.0	3.0	21.5	28.2	25.38
Typical type sys	Sm Grain	3.0	7.0	8.0			18	26.3	23.67
60% Irrig Effic									
Approx 10% runoff									
Sprinkler	Alfalfa	4.0	5.5	8.3	6.0	1.0	24.8	29.1	24.735
Wheel/Hand Line	Pasture	3.0	4.5	7.0	6.0	3.0	23.5	30.7	26.095
Typical type sys	Potatoes	1.5	9.0	9.0	2.0		21.5	28.7	24.395
55% Irrig Effic	Sm Grain	4.5	7.5	7.3			19.3	21.2	18.02
Approx 15% evap									
Sprinkler	Alfalfa	3.0	5.0	6.5	4.0		18.5	22.3	18.955
Center Pivot/Linear	Pasture	3.0	4.0	6.0	4.0		17	23.5	19.975
Typical type sys	Potatoes	1.0	7.0	7.0	1.5	1.0	17.5	21.9	18.615
72% Irrig Effic	Sm Grain	2.0	6.0	6.3			14.3	16.2	13.77
Approx 15% evap									

SOIL LOSS SPREADSHEETS

SOIL LOSS SPREADSHEETS

Three spreadsheets have been "hotlinked" to this manual. They are:

1. B&B Soil removal for SCI: Tree nurseries that use a tree spade to remove trees also physically remove considerable amounts of soil. Use this spreadsheet to determine how many tons per acre of soil are removed when trees are harvested using this method. Enter the average annual value in the Soil Condition Index window where wind and irrigation induced erosion values are entered. Trees are dug from the ground, and then wrapped with burlap, resulting in the name balled and burlap (B&B).

2. Growbag Soil Removal for SCI: Some tree nurseries use a technique called growbag. A burlap bag is placed in the ground and a tree planted in it. At the proper growth stage, the tree is harvested by physically removing the bag.

3. Sod Farming Soil Removal for SCI: When grass sod is harvested, a layer of soil is removed with it. Use this spreadsheet to determine what that loss is.

Using the appropriate spreadsheet or table, determine the soil loss and enter the value in the Soil Condition Index screen where irrigation and/or wind erosion values are entered.

RUSLE2 EXERCISE INDEX

RUSLE2 Exercises

Learning How To Use RUSLE2: Working through the exercises assembled in the next three sections is the best method you have for learning RUSLE2. With few exceptions, the exercises address the major functions you need to know in order to use this program. The following index explains what those exercises cover. There are three sets of exercises:

1. North Idaho Dryland
2. South Idaho Dryland
3. Irrigated Cropland

Training Exercise 1. How to build and save a basic Profile, generate soil erosion and sediment rates, and SCI and STIR output.

Training Exercise 2. How to edit or modify an existing profile.

Training Exercise 3. How to build and save a rotation using "Single Year Crop Templates".

Training Exercise 4. How to edit or modify an existing template by replacing one management scenario (tillage sequence) with another.

Training Exercise 5. How to edit or modify an existing template by substituting tillage practices, adding tillage practices, deleting tillage practices and changing application dates of tillage practices.

Training Exercise 6. How to use the "Worksheet" view of RUSLE2.

Training Exercise 7. How to use the "Plan" view of RUSLE2.

Learning about RUSLE2 Databases.

Training Exercise 8. Understanding the Climate database.

Training Exercise 9. Understanding the Vegetative database.

Training Exercise 10. Understanding the Soils database.

Training Exercise 11. Understanding the Operations database.

Training Exercise 12. Understanding the Residues database.

NORTH IDAHO EXERCISES

RUSLE2
North Idaho Training Exercises

Training Exercise 1

Task: In this exercise, you will calculate soil loss for a single crop on one field. Use the most current NRCS Simple SCI User's Template and the R2_NRCS_Fld Office access level. Use inputs and report output as specified below.

Step-By-Step Procedure:

1. Locate and click on the icon for **Profile** on the icon bar near the top of the RUSLE2 screen.
2. Double-click on the **default** record. You are now in the **Profile** screen.
3. **Location**: Left-click the drop down arrow. Double click on the USA folder and then Idaho. Move through the listing of counties and select **Latah County,** then the **Req record** in the **22"-25"** annual precipitation range.
   - What does "Location" mean? Place the cursor over the word "Location". Note that the cursor changes to a right arrow. Right click. A window appears with several options to select from. Click on "Help." A description of Location is provided. Screens like this are scattered throughout RUSLE2.
   - There are two options to select from, the "R" and "Req." Always select the "Req" option. The number following the Req designation represents the average, annual rainfall for the location being evaluated. Use county PRISM maps to determine rainfall.
   - To see the climate data related to Req 22-25, click on the yellow folder on the left side of the "Location" box.
4. **Soil**: Left click the drop down arrow and select **Latah id710, ID**. Select the map unit component for map unit **16 Joel SILT LOAM, 7-25% PERCENT SLOPES.**
   - When a soil is selected, a sub-window opens below the first line. If the selected soil is a complex, then all the soils in the complex are displayed. Click on the desired soil.
   - RUSLE2 uses the "K" factor for the selected soil when calculating sheet and rill erosion rates. To see the "K" and other factors representing the chosen soil, click on the yellow folder on the left side of the soil selection box.
5. **Topography**: Set the slope length at 275 feet. Set the average slope steepness at 10%. **Reference Section V, "Default Slope Ranges"** in the User Guide.
   - The slope length (L) and % slope (S) is meant to represent the average condition in terms of length of slope and percent slope within a field. There will be areas which are steeper and shorter, and areas which are longer and flatter than the average condition. "L" starts where erosion begins towards the top of a slope and ends where sediment deposition occurs or where concentrated flow begins. "S" represents the average slope, measured in percent, found within "L".

- General Guidance. Reference Section V, "Default Slope Ranges" of this guide. Use the default condition values displayed in that section unless on-site measurements have been made.

6. **Base Management**: Click on the drop down window button at the right side of the entry screen "Base Management." Scroll down the list of "Crop Management Zones" (CMZ) to CMZ 47 and click on it. Click on "Single Year/ Single Crop Templates." Scroll down the list of crops and select "**Wheat, winter, conv., fplow, Z47**."
   - Crop Management Zones (CMZ). Reference the discussion of database organization and use in this user guide.
   - A CMZ is a geographic area in which similar crops are grown and that have similar seeding and harvest dates. They are similar to irrigation climatic zones, MRLA, CRAs, etc.

   View the tillage scenario used in this Base Management. Click on the yellow folder on the left side of the Base Management entry screen. The tillage sequence, date when each operation was performed, and the crop(s) included in the template are displayed.
   - As discussed earlier in the User Guide, Single Year/Single Crop files and Multi-year Crop files are templates. As such, they are protected and can not be overwritten. Users can open a template, edit and save it, but it must be saved to C. Other Local Mgt Records.

   Close this screen and return to the Profile screen.

   Enter the appropriate information in the "Info" block at the bottom center of the screen. Whatever is typed here will appear at the top of the printout, if generated and printed.

   Saving Profiles. The developers of RUSLE2 did not intend that "profiles" be saved. The philosophy was that a Base Management would be opened, edited or used, and that the base management would be saved. All the variables (climate, soils, slope, % slope, etc.) were to be entered into profiles and then output to a word document containing the formatted results of the "run". The word document can be printed and/or saved. Profiles can be saved, but if they are, they should be saved into subfolders created in the profile record. **Reference Section I, Part L of this guide for directions on creating subfolders in RUSLE2.**

   Save this Profile:
   a. File, Save As.
   b. Double click on Co Profile.
   c. Type the desired name in the entry screen at the bottom of the page, overtype "default". Name this file **Latah Co Ex 1**.

Check Output for this Profile:

Soil loss for conservation planning: _____ t/a/y
T value for soil map unit Joel: ____
Surface residue cover after planting with drill (click yellow folder): _____%
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Wheat yield (see Step 4c): _____ bu/ac
Soil Condition Index: _____
STIR: _____

What Does This Information Represent?

- Output from an unedited Single Crop Template, which includes one crop and tillage scenario.

Does it meet the soil resource concern quality criteria?

- Yes. Why?

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Record with SCI.pro.dot to generate a report that can be printed or saved.

Close the Profile.

Training Exercise 2

Task: Using Exercise 1, modify the **Latah Co Ex 1 Profile** just created.

Step-By-Step Procedure:

1. Reopen Latah Co Ex 1 Profile. Place the cursor on the Profile icon and right click. The list of Profile folders will appear.
   - Click on the **Co Profile** folder button. Latah Co Ex 1 file name is displayed. Select it. The Profile with all its data is displayed.
2. **Locate Step 5 on the screen "Contouring"**. Click on the pull down arrow on the right side of the field. The pull down screen displays a list of ascending per cents of slope. Scroll down the list and select "absolute 5%".

   Discussion: Always select "Absolute" row grade versus "Relative Grade". A tillage operation that is performed on the contour is perpendicular to the down slope grade of the field. Row grade represents how far off contour tillage operations are performed.

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

Discussion:
- Why didn't the sediment delivery change?

3. **Locate "Strips/barriers"** immediately below the Contouring button. Click on the pull down button on the right side of the strips/barriers line. Several strips and barriers options are displayed. Select "**Contour Buffer Strips,**" "**Actual Width, 30 feet wide,**" and then "**Cool season grass buffer midslope, 30 feet wide".**
   - What happens? (A warning window appears. The warning cautions the planner that the planned practice is nearing the limits of its effectiveness for the slope defined for the field.)
   - Why? (If a practice like a buffer strip or filter strip is placed on too steep a row grade, runoff from above can collect above the strip, run along it and eventually start eroding a gully.) RUSLE2 cautions the planner when this could happen and, if row grade exceeds the limits of the practice, it will not calculate the erosion rate for the field.

Change Absolute grade to 1%.

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

Save: Save this Profile. Name it **Latah Co Ex 2.**

Discussion:

- Did soil loss change as much as you expected after the buffer strip was added?
- Why do you think it changed this amount?
- Did sediment delivery change from Exercise 1, and if so, why?

Substitute a filter strip at the bottom of the field for the buffer strip at mid slope.

Strips/barriers: Click the pull down button at the right side of the "Strips & Barriers data entry line. Select "**Filter Strips,**" "**Actual Width, 30 feet wide,**" and "**Cool season grass filter**".

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

Discussion:

- Why did the sediment rate for filter strips go down?

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Erosion Calculation Report.

Training Exercise 3

Task: In this exercise you will use the "**Rotation Builder**" to build a 3-year rotation or management system for CMZ 47. Pre-built, single year crop templates are stacked one on top of the other to form multi-year rotations (management systems) using "Rotation Builder."

Step-By-Step Procedure:

1. Open RUSLE2, click on the Profile view using the "**default**" option on the screen. Enter the same location, soil, length of slope and % slope information as used in Exercise 1.
2. Click the yellow folder on the left side of the Base Management entry screen.
3. Click the yellow folder on the left side of the "Rotation builder for this management" line.
4. Click on the drop down arrow on line 1 under **Management** (on the upper part of the rotation builder screen).
5. Double-click on **CMZ 47**.
6. Double-click on the folder **Single Year/Single Crop Templates**.
7. Scroll through the list of crops and locate **Wheat, winter, conv., fplow, Z47.** Double-click on this crop.
8. Click the plus (+) button above line 1 under Man. (for Management). The first line is duplicated.
9. Click on the drop-down arrow on the right side of line 2 under **Management**.
10. Scroll through the list of crops as in step 7. Locate **Barley, spring, conv., fplow, Z47** and double-click on it.
11. Highlight line 2 and click the plus (+) button at the top of the column. Line 2 is duplicated.
12. Click on the drop down arrow on line 3 under **Management**.
13. Scroll through the list of crops and locate **lentils, conv., fplow, Z47** and double-click on it.

Explanation: You have "built" a 3-year rotation by stacking 3 single crop templates one on top of the other. At this point, the templates have not been edited.

14. Click **Apply/close** at the bottom of the screen. The tillage scenario for the rotation just assembled is displayed.
15. **Save this multi-year management system**. At the top of the screen under File, Save As, double click on CMZ47. **IMPORTANT:** Double click "**C. Other Local Mgt. Records.**" Type the name of the rotation in the input cell adjacent to "Name" at the bottom of the screen. Use the name: **Wheat, winter, Barley spring, lentils, conv., fplow CMZ47**, then close the management screen. The program returns to the profile view.
16. **View the tillage sequence**. Click on the yellow folder at the left side of the Base Management entry cell. The tillage sequence for this rotation is displayed. Is it correct? Notice the **Duration, yr** box in the top-center of the screen. It displays

the length of the rotation. How long is this rotation? Is it correct? Close this management screen and return to the "Profile" screen.
IMPORTANT: The program uses default yield values which may or may not reflect actual yields. Click on Step 4c "Adjust yields" to see the default yields used in the management templates. If they are not correct, edit them. For this exercise use:

a. Winter wheat: 80 bu/ac
b. Spring barley: 3500 lbs/ac
c. Lentils: 1500 lbs/ac

17. **Enter the contour (row grade) value**. Click on the Contouring button, scroll down the list and select the "Absolute Row Grade 5%" value.
18. **Save this "profile".** Name it **Latah Co Ex 3.**

Check Output for this Profile:

Click "**Results"** in the lower left hand corner of the screen.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Lentils (click yellow folder): _____ %
Soil Condition Index: Click Soil Conditioning Index: _____
STIR_____

Note: Occasionally the SCI will be displayed as a whole number, i.e., 1 or 2. If this happens, the program has defaulted to displaying the SCI as 1 digit. To change the number of digits displayed, place the cursor over the "Soil Condition Index". The cursor changes to an arrow pointing right. Right click on the mouse. A pull down window appears with several options. Click on "Visible Digits," then click on "Show 2 significant digits".

Click **"Additional Results."**

Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat _____ bu/ac
- Spring Barley _____bu/ac
- Lentils _____bu/ac

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Record with SCI.pro.dot.

Save the document. The output generated is a word file and as such can be saved in several locations including Toolkit.

Training Exercise 4

Task: In this exercise, you will modify the Multi-year management record, **Latah Co Ex 3**, just created. The file will be modified by replacing the conventional tillage systems for each crop with a medium residue crop scenario.

Step-By-Step Procedure:

1. With the Profile view open for Exercise 3, click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation. Click the box that says **Open** to the right of the heading "**Rotation builder for this management.**"
2. Click on the drop down arrow on line 1 under **Management**.
3. Move the cursor and double click on **Wheat, winter, medium residue, fdisk.**
4. **Repeat step 3 for the spring barley and the lentils.**
5. Click the **Apply/Close** button in the lower-left corner of the screen.
6. **Save this file**. Click the **File**, **Save As** icon in the upper-left of the RUSLE2 screen (or click File, Save As).
7. Check to make sure you are in folder **C. Other Local Mgt Records**.
8. Name this rotation in the box at the bottom **Wheat, winter, Barley, spring, Lentils medium residue, fdisk.**

Discussion:

- What other names could you use here?

9. Close this screen and return to the "Profile" screen. **IMPORTANT:** The original template was modified by substituting one management scenario for another. By doing that, the program defaults to the original default yields used in the template. Click on Step 4c "Adjust yields" and enter the appropriate yields. For this exercise use:
    a. Winter wheat: 80 bu/ac
    b. Spring barley: 3500 lbs/ac
    c. Lentils: 1500 lbs/ac
10. No other factors change in the "Profile" screen.

Check Output for this Profile:

Click on "**Results**" tab.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Lentils (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat_____ bu/ac
- Spring Barley _____bu/ac
- Lentils: _____bu/ac

Soil Condition Index: _____ STIR _____

Printing: As in previous exercises, the output can be printed or saved.

Training Exercise 5

Task: In this exercise, you will again modify the Management record you created in Exercise 4, but this time you will substitute tillage operations in the tillage scenario with other operations, add a tillage operation and delete an operation.

Step-By-Step Procedure:

1. With the Profile view open for Exercise 4, click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation.
2. **Substitute a practice**. The first operation displayed in the tillage scenario is "Disk Offset Heavy." The operation date is 9/5/0. Click on the pull down tab to the right of the operation. Scroll down the list of operations and locate the "chisel, st.pt 12 inch." Double click on this operation. The chisel is substituted for the heavy disk.
3. **Delete a practice**. Immediately below the chisel operation are two cultivator operations. Click on the date of the first operation. Click on the minus button (-) at the top of the column. The operation is deleted.
4. Repeat the process to delete the second cultivator operation.
5. **Add a practice**. Scroll down the list of operations and locate the date 4/26/3 which is associated with the practice "cultipacker, roller." Click on that date. Click on the plus sign (+) at the top of the column. The cultipacker line is duplicated. Click the pull down button to the right of the second cultipacker operation. Scroll through the list of operations and locate the practice **Fert applic. Surface broadcast.**" Double click on it. The cultipacker operation is replaced with the fertilizer operation. **IMPORTANT:** Change the date of the broadcast operation to at least **one day after** the previous operation date.

   Discuss dates in the tillage sequence.

6. **Saving:** Should you save the record?
   - Save this edited tillage scenario as with other records saved. Click File, Save As, and make sure you are in the **C. Other Local Mgt Records** folder. Type in the desired name and save.
7. Close the "Management" screen. **IMPORTANT:** If you did not save the file as outlined in step 6 above, you will be asked if you want to save this management to "**C. Other local Mgt Records**" and over write the existing file. If you want to do this, press Y; if not, press N.

Check Output for this Profile:

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Lentils (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat_____ bu/ac
- Spring Barley_____bu/ac
- Lentils _____bu/ac

Soil Condition Index: _____
STIR _____

Print this record if desired.

Close the Profile.

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 hillslope (or same field). Follow the steps below to calculate erosion for three alternative management systems.

Step-By-Step Procedure:

1. Locate and click on the Worksheet icon on the icon bar near the top of the RUSLE2 screen.
2. Double-click on the default record. You are now in the Worksheet screen.
3. Make the following inputs at the top of the screen: **Tract 1224**, Owner name: **John Pedon**, Field: **1**.
4. Type any pertinent information in the information block. It is suggested that a short explanation of the rotation, tillage scenario, type of systems evaluated, etc. be entered.
5. Click the drop down arrow in the box for Location.
6. Double click the **USA** folder.
7. Double click the **Idaho** folder.
8. Double click **NezPerce County.**
9. Double click **ID_NezPerce_Req_20-22.**
10. Click the drop down arrow in the box for Soil.
11. Double click the **NezPerce id 611, ID** folder.
12. Click the plus (+) button to the right of the folder for unit **101 Oliphant silt loam 8-20.**
13. Double click the map unit component, **Oliphant silt loam 85% SILT LOAM, 90%.**
14. Enter **slope length: 200; slope steepness: 10%**.
15. Click the **Save As** icon. Name this Worksheet **NezPerce Co ID Ex 6.**
16. Click the drop down arrow under **Management** on the line near the bottom of the screen.
17. Double click on **CMZ 47.**
18. Double click on the folder **C. Other Local Mgt Records.**
19. Double click on **Wheat, winter, Barley spring, lentils, conv. fplow.**
20. Use the slider bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **Conventional System**. Click **OK**.
21. Move the display back to the left side of the screen with the slide bar.
22. Click the plus (+) button under **Temp. scenario** on the left of the screen.
23. Click the drop down arrow under **Management** on the second line.
24. Double click on **Wheat, winter, Barley spring, lentils, medium residue, fdisk, CMZ47.**
25. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **medium residue 3 yr rotation**. Click **OK**.
26. Click the plus (+) button under **Temp. scenario** on the left of the screen.
27. Click the drop down arrow under **Management** on the second line.
28. Double click on **Wheat, winter, Barley spring, lentils NT, CMZ47.**

29. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **No-Till System**. Click **OK**.
30. **Enter the Contouring row grade value**. Under the column heading Contouring, click the pull down menu for each crop, scroll down to **"5% absolute row grade"** and select.

Save your Worksheet as **NezPerce Co, Ex 6**.

Results:

- **Soil loss:**
  - Conservation planning, Conventual system: _____ t/a/y
  - Conservation planning, Medium Residue System _____ t/a/y
  - Conservation planning, NT: _____ t/a/y
- **Soil Condition Index:**
  - Conservation planning, Conventual system: _____
  - Conservation planning, Medium Residue System _____
  - Conservation planning, NT: _____

Print to MS Word Template. Click on File, NRCS RUSLE2 Worksheet Calculation Record.

Close this view.

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 hillslopes (2 or more fields) on the same farm (location). Follow the steps below to calculate erosion for three alternative management systems on two different fields (hillslopes).

Step-By-Step Procedure:

1. Locate and click on the icon for **Plan** on the icon bar near the top of the RUSLE2 screen.
2. Double click on the **default** record. You are now in the **Plan** screen.
3. Input Owner name: **John Pedon**.
4. Click the drop down arrow in the box for Location.
5. Double click the **USA** folder.
6. Double click the **Idaho** folder.
7. Double click **NezPerce County**.
8. Double click **ID_NezPerce_Req_20-22**.
9. Click the **Save As** icon at the top of the RUSLE2 screen. Name this **NezPerce Co ID Ex 7**.
10. **Under the heading "Compare Field Alternatives,"** right-click on the title "Worksheet". In the pop-up box, click on **Load from file**.
11. Double click on the record, **NezPerce Co ID Ex 6**.
12. Click the plus (+) button under **Field** on the left side of the screen. A second Worksheet line appears.
13. Click the yellow tab for the **Worksheet** on line 2.
14. Locate the **Field Name** data entry box near the top left of the screen. Enter **2** (for field 2) in the field name data entry cell.
15. Click the drop down arrow in the box for **Soil**.
16. Move the cursor to map unit **119 Southwick-Blue Spring Complex** and select map unit component **Southwick Silt loam 50%.**
17. Enter a **Slope length: 200**, and **average slope steepness of 16**.
18. Close the Worksheet screen by clicking the **X** in the upper-right corner.
19. Resave this Plan as **NezPerce Co ID 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

View Printout Options.

Training Exercise 8

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

- Locate the **Climate** icon and click to open it.
- Open the folders and records in this order: **USA, Idaho, Lewis County**.
- Open the record **ID_Lewis_Req_20-22**.

What is the value for **Req**? _____ What is the highest monthly ppt?: ____

What is the highest **ed** (erosivity density) value? ____

- Place the cursor over the heading "Eros. Density, US eros./in." and left click. The column is highlighted. Right click and a drop down window appears. Click on Graph.

What 4 months have the highest **ed** (erosivity density) ? ____ ____ ____ ___

- Click the **Climate** icon, open the **ID_Lewis_R_16-18**, and position this record alongside the **ID_Power_Req_20-22** record.

In the **ID_Lewis_R_16-18** record, what is the **R Factor** value? _____

What is the highest **ed** (erosivity density) value? ____

What 4 months have the highest **ed** (erosivity density)? ____ ____ ____ ___

- Click the **daily** tab in both records.
- Right-click on the heading **Daily EI Used**.
- Click **graph** on the pop-up box.
- Move the graphs so they are adjacent to one other.

Circle the correct answer below:
In the R record, erosivity is greatest in the (summer/winter).
In the Req record, erosivity is greatest in the (summer/winter).

What do these graphs represent? _____

Training Exercise 9

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 **Wheat, winter, CMZ 47, 10 in. spac. early plant**.
What is the yield of this record? _____ bu/ac

What is the above-ground biomass, in lb/ac, at maximum canopy? _____

On what day (day after planting) does maximum canopy first occur? _____

Graph the **root mass in top 4 inches** and the **Canopy cover**.

Are these graphs similar? _____.

How does their seasonal growth differ?

Close all Vegetation windows.

Training Exercise 10

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

Locate the Soils icon and click to open it. **Open Lewis 611, ID**.

Locate and select the map unit **101 Oliphant silt loam 8 to 20% slopes,** then map unit component **Oliphant silt loam 85%**.

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? _____

What is "**Fall Velocity**"? Place the cursor over "Fall Velocity", right click, and then click on **Help**.

Training Exercise 11

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, heavy, direct seed, dbl disk opnr**.

Click the yellow tab by **Process: Flatten standing residues**.

What fraction of standing wheat straw is flattened by this operation? ____

Click **cancel** to close this window.

Click the yellow tab 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 wheat residue buried by this operation? _____

What is the fraction of buried wheat residue resurfaced by this operation? _____

Close all windows for this Operation.

What is "**Random Roughness**"? Place the cursor over "Fall Velocity", right-click, and then click on **Help**. Print the document. Move the cursor to any location in the text and right-click, select "**Print.**"

Training Exercise 12

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

Locate the icon for **Residues** and click to open it.

Click on the folder **NWRR**.

Select the record for **barley, straw, spring, NWRR**.

This residue responds to tillage like (fill in) _____

What is this residue's half-life? _____

What is the mass at 30% cover? _____

What is the mass at 60% cover? _____

What is the mass at 90% cover? _____

SOUTH IDAHO EXERCISES

RUSLE2
South Idaho Dryland Training Exercises

Training Exercise 1

Task: In this exercise, you will calculate soil loss for a single crop on one field. Use the most current NRCS Simple SCI User's Template, and the R2_NRCS_Fld Office access level. Use inputs and report output as specified below.

Step-By-Step Procedure:

1. Locate and click on the icon for **Profile** on the icon bar near the top of the RUSLE2 screen
2. Double-click on the **default** record. You are now in the **Profile** screen.
3. **Location:** Left-click the drop down arrow. Double click on the USA folder and then Idaho. Move through the listing of counties and select **Power County,** then the **Req record** in the **14"** annual precipitation range.
   - What does "Location" mean? Place the cursor over the word "Location". Note that the cursor changes to a right arrow. Right click. A window appears with several options to select from. Click on "Help". A description of Location is provided. Screens like this are scattered throughout RUSLE2.
   - There are two options to select from, the "R" and "Req." Always select the "Req" option. The number following the Req designation represents the average, annual inches of rainfall for the location being evaluated. Use county PRISM maps to determine rainfall.
   - To see the climate data related to Req 14, click on the yellow folder on the left side of the "Location" box.
4. **Soil**: Left-click the drop down arrow and select **Power id710, ID**. Select the map unit component for map unit **PvD Pocatello Silt Loam 8-12 % slopes**.
   - When a soil is selected, a sub-window opens below the first line. If the selected soil is a complex, then all the soils in the complex are displayed. Click on the desired soil.
   - RUSLE2 uses the "K" factor for the selected soil when calculating sheet and rill erosion rates. To see the K factor and other factors representing the chosen soil, click on the yellow folder on the left side of the soil selection box.
5. **Topography**: Set the slope length at 300 feet. Set the average slope steepness at 10%. **Reference Section V, "Default Slope Ranges"** in the User Guide.
   - The slope length (L) and % slope (S) is meant to represent the average condition in terms of length of slope and percent slope within a field. There will be areas which are steeper and shorter, and areas which are longer and flatter than the average condition. "L" starts where erosion begins towards the top of a slope and ends where sediment deposition occurs or where concentrated flow begins. "S" represents the average slope, measured in percent, found within "L".

- General Guidance. Reference Section V, "Default Slope Ranges" of this guide. Use the default condition values displayed in that section unless on-site measurements have been made.

6. **Base Management**: Click on the drop down window button at the right side of the entry screen "Base Management." Scroll down the list of "Crop Management Zones" (CMZ) to CMZ 10 and click on it. Click on "Single Year/ Single Crop Templates." Scroll down the list of crops and select "**Wheat, winter, conv., fplow, Z10**."
   - Crop Management Zones (CMZ): Reference the discussion of database organization and use in this user guide.
   - A CMZ is a geographic area in which similar crops are grown and that have similar seeding and harvest dates. They are similar to irrigation climatic zones, MRLA, CRAs etc.

   View the tillage scenario used in this Base Management. Click on the yellow folder on the left side of the Base Management entry screen. The tillage sequence, date when each operation was performed and the crop(s) included in the template are displayed.
   - As discussed earlier in the User Guide, Single Year/Single Crop files and Multi-year Crop files are templates. As such, they are protected and can not be overwritten. Users can open a template, edit and save it, but it must be saved to C. Other Local Mgt Records.

   Close this screen and return to the Profile screen.

   Enter the appropriate information in the "Info" block at the bottom center of the screen. Whatever is typed here will appear at the top of the printout if it is generated and printed.

   Saving Profiles. The developers of RUSLE2 did not intend that "profiles" be saved. The philosophy was that a Base Management was to be opened, edited or used, and that the base management would be saved. All the variables (climate, soils, slope, % slope, etc.) were to be entered into profiles and then output to a word document containing the formatted results of the "run". The word document can be printed and/or saved. Profiles can be saved, but if they are, they should be saved into subfolders created in the profile record. **Reference Section I, Part L of this guide for directions on creating subfolders in RUSLE2.**

   Save this Profile:
   a. File, Save As.
   b. Double click on Co Profile.
   c. Type the desired name in the entry screen at the bottom of the page, overtype "default". Name this file **Power Co Ex 1**.

Check Output for this Profile:

Soil loss for conservation planning: _____ t/a/y
T value for soil map unit: ____
Surface residue cover after planting with drill (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Wheat yield (see Step 4c): _____ bu/ac
Soil Condition Index: _____
STIR: _____

What Does This Information Represent?

- Output from an unedited Single Crop Template, which includes one crop and tillage scenario.

Does it meet the soil resource concern quality criteria?

- Yes. Why?

Print to MS Word Template: Click on File, click NRCS RUSLE2 Profile Record with SCI.pro.dot to generate a report that can be printed or saved.

Close the Profile.

Training Exercise 2

Task: Using Exercise 1, modify the **Power Co Ex 1 Profile** just created.

Step-By-Step Procedure:

1. Reopen Power Co Ex 1 Profile. Place the cursor on the Profile icon and right click. The list of Profile folders will appear.
   - Click on the **Co Profile** folder button. Power Co Ex 1 file name is displayed. Select it. The Profile with all its data is displayed.
2. **Locate Step 5 on the screen "Contouring"**. Click on the pull down arrow on the right side of the field. The pull down screen displays a list of ascending per cents of slope. Scroll down the list and select "absolute 5%."

   Discussion: Always select "Absolute" row grade versus "Relative Grade". A tillage operation that is performed on the contour is perpendicular to the down slope grade of the field. Row grade represents how far off contour tillage operations are performed

Output:
Soil loss for conservation planning: _____ t/ac/y
Sediment Delivery: _____ t/a/y

Discussion:
- Why didn't the sediment delivery change?

3. **Locate "Strips/barriers"** immediately below the Contouring button. Click on the pull down button on the right side of the strips/barriers line. Several strips and barriers options are displayed. Select "**Contour Buffer Strips,**" "**Actual Width, 30 feet wide,"** and then "**Cool season grass buffer midslope, 30 feet wide"**.
   - What happens? (A warning window appears. The warning cautions the planner that the planned practice is nearing the limits of its effectiveness for the slope defined for the field.)
   - Why? (If a practice like a buffer strip or filter strip is placed on too steep a row grade, runoff from above can collect above the strip, run along it and eventually start eroding a gully.) RUSLE2 cautions the planner when this could happen, and if row grade exceeds the limits of the practice it will not calculate the erosion rate for the field.

Change Absolute grade to 1%.

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

Save: Save this Profile. Name it **Power Co Ex 2**.

Discussion:

- Did soil loss change as much as you expected after the buffer strip was added?
- Why do you think it changed this amount?
- Did sediment delivery change from Exercise 1, and if so, why?

Substitute a filter strip at the bottom of the field for the buffer strip at mid slope.

Strips/barriers: Click the pull down button at the right side of the "Strips & Barriers data entry line. (Turns off the buffer strip). Click **None** at the top of the pull down screen. Select "**Filter Strips**," "**Actual Width, 30 feet wide**," and "**Cool season grass filter**".

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

Discussion:

- Why did the sediment rate for filter strips go down?

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Erosion Calculation Report.

Training Exercise 3

Task: In this exercise you will use the "**Rotation Builder**" to build a 3-year rotation or management system for CMZ 10. Pre-built, single year crop templates are stacked one on top of the other to form multi-year rotations (management systems) using "Rotation Builder".

Step-By-Step Procedure:

1. Open RUSLE2, click on the Profile view using the "**default**" option on the screen. Enter the same location, soil, length of slope and % slope information as used in Exercise 1.
2. Click the yellow folder on the left side of the Base Management entry screen.
3. Click the yellow folder on the left side of the "Rotation builder for this management" line.
4. Click on the drop down arrow on line 1 under **Management** (on the upper part of the rotation builder screen).
5. Double-click on **CMZ 10**.
6. Double-click on the folder **Single Year/Single Crop Templates**.
7. Scroll through the list of crops and locate **Wheat, winter, conv., fplow, Z10**. Double-click on this crop.
8. Click the plus (+) button above line 1 under Man. (for Management). The first line is duplicated.
9. Click on the drop down arrow on the right side of line 2 under **Management**.
10. Scroll through the list of crops as in step 7, locate **Barley, spring, conv., fplow, Z10** and double-click on it.
11. Highlight line 2 and click the plus (+) button at the top of the column. Line 2 is duplicated.
12. Click on the drop down arrow on line 3 under **Management**.
13. Scroll through the list of crops and locate "**Fallow, black fdisk, Z10** and double-click on it.

Explanation: You have "built" a 3-year rotation by stacking 3 single crop templates one on top of the other. At this point, the templates have not been edited.

14. Click **Apply/close** at the bottom of the screen. The tillage scenario for the rotation just assembled is displayed.
15. **Save this multi-year management system**. At the top of the screen under File, Save As, double click on CMZ10. **IMPORTANT:** Double click **C. Other Local Mgt. Records**. Type the name of the rotation in the input cell adjacent "Name" at the bottom of the screen. Use the name **Wheat, winter, Barley spring, Fallow, black, fdisk CMZ10,** then close the management screen. The program returns to the profile view.
16. **View the tillage sequence**. Click on the yellow folder at the left side of the Base Management entry cell. The tillage sequence for this rotation is displayed. Is it correct? Notice the **Duration, yr** box in top-center of screen. It displays the

length of the rotation. How long is this rotation? Is it correct? Close this management screen, returning to the "Profile" screen.

IMPORTANT: The program uses default yield values which may or may not reflect actual yields. Click on Step 4c "Adjust yields" to see the default yields used in the management templates. If they are not correct, edit them. For this exercise use:

a. Winter wheat: 35 bu/ac
b. Spring barley: 3000 lbs/ac

17. **Enter the contour (row grade) value**. Click on contouring button, scroll down the list and select the "**Absolute row grade 5% value**".
18. **Save this "profile".** Name it **Power Co Ex 3.**

Check Output for this Profile:

Click "**Results"** in the lower left hand corner of the screen.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Winter wheat (click yellow folder): _____ %
Soil Condition Index: Click Soil Conditioning Index: _____
STIR: _____

Note: Occasionally the SCI will be displayed as a whole number, i.e., 1 or 2. If this happens, the program has defaulted to displaying the SCI as 1 digit. To change the number of digits displayed, place the cursor over the "Soil Condition Index". The cursor changes to an arrow pointing right. Right click on the mouse. A pull down window appears with several options. Click on "Visible Digits," then click on "Show 2 significant digits".

Click **"Additional Results."**

Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):
Wheat _____ bu/ac
Spring barley _____bu/ac

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Record with SCI.pro.dot.

Save the document. The output generated is a word file and as such can be saved in several locations including Toolkit.

Training Exercise 4

Task: In this exercise, you will modify the Multi-year management record, **Power Co Ex 3**, just created. The file will be modified by replacing the conventional tillage systems for each crop with a medium residue crop scenario.

Step-By-Step Procedure:

1. With the Profile view open for Exercise 3, click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation. Click the box that says **Open** to the right of the heading, "**Rotation builder for this management.**"
2. Click on the drop down arrow on line 1 under **Management**.
3. Move the cursor and double click on **Wheat, winter, medium residue, fdisk**.
4. Repeat step 3 for the **Barley, spring** and select **Fallow, chem** for the summer fallow year.
5. Click the **Apply/Close** button in the lower-left corner of the screen.
6. **Save this file**. Click the **File**, **Save As** icon in the upper-left of the RUSLE2 screen (or click File, Save As).
7. Check to make sure you are in folder **C. Other Local Mgt Records**.
8. Name this rotation in the box at the bottom **Wheat, winter, Barley, spring, Fallow, chem.CMZ10**.

Discussion:

- What other names could you use here?

9. Close this screen and return to the "Profile" screen. **IMPORTANT:** The original template was modified by substituting one management scenario for another. By doing that, the program defaults to the original default yields used in the template. Click on Step 4c "Adjust yields" and enter the appropriate yields. For this exercise use:
    1. Winter wheat: 35 bu/ac
    2. Spring barley: 3000 lbs/ac
10. No other factors change in the "Profile" screen.

Check Output for this Profile:

Click on "**Results**" tab.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Wheat, winter (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat: _____ bu/ac
- Spring barley: bu/ac
- Lentils: _____bu/ac

Soil Condition Index: _____ STIR: _____

Printing: As in the previous exercises, the output can be printed or saved.

ADDITIONAL EXERCISE

Repeat the Rotation Builder portion of this exercise to create a third Management template (rotation). Create a Winter Wheat, Spring Barley, NoTill, Chem fallow rotation. Give the system that name. Save it in C. Other Local Mgt Records.

Training Exercise 5

Task: In this exercise, you will again modify the Management record you created in Exercise 4, but this time you will substitute tillage operations in the tillage scenario with other operations, add a tillage operation and delete an operation.

Step-By-Step Procedure:

1. With the Profile view open for Exercise 4, click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation.
2. **Substitute a practice**: The first operation displayed in the tillage scenario is "**Plow, moldboard**." The operation date is 9/15/0. Click on the pull down tab to the right of the operation. Scroll down the list of operations and locate the "**chisel, st.pt 12 inch**." Double click on this operation. The chisel is substituted for the plow.
3. **Delete a practice**: Immediately below the new chisel operation is a "**Cultivator, field 12 inch sweeps"** operation. Click on the date of the first operation. Click on the minus button (-) at the top of the column. The operation is deleted.
4. **Add a practice**: Scroll down the list of operations and locate the date 10/1/1 which is associated with the practice "**Disk, offset heavy**.**"** Click on that date. Click on the plus sign (+) at the top of the column. The disk line is duplicated. Click the pull down button to the right of the second disk operation. Scroll through the list of operations and locate the practice **"Subsoiler**.**"** Double click on it. The disk operation is replaced with the subsoiler operation. Change the date of the subsoiler to 10/15/1.

   Discuss dates in the tillage sequence.

5. **Saving:** Should you save the record?
   - Save this edited tillage scenario as with other records saved. Click File, Save As, and make sure you are in the ***C. Other Local Mgt Records*** folder. Type in the desired name (Power Co Ex 5) and save.
6. Close the "Management" screen. **IMPORTANT:** If you did not save the file as outlined in 5 above, you will be asked if you want to save this management to "**C. Other Local Mgt Records**" and over write the existing file. If you want to do this, press Y; if not, press N.

Check Output for this Profile:

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Lentils (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):
- Wheat _____ bu/ac
- Spring barley _____bu/ac

Soil Condition Index: _____
STIR: _____

Print this record if desired.

Close the Profile.

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 calculate erosion for the three alternative management systems.

Step-By-Step Procedure:

1. Locate and click on the Worksheet icon on the icon bar near the top of the RUSLE2 screen.
2. Double-click on the default record. You are now in the Worksheet screen.
3. Make the following inputs at the top of the screen: **Tract 1224**, Owner name: **John Pedon**, Field: **1**.
4. Type any pertinent information in the information block. It is suggested that a short explanation of the rotation, tillage scenario, type of systems evaluated, etc. be entered.
5. Click the drop down arrow in the box for Location.
6. Double click the **USA** folder.
7. Double click the **Idaho** folder.
8. Double click **Power County**.
9. Double click **ID_Power Co _Req_14**.
10. Click the drop down arrow in the box for Soil.
11. Double click the **Power id710, ID** folder.
12. Click the plus (+) button to the right of the folder for unit **PvD Pocatello Silt Loam 8-12 % slopes**.
13. Double click the map unit component, **Pocatello Silt Loam**.
14. Enter **slope length: 300; slope steepness: 10%**.
15. Click the **Save As** icon. Name this Worksheet **Power Co ID Ex 6**.
16. Click the drop down arrow under **Management** on the line near the bottom of the screen.
17. Double click on **CMZ 10**.
18. Double click on the folder **C. Other Local Mgt Records**.
19. Double click on **Wheat, winter, Barley spring, Fallow, black, fdisk**.
20. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **Conventional System**. Click **OK**.
21. Move the display back to the left side of the screen with the slide bar.
22. Click the plus (+) button under **Temp. scenario** on the left of the screen.
23. Click the drop down arrow under **Management** on the second line.
24. Double click on **Wheat, winter, Barley spring Fallow, chem , medium residue, fdisk, CMZ10**.
25. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **medium residue 3 yr rotation**. Click **OK**.
26. Click the plus (+) button under **Temp. scenario** on the left of the screen.
27. Click the drop down arrow under **Management** on the second line.
28. Double click on **Wheat, winter, Barley spring, Fallow, chem NT, CMZ10**.
29. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **No-Till System**. Click **OK**.

30. **Enter the Contouring row grade value**. Under the column heading Contouring, click the pull down menu for each crop, scroll down to **"5% absolute row grade"** and select.

Save your Worksheet **Power Co, Ex 6**.

Results:

- **Soil loss:**
  - Conservation planning, Conventional System: _____ t/a/y
  - Conservation planning, Medium Residue System: _____ t/a/y
  - Conservation planning, NT: _____ t/a/y
- **Soil Condition Index:**
  - Conservation planning, Conventional System: _____
  - Conservation planning, Medium Residue System: _____
  - Conservation planning, NT: _____

Print to MS Word Template. Click on File, NRCS RUSLE2 Worksheet Calculation Record.

Close this view.

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 calculate erosion for three alternative management systems on two different fields (hill slopes).

Step-By-Step Procedure:

1. Locate and click on the icon for **Plan** on the icon bar near the top of the RUSLE2 screen.
2. Double click on the **default** record. You are now in the **Plan** screen.
3. Input Owner name: **John Pedon**.
4. Click the drop down arrow in the box for Location.
5. Double click the **USA** folder.
6. Double click the **Idaho** folder.
7. Double click **Power County**.
8. Double click **ID_Power_Req_14**.
9. Click the **Save As** icon at the top of the RUSLE2 screen. Name this **Power Co ID Ex 7.**
10. **Under the heading "Compare Field Alternatives,"** right-click on the title "Worksheet". In the pop-up box, click on **Load from file**.
11. Double click on the record, **Power Co ID Ex 6**.
12. Click the plus (+) button under **Field** on the left side of the screen. A second Worksheet line appears.
13. Click the yellow tab for the **Worksheet** on line 2.
14. Locate the **Field Name** data entry box near the top left of the screen. Enter **2** (for field 2) in the field name data entry cell.
15. Click the drop down arrow in the box for **Soil**.
16. Move the cursor to map unit **NLE-Neeley silt Loam 4-12% a**nd select map unit component **Neeley Silt loam 80%**.
17. Enter **Slope length: 200** and **average slope steepness of 16**.
18. Close the Worksheet screen by clicking the **X** in the upper-right corner.
19. Resave this Plan as **Power Co ID 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

View Printout Options.

Training Exercise 8

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

- Locate the **Climate** icon and click to open it.
- Open the folders and records in this order: **USA**, **Idaho, Power County**.
- Open the record **ID_Power_Req_20-22**.

What is the value for **Req**? _____ What is the highest monthly ppt? ____

What is the highest **ed** (erosivity density) value? ____

- Place the cursor over the heading "Eros. Density, US eros./in." and left click. The column is highlighted. Right click and a drop down window appears. Click on Graph.

What 4 months have the highest **ed** (erosivity density) ____ ____ ____ ___

- Click the **Climate** icon, open the file **ID_Power _R_14**, and position this record alongside the **ID_Power_Req_14** record.

In the **ID_Power_R_14** record, what is the **R Factor** value? _____

What is the highest **ed** (erosivity density) value? ____

What 4 months have the highest **ed** (erosivity density)? ____ ____ ____ ___

- Click the **daily** tab in both records.
- Right-click on the heading **Daily EI Used**.
- Click **graph** on the pop-up box.
- Move the graphs so that they are adjacent to one other.

Circle the correct answer below:
In the R record, erosivity is greatest in the (summer/winter).
In the Req record, erosivity is greatest in the (summer/winter).

What do these graphs represent? _____

Training Exercise 9

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 **Wheat, winter, CMZ 10, 10 in. spac. early plant**.
What is the yield of this record? _____ bu/ac

What is the above-ground biomass, in lb/ac, at maximum canopy? _____

On what day (day after planting) does maximum canopy first occur? _____

Graph the **root mass in the top 4 inches** and the **Canopy cover**.

Are these graphs similar? _____.

How does their seasonal growth differ?

Close all Vegetation windows.

Training Exercise 10

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

Locate the Soils icon and click to open it. **Open Power id710**.

Locate and select the map unit **PvD Pocatello Silt Loam 8-12,** then map unit component **Pocatello silt loam 80%.**

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? _____

What is "**Fall Velocity**"? Place the cursor over "Fall Velocity," right click, and then click on **Help**.

Training Exercise 11

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, heavy, direct seed, dbl disk opnr**.

Click the yellow tab by **Process: Flatten standing residues**.

What fraction of standing wheat straw is flattened by this operation? ____

Click **cancel** to close this window.

Click the yellow tab 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 wheat residue buried by this operation? _____

What is the fraction of buried wheat residue resurfaced by this operation? __

Close all windows for this Operation.

What is "**Random Roughness**"? Place the cursor over "Fall Velocity", right-click, and then click on **Help**. Print the document. Move the cursor to any location in the text and right-click, select "**Print**".

Training Exercise 12

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

Locate the icon for **Residues** and click to open it.

Click on the folder **NWRR**.

Select the record for **barley, straw, spring, NWRR**.

This residue responds to tillage like (fill in) _____

What is this residue's half-life? _____

What is the mass at 30% cover? _____

What is the mass at 60% cover? _____

What is the mass at 90% cover? _____

IRRIGATED CROPLAND EXERCISES

Training Exercise 1

Task: In this exercise, you will calculate soil loss for a single crop on one field. Use the most current NRCS Simple SCI User's Template and the R2_NRCS_Fld Office access level. Use inputs and report output as specified below.

Step-By-Step Procedure:

1. Locate and click on the icon for ***Profile*** on the icon bar near the top of the RUSLE2 screen.
2. Double click on the **default** record. You are now in the **Profile** screen.
3. **Location**: Left-click the drop down arrow. Double click on the USA folder and then Idaho. Move through the listing of counties and select **Canyon County,** then the **Req record** in the **10"** annual precipitation range.
   - What does "Location" mean? Place the cursor over the words "Location". Note that the cursor changes to a right arrow. Right click. A window appears with several options to select from. Click on "Help." A description of Location is provided. Screens like this are scattered throughout RUSLE2.
   - There are two options to select from, "R" and "Req." Always select the "Req" option. The number following the Req designation represents the average, annual rainfall for the location being evaluated. Use county PRISM maps to determine rainfall.
   - To see the climate data related to Req 10, click on the yellow folder on the left side of the "Location" box.
4. **Soil**: Left click the drop down arrow and select **Canyon id665**. Select the map unit component for map unit **GsB Greenleaf silt loam 1-3%.**
   - When a soil is selected, a sub-window opens below the first line. If the selected soil is a complex, then all the soils in the complex are displayed. Click on the desired soil.
   - RUSLE2 uses the "K" factor for the selected soil when calculating sheet and rill erosion rates. To see the "K" and other factors representing the chosen soil, click on the yellow folder on the left side of the soil selection box.
5. **Topography**: Set the slope length at 400 feet. Set the average slope steepness at 1%.
   - The slope length (L), and % slope (S) is meant to represent the average condition in terms of length of slope and percent slope within a field. There will be areas which are steeper and shorter, and areas which are longer and flatter than the average condition. "L" starts where erosion begins towards the top of a slope and ends where sediment deposition occurs or where concentrated flow begins. "S" represents the average slope, measured in percent, found within "L".
   - General Guidance. Reference Section V, "Default Slope Ranges" of this guide. Use the default condition values displayed in that section unless on-site measurements have been made.
6. **Base Management**: Click on the drop down window button at the right side of the entry screen "Base Management." Scroll down the list of "Crop Management Zones" (CMZ) to CMZ 11 and click on it. Click on "Single Year/ Single Crop

Templates." Scroll down the list of crops and select "**Wheat, winter, conv., fplow, Z11**."

- Crop Management Zones (CMZ). Reference the discussion of database organization and use in this user guide.
- A CMZ is a geographic area in which similar crops are grown and that have similar seeding and harvest dates. They are similar to irrigation climatic zones, MRLA, CRAs etc.

View the tillage scenario used in this Base Management. Click on the yellow folder on the left side of the Base Management entry screen. The tillage sequence, date when each operation was performed, and the crop(s) included in the template are displayed.

- As discussed earlier in the User Guide, Single Year/Single Crop files and Multi-year Crop files are templates. As such, they are protected and can not be overwritten. Users can open a template, edit and save it, but it must be saved to C. Other Local Mgt Records.

Close this screen and return to the Profile screen.

Enter the appropriate information in the "Info" block at the bottom center of the screen. Whatever is typed here will appear at the top of the printout, if generated and printed.

Saving Profiles. The developers of RUSLE2 did not intend that "profiles" be saved. The philosophy was that a Base Management would be opened, edited or used, and that the base management would be saved. All the variables (climate, soils, slope, % slope, etc.) were to be entered into profiles and then output to a word document containing the formatted results of the "run". The word document can be printed and/or saved. Profiles can be saved, but if they are, they should be saved into subfolders created in the profile record. **Reference Section I, Part L of this guide for directions on creating subfolders in RUSLE2.**

Save this Profile:

a. File, Save As.
b. Double click on Co Profile.
c. Type the desired name in the entry screen at the bottom of the page, overtype "default". Name this file **Canyon Co Ex 1.**

<u>Check Output for this Profile</u>:

Soil loss for conservation planning: _____ t/a/y
T value for soil map unit Joel: ____
Surface residue cover after planting with drill (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Wheat yield (see Step 4c): _____ bu/ac
Soil Condition Index: _____ STIR: _____

What Does This Information Represent?

- Output from an unedited Single Crop Template, which includes one crop and tillage scenario.

Does it meet the soil resource concern quality criteria?

- Yes. Why?

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Record with SCI.pro.dot to generate a report that can be printed or saved.

Close The Profile.

Training Exercise 2

Task: Using Exercise 1, modify the **Canyon Co Ex 1 Profile** just created.

Step-By-Step Procedure:

1. Reopen Canyon Co Ex 1 Profile. Place the cursor on the Profile icon and right click. The list of Profile folders will appear.
   - Click on the **Co Profile** folder button. Canyon Co Ex 1 file name is displayed. Select it. The Profile with all its data is displayed.
2. **Locate Step 5 on the screen "Contouring"**. Click on the pull down arrow on the right side of the field. The pull down screen displays a list of ascending per cents of slope. Scroll down the list and select "absolute 1%".

   Discussion: Always select "Absolute" row grade versus "Relative Grade". A tillage operation that is performed on the contour is perpendicular to the down slope grade of the field. Row grade represents how far off contour tillage operations are performed

Output:
Soil loss for conservation planning: _____ t/ac/y
Sediment Delivery: _____ t/a/y

Discussion:
- Why didn't the sediment delivery change?

3. **Locate "Strips/barriers"** immediately below the Contouring button. Click on the pull down button on the right side of the strips/barriers line. Several strips and barriers options are displayed. Select "**Filter Strips**," "**Actual Width**, **30 feet wide,"** and then **"Cool season grass filter strip"**.
   - What happens? (A warning window appears. The warning cautions the planner that the planned practice is nearing the limits of its effectiveness for the slope defined for the field.)
   - Why? (If a practice like a buffer strip or filter strip is placed on too steep a row grade, runoff from the field can collect above the strip, run along it and eventually start eroding a gully on the upstream side of the filter strip.) RUSLE2 cautions the planner when this could happen and, if row grade exceeds the limits of the practice, it will not calculate the erosion rate for the field.
   - **Change Absolute grade to .5%.**
     What happened?
   - **Change row grade to Relative row grade 1% of row grade.**
     What happened?

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

Save: Save this Profile. Name it **Canyon Co Ex 2.**

Discussion:

- Did soil loss change as much as you expected after the filter strip was added?
- Why do you think it changed this amount?
- Did sediment delivery change from Exercise 1, and if so, why?

Strips/barriers: Click the pull down button at the right side of the "**Strips/barriers**" data entry line. Select "**Contour Buffer Strips**," "**Actual Width"**, and then "**Cool season grass buffer midslope, 30 feet wide"**.

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

Discussion:

- Why did the sediment rate for filter strips go down?

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Erosion Calculation Report.

Training Exercise 3

Task: In this exercise you will use the "**Rotation Builder**" to build a 3-year rotation or management system for CMZ 11. Pre-built, single year crop templates are stacked one on top of the other to form multi-year rotations (management systems) using "Rotation Builder."

Step-By-Step Procedure:

1. Open RUSLE2, click on the Profile view using the "**default**" option on the screen. Enter the same location, soil, length of slope and % slope information as used in Exercises 1.
2. Click the yellow folder on the left side of the Base Management entry screen.
3. Click the yellow folder on the left side of the "Rotation builder for this management" line.
4. Click on the drop down arrow on line 1 under **Management** (on the upper part of the rotation builder screen).
5. Double click on **CMZ 11.**
6. Double click on folder **Single Year/Single Crop Templates.**
7. **Scroll** through the crops available, **discuss** "Low residue root crops (default potatoes) and Low residue non-root crops" (default beans).
8. Scroll through the list of crops and locate **Wheat, winter, conv., fplow, Z11.** Double click on this crop.
9. Click the plus (+) button above line 1 under Man. (for Management). The first line is duplicated.
10. Click on the drop down arrow on the right side of line 2 under **Management.**
11. Scroll through the list of crops as in step 8. Locate **Barley, spring, conv., fplow, Z11** and double click on it.
12. Highlight line 2 and click the plus (+) button at the top of the column. Line 2 is duplicated.
13. Click on the drop down arrow on line 3 under **Management.**
14. Scroll through the list of crops and locate **corn, silage, conv, fplow, Z11** and double click on it.

Explanation: You have "built" a 3-year rotation by stacking 3 single crop templates one on top of the other. At this point, the templates have not been edited.

15. Click **Apply/close** at the bottom of the screen. The tillage scenario for the rotation just assembled is displayed.
16. **Save this multi-year management system**. At the top of the screen under File, Save As, double click on CMZ11. **IMPORTANT:** Double click "**C. Other Local Mgt. Records.**" Type the name of the rotation in the input cell adjacent to "Name" at the bottom of the screen. Use the name **Wheat, winter, Barley spring, corn silage, conv., fplow CMZ11,** then close the management screen. The program returns to the profile view.

17. **View the tillage sequence**. Click on the yellow folder at the left side of the Base Management entry cell. The tillage sequence for this rotation is displayed. Is it correct? Notice the **Duration, yr** box in the top-center of the screen. It displays the length of the rotation. How long is this rotation? Is it correct?
18. **Examine Irrigation.** Irrigation inputs are now entered at the top of the multi-year or the single year management template. Click on the yellow folder on the right side of "Examine Irrigation." A second window appears. The active window in that pull down reads "**Irrigation Distribution.**" Click on the yellow folder adjacent it. Each month for each of the 3 crops included in the rotation is displayed. **Reference Section VI, Irrigation Water Input,** in this guide**.** Locate the climatic zone, the crop, level of management for the evaluation being made and enter data in the Examine Irrigation input screen. Close this management screen and return to the "Profile" screen.
19. **In the "Profile" Screen, it is essential to input or adjust these values**:
    - Crop yields
    - Soil erosion for wind and/or irrigation induced, as applicable
    - Row grade, if applicable
    - Filter strips, if applicable
    - Related information about this operation in the "Info" block
20. **Yields:** The program uses default yield values which may or may not reflect actual yields. Click on Step 4c "Adjust yields" to see the default yields used in the management templates. If they are not correct, edit them. For this exercise use:
    a. Winter wheat: 120 bu/ac
    b. Spring Barley 4000 lbs/ac
    c. Corn silage: 28 tons/ac.
21. **Enter the contour (row grade) value**. Click on Contouring button, scroll down the list and select the "Absolute Row Grade 1%" value.
22. **Enter erosion values for the Soil Condition Index:** In the lower left hand corner of the Profile screen, click on the Soil Condition Index. A window appears that allows input of the total erosion rate for wind and irrigation induced erosion. **Enter 10 tons.**
23. **Type Canyon Co Ex 3** in the "Info" box at the bottom center of the screen.
24. **Save this "profile".** Name it **Canyon Co Ex 3.**

<u>Check Output for this Profile</u>:

Click "**Results"** in the lower left hand corner of the screen.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Silage Corn (click yellow folder): _____ %.
Soil Condition Index: Click Soil Conditioning Index: _____

Note: Occasionally the SCI will be displayed as a whole number, i.e., 1 or 2. If this happens, the program has defaulted to displaying the SCI as 1 digit. To change the number of digits displayed, place the cursor over the name "Soil

Condition Index." The cursor changes to an arrow pointing right. Right click on the mouse. A pull down window appears with several options. Click on "Visible Digits," then click on "Show 2 significant digits."

Click **"Additional Results".**

Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c): Wheat_____ bu/ac

- Spring Barley _____bu/ac
- Corn Silage: _____tons/ac

Print to MS Word Template: Click on File, NRCS RUSLE2 Profile Record with SCI.pro.dot.

Save the word document**.** The output generated is a word file and as such can be saved in several locations including Toolkit.

Training Exercise 4

Task: In this exercise, you will modify the Multi-year management record, **Canyon Co Ex 3**, just created. The file will be modified by replacing the conventional tillage systems for each crop with a medium residue crop scenario.

Step-By-Step Procedure:

1. Open **Canyon Co Ex 3** Profile.
2. Click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation. Click the box that says **Open** to the right of the heading "**Rotation builder for this management.**"
3. Click on the drop down arrow on line 1 under **Management.**
4. Move the cursor and double click on **Wheat, winter, medium residue, fdisk**
5. **Repeat step 4 for the spring barley and corn silage.**
6. Click the **Apply/Close** button in the lower-left corner of the screen.
7. **Save this file**. Click the **File**, **Save As** icon in the upper-left of the RUSLE2 screen (or click File, Save As).
8. Check to make sure you are in folder **C. Other Local Mgt Records**.
9. Name this rotation in the box at bottom **Wheat, winter, Barley, spring, Corn silage, medium residue, fdisk.**

Discussion:

- What other names could you use here?

10. Close this screen and return to the "Profile" screen. **IMPORTANT:** The original template was modified by substituting one management scenario for another. By doing that, the program defaults to the original default yields used in the template. Click on Step 4c "Adjust yields" and enter the appropriate yields. For this exercise use:
    a. Winter wheat: 120 bu/ac
    b. Spring Barley 4000 lbs/ac
    c. Corn Silage: 28 tons/ac.
11. No other factors change in the "Profile" screen.

Check Output for this Profile:

Click on "**Results**" tab.

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Corn Silage (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat_____ bu/ac
- Spring Barley _____bu/ac
- Corn Silage: ____tons/ac

- Soil Condition Index: _____

Printing: As in previous exercises, the output can be printed or saved.

Training Exercise 5

Task: In this exercise, you will again modify the Management record you created in Exercise 4, but this time you will substitute tillage operations in the tillage scenario with other operations, add a tillage operation and delete an operation.

Step-By-Step Procedure:

1. With the Profile view open for Exercise 4, click on the yellow folder on the left side of the Base Management entry cell. The Management screen opens displaying the tillage scenario for the rotation.
2. **Substitute a practice**. The first operation displayed in the tillage scenario is "Disk Offset Heavy." The operation date is10/22/0. Click on the pull down tab to the right of the operation. Scroll down the list of operations and locate the "chisel, st.pt 12 inch". Double click on this operation. The chisel is substituted for the heavy disk.
3. **Delete a practice**. Immediately below the chisel operation, are two cultivator operations. Click on the date of the first operation. Click on the minus button (-) at the top of the column. The operation is deleted.
4. Repeat the process to delete the second cultivator operation.
5. **Add a practice**. Scroll down the list of operations and locate the date 4/23/2 which associated with the practice "Harrow, spike tooth." Click on that date. Click on the plus sign (+) at the top of the column. The harrow line is duplicated. Click the pull down button to the right of the second harrow operation. Scroll through the list of operations and locate the practice "**cultipacker, roller.**" Double click on it. The second spike tooth operation is replaced with the cultipacker operation. Change the date to 4/24/2. **IMPORTANT:** Check the "duration" box. Is the rotation still 3 years long?

   CAUTION: Change tillage dates carefully. Tillage practices must be entered in sequence. If the dates are out of order, RUSLE2 will think that an additional year is added to the rotation, i.e., Operation 1 is dated 4/1/0. A second Operation is added after operation 1 and the date of the second operation is changed to 4/1/1 adding another year.

6. **Saving:** Should you save the record?
   - Save this edited tillage scenario as with other records saved. Click File, Save As, and make sure you are in the **C. Other Local Mgt Records** folder. Type in the desired name and save.

7. Close the "Management" screen. **IMPORTANT:** If you did not save the file as outlined in step 6 above, you will be asked if you want to save this management to "C**. Other Local Mgt Records"** and over write the existing file. If you want to do this, press Y; if not, press N.

Check Output for this Profile:

Soil loss for conservation planning: _____ t/ac/yr
Surface residue cover after planting Corn Silage (click yellow folder): _____ %
Sediment Delivery (click "Additional Results" tab): _____ t/a/y
Crop yields used in the analysis: (see Step 4c):

- Wheat_____ bu/ac
- Spring Barley_____bu/ac
- Silage Corn: _____bu/ac

Soil Condition Index: _____

Print this record if desired.

Close the Profile.

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 field. Follow the steps below to calculate erosion for three alternative management systems.

Step-By-Step Procedure:

1. Locate and click on the Worksheet icon on the icon bar near top of the RUSLE2 screen.
2. Double click on the default record. You are now in the Worksheet screen.
3. Make the following inputs at the top of the screen: **Tract 1224**, Owner name: **John Pedon**, Field: **1**.
4. Type any pertinent information in the information block. It is suggested that a short explanation of the rotation, tillage scenario, type of systems evaluated, etc. be entered.
5. Click the drop down arrow in the box for Location.
6. Double click the **USA** folder
7. Double click the **Idaho** folder
8. Double click **Canyon County.**
9. Double click on **ID_Canyon_Req_10.**
10. Click the drop down arrow in the box for Soil.
11. Double click the **GsB Greenleaf silt loam 1-3%** folder.
12. Enter **slope length: 200; slope steepness: 10%**.
13. Click the **Save As** icon. Name this Worksheet **Canyon Co ID Ex 6.**
14. Click the drop down arrow under **Management** on the line near the bottom of the screen.
15. Double click on **CMZ 11.**
16. Double click on the folder **C. Other Local Mgt Records.**
17. Double click on **Wheat, winter, Barley spring, Corn Silage, conv. fplow.**
18. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **Conventional System.** Click **OK**.
19. Move the display back to the left side of the screen with the slide bar.
20. Click the plus (+) button under **Temp. scenario** on the left of the screen.
21. Click the drop down arrow under **Management** on the 2nd line.
22. Double click on **Wheat, winter, Barley spring, Corn Silage, medium residue, fdisk, CMZ11.**
23. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **medium residue 3-yr rotation.** Click **OK**.
24. Click the plus (+) button under **Temp. scenario** on the left of the screen.
25. Click the drop down arrow under **Management** on the second line.
26. Double click on **Wheat, winter, Barley spring, Corn Silage NT, CMZ11.**
27. Use the slide bar and move to the right on this line. Click the drop down arrow under **Description**. Type in **No-Till System**. Click **OK**.
28. **Enter the Contouring row grade value**. Under the column heading Contouring, click the pull down menu for each crop, scroll down to **"5% absolute row grade"** and select.

Save your Worksheet as **Canyon Co, Ex 6**.

Results:

- **Soil loss:**
  - Conservation planning, Conventual system: _____ t/a/y
  - Conservation planning, Medium Residue System _____ t/a/y
  - Conservation planning, NT: _____ t/a/y
- **Soil Condition Index:**
  - Conservation planning, Conventual system: _____
  - Conservation planning, Medium Residue System _____
  - Conservation planning, NT: _____

Print to MS Word Template. Click on File, NRCS RUSLE2 Worksheet Calculation Record.

Close this view.

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 hillslopes (2 or more fields) on the same farm (location). Follow the steps below to calculate erosion for three alternative management systems on two different fields (hillslopes).

Step-By-Step Procedure:

20. Locate and click on the icon for **Plan** on the icon bar near the top of the RUSLE2 screen.
21. Double click on the **default** record. You are now in the **Plan** screen.
22. Input Owner name: **John Pedon**.
23. Click the drop down arrow in the box for Location.
24. Double click the **USA** folder.
25. Double click the **Idaho** folder.
26. Double click **Canyon County.**
27. Double click **ID_Canyon_Req_10.**
28. Click the **Save As** icon at the top of the RUSLE2 screen. Name this **Canyon Co ID Ex 7.**
29. **Under the heading "Compare Field Alternatives", r**ight-click on the title "Worksheet". In the pop-up box, click on **Load from file**.
30. Double click on the record, **Canyon Co ID Ex 6**.
31. Click the plus (+) button under **Field** on the left side of the screen. A second Worksheet line appears.
32. Click the yellow tab for the **Worksheet** on line 2.
33. Locate the **Field Name** data entry box near the top left of the screen. Enter **2** (for field 2) in the field name data entry cell.
34. Click the drop down arrow in the box for **Soil**.
35. Move the cursor to map unit **JaB Jacquith loamy fine sand 1-3%** and select map unit component **Jacquith loamy fine sand.**
36. Enter a **Slope length: 400**, and **average slope steepness of 3%.** Close the Worksheet screen by clicking the **X** in the upper-right corner.
37. Resave this Plan as **Canyon Co ID 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

View Printout Options.

Training Exercise 8

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

- Locate the **Climate** icon and click to open it.
- Open the folders and records in this order: **USA, Idaho, Canyon County**.
- Open the record, **ID_Canyon_Req_10.**

What is the value for **Req**? _____ What is the highest monthly ppt?: ____

What is the highest **ed** (erosivity density) value? ____

- Place the cursor over the heading "Eros. Density, US eros./in." and left click. The column is highlighted. Right click and a drop down window appears. Click on Graph.

What 4 months have the highest **ed** (erosivity density)? ____ ____ ____ ___

- Click the **Climate** icon. Open the **ID_Canyon _R_10** and position this record alongside the **ID_Canyon _Req_10** inch record**.** In the **ID_Canyon R_10** record, what is the **R Factor** value? _____

What is the highest **ed** (erosivity density) value? ____

What 4 months have the highest **ed** (erosivity density)? ____ ____ ____ ___

- Click the **daily** tab in both records.
- Right-click on the heading, **Daily EI Used**.
- Click **graph** on the pop-up box.
- Move the graphs so that they are adjacent to one other.

Circle the correct answer below:
In the R record, erosivity is greatest in the (summer/winter).
In the Req record, erosivity is greatest in the (summer/winter).

What do these graphs represent? _____

Training Exercise 9

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, **Wheat, winter, CMZ 11.**
What is the yield of this record? _____ bu/ac

What is the above-ground biomass, in lb/ac, at maximum canopy? _____

On what day (day after planting) does maximum canopy first occur? _____

Graph the **root mass in top 4 in** and the **Canopy cover**.

Are these graphs similar? _____.

How does their seasonal growth differ?

Close all Vegetation windows.

Training Exercise 10

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

Locate the Soils icon and click to open it. **Open Canyon**.

Locate and select the map unit **Jacquith loamy fine sand.**

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? _____

What is "**Fall Velocity**"? Place the cursor over "Fall Velocity," right click and then click on **Help**.

Training Exercise 11

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, heavy, direct seed, dbl disk opnr.**

Click the yellow tab by **Process: Flatten standing residues.**

What fraction of standing wheat straw is flattened by this operation? ____

Click **cancel** to close this window.

Click the yellow tab 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 wheat residue buried by this operation? _____

What is the fraction of buried wheat residue resurfaced by this operation? __

Close all windows for this Operation.

What is "**Random Roughness**"? Place the cursor over "Fall Velocity," right click, and then click on **Help**. Print the document. Move the cursor to any location in the text and right click, select "**Print**".

Training Exercise 12

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

Locate the icon for **Residues** and click to open it.

Click on the folder **NWRR.**

Select the record for **barley, straw, spring, NWRR.**

This residue responds to tillage like (fill in) _____

What is this residue's half-life? _____

What is the mass at 30% cover? _____

What is the mass at 60% cover? _____

What is the mass at 90% cover? _____

APPENDICES

APPENDIX A

TECHNICAL GUIDE NOTICES
For RUSLE2

June 29, 2006

IDAHO TECHNICAL GUIDE NOTICE NUMBER 257

Purpose: To distribute updated electronic PRISM maps for use in RUSLE2.

Effective Date: Upon receipt

Idaho Technical Guide Notice 132, dated September 12, 1999, which transmitted hard copy PRISM precipitation maps to be used with RUSLE2 is cancelled. These maps have been refined and replaced by those transmitted by this Notice. Use the revised PRISM maps when determining the correct precipitation for making RUSLE2 runs.

If additional information is needed on the maps or RUSLE2, contact Ralph Fisher, State Agronomist, at (208) 378-5730.

Filing instructions:

Remove Technical Guide Notice 132 from your hard copy file, if applicable. Maps transmitted by Notice 132 were filed in Section I, Maps of the Field Office Technical Guide. Remove and discard all PRISM maps in that section.

Revised PRISM maps are found in the Idaho eFOTG, Section I, Maps and can be viewed and/or downloaded from that site.

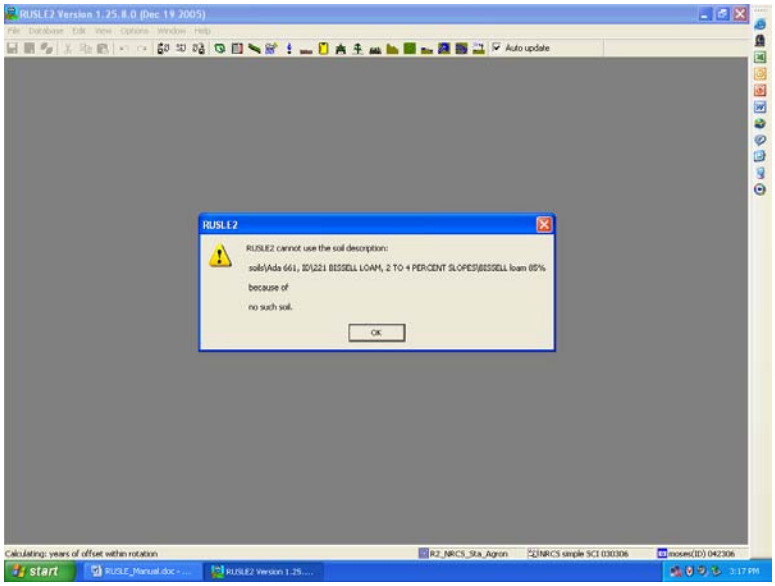
/s/
RICHARD SIMS
State Conservationist

cc:
Mark Weatherstone, Assistant State Conservationist (TS), NRCS, Boise, Idaho
Ralph Fisher, State Agronomist, NRCS, Boise, Idaho
Tom Gohlke, Regional Agronomist, NRCS, Portland, Oregon

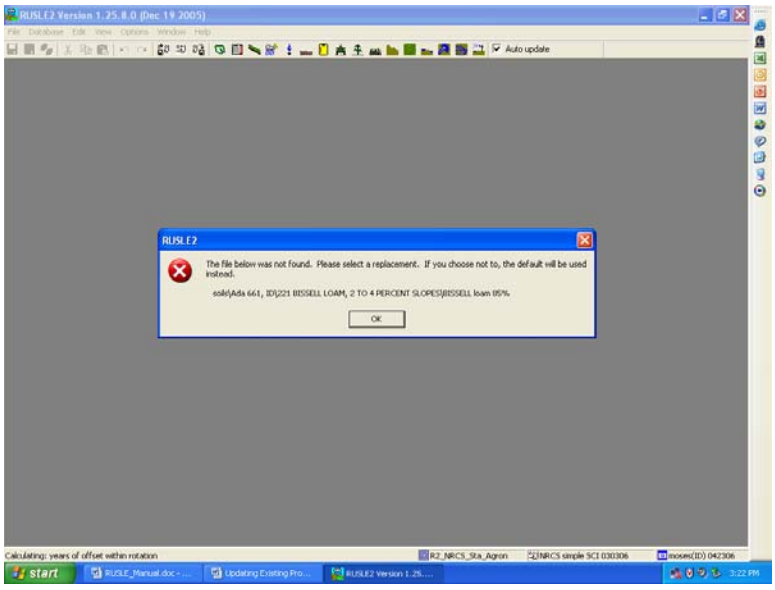
APPENDIX B

USER NOTES

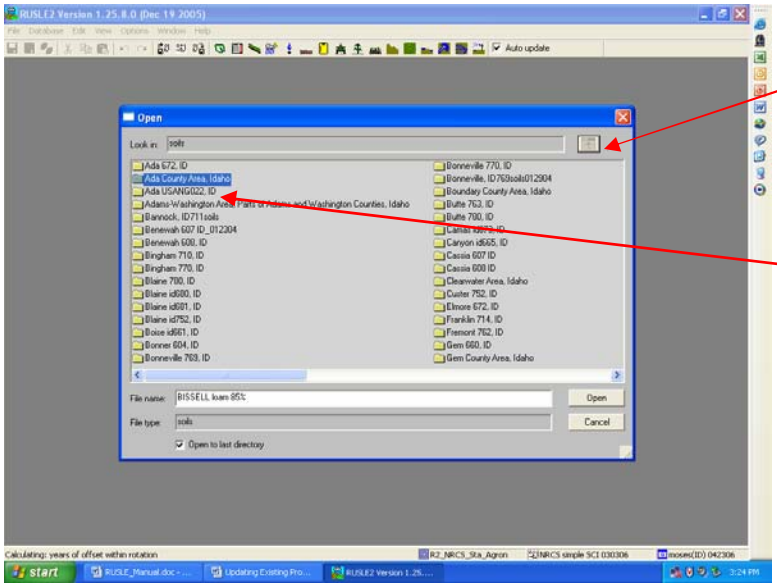
Updating Existing Profiles/Plans/Worksheets Using NASIS Soils Databases



When a currently saved profile/plan or worksheet is opened, this message appears. It is asking you to select the correct (new NASIS) database. Click OK.

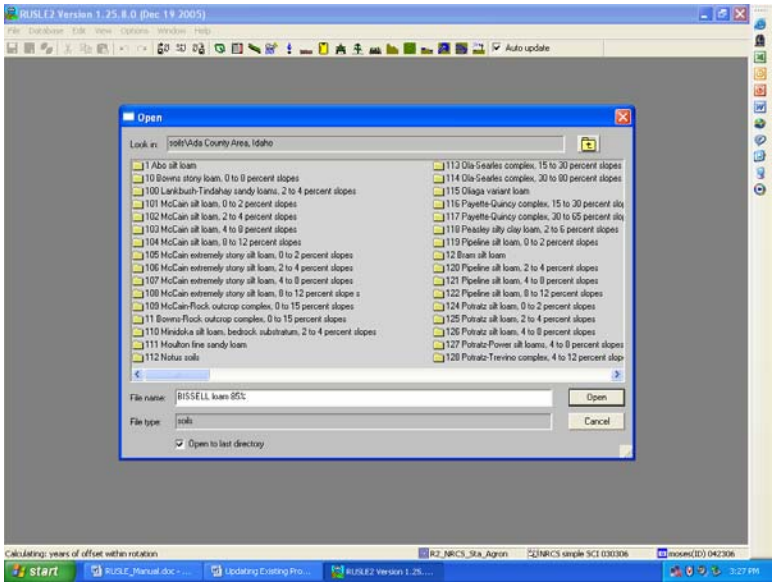


The next screen provides the same guidance. Press OK.



Use the up arrow to navigate to the desired soil survey area and select it.

Select the desired soil survey area.



Navigate to the desired soil and select it. You will be asked to confirm the selected soils.

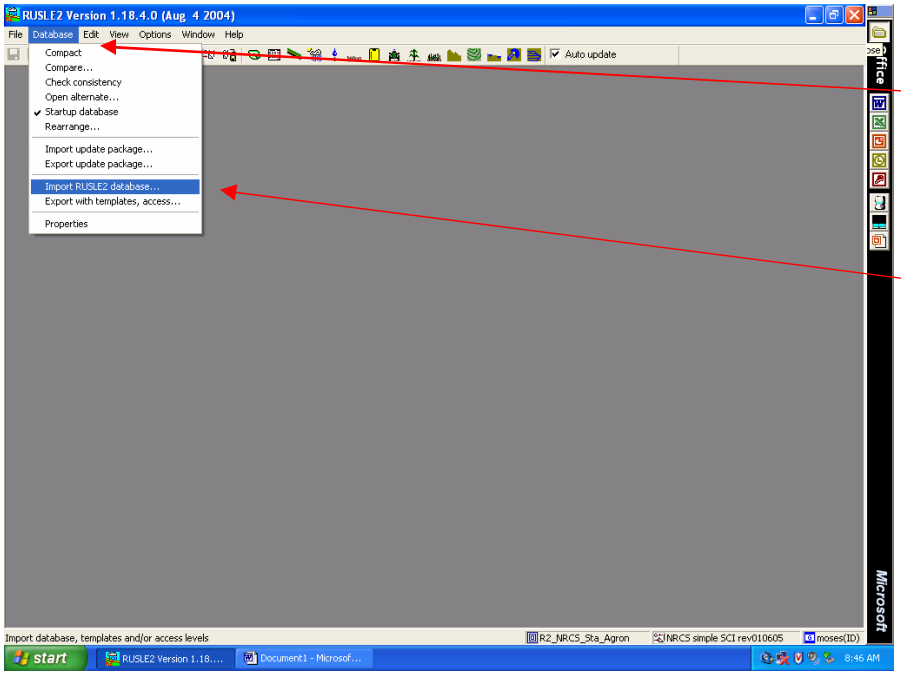
How To Import RUSLE2 Updates

Step 1: Copy the file ("NRCS_Moses_updates_"date".gdb"), attached to this email, to RUSLE2 Imports.

RUSLE2 Imports is located at: C:/Program Files
USDA
RUSLE2
Imports

Step 2: Open RUSLE2.

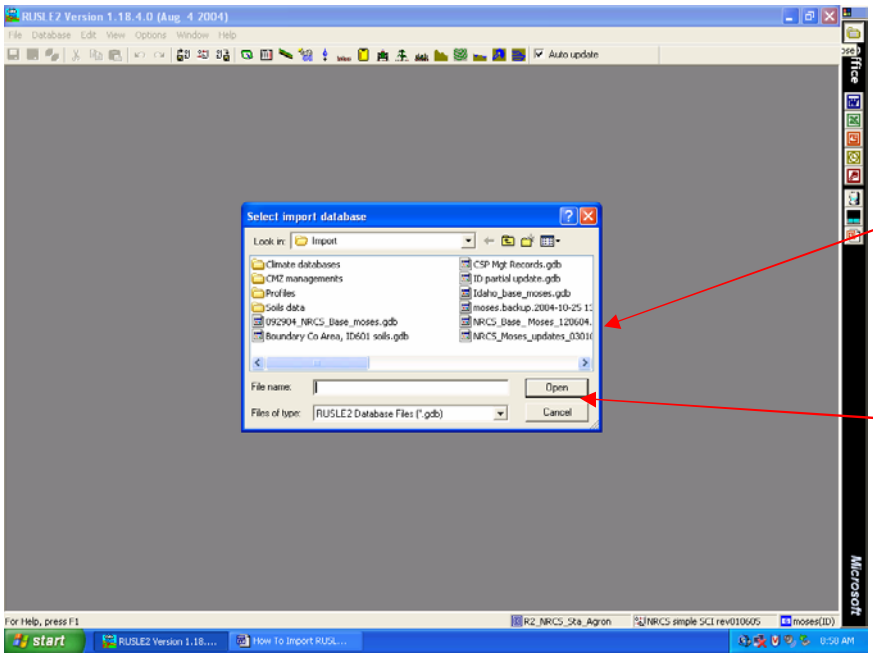
Step 3: Click on Database, then "Import RUSLE2 Database."



Click on Database.

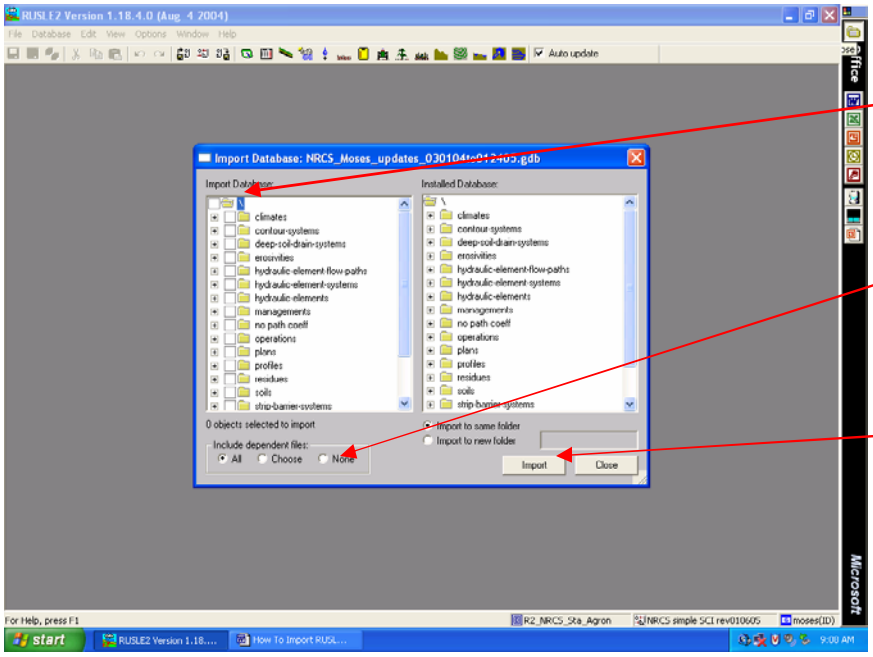
Click on "Import RUSLE2 Database."

Step 4: A screen "Select Import Database" appears. Click on "NRCS_Moses_updates-"Date".gdb," and then click "Open."



Step 5: The update file includes only those items which need to be imported into RUSLE2.

- Click the box in the upper left hand corner of the screen under "Import Database." When this box is clicked, all the boxes are automatically clicked. This allows RUSLE2 to import all the necessary files included in the update and place them where they have to be.
- Click "None."
- Click "Import."



The program automatically imports the update files. When the import is done, another box will appear that indicates that the import is complete. Click OK and you are done.

Guidelines for Estimating Soil Erosion with Terraces Using RUSLE2

7/7/04

If Terraces Already Exist

1. Select a slope length and steepness down to the first terrace or the terrace interval.
2. Select a contouring row grade from the drop down choice list for **Contouring**.
3. Select a terrace at the bottom of the slope from the drop down choice list for **Diversion/terrace, sediment basin.**

NOTE: If terraces already exist on the RUSLE2 slope, we need to take credit for remote deposition that occurs in the terrace channel outlet. Therefore, we must place the terrace at the bottom of the RUSLE2 slope as instructed above. If the grade of the outlet channel is sufficiently flat, RUSLE2 gives partial credit for this deposition, and the RUSLE2 erosion rate and sediment delivery values will be reduced.

If Terraces Are Being Planned But Are Not Installed

1. Select a slope length from the point where runoff begins to the point where deposition occurs or to a concentrated flow channel. Since terraces do not yet exist, measure the entire RUSLE2 slope.
2. Select a contouring row grade from the drop down choice list for **Contouring**.
3. Select a terrace system for the RUSLE2 slope. From the drop down choice list for **Diversion/terrace, sediment basin**, choose a system of one or more terraces and an appropriate channel grade that best matches the system planned.

APPENDIX C

DATA INPUT WORKSHEET

RUSLE C FACTOR INPUT WORKSHEET

Cooperator: _____ Date:_____

Field Office: _____ Assisted By: _____

C Factor Zone: _____ Climate Station Used: _____

Precipitation: _____ REQ: _____Slope Length: _____

Slope Steepness: _____ Soils K: _____

Support Practices:

Cross Slope (Y/N) _____ Row Grade (%) _____

Stripcropping (Y/N) _____ No. Strips _____
Strip Width _____

Terraces (Y/N) _____ Type _____
Spacing _____

Crops in Rotation	Yield	Crops in Rotation	Yield

See page 2 for Tillage Scenario

Tillage Scenario

List all the tillage operations you use to grow each crop in your rotation. Start with the seedbed preparation for the first crop to harvest of the last crop. Include all operations including spraying of weeds, harvest, etc.

Tillage Sequence	Date	Tillage Sequence	Date

CROP AND TILLAGE RECORD

Producer Name: _____
Date: _____

Complete this worksheet for each rotation on the acres being offered.

Crops & Yields For This Rotation

Crop: _____ Yield _____ | Crop: _____
Yield _____

Crop: _____ Yield _____ | Crop: _____
Yield _____

Crop: _____ Yield _____ | Crop: _____
Yield _____

Crop: _____ Yield _____ | Crop: _____
Yield _____

Crop: _____ Yield _____ | Crop: _____
Yield _____

Crop: _____ Yield _____ | Crop: _____
Yield _____

Soil Test Data For This Rotation.

Tract & Field Number	Date of last soil test

Tillage Sequence

List each tillage operation you normally conduct for each crop in this rotation. Begin by listing the first tillage operation following harvest of the last crop in your rotation.

For example, a 3-year rotation of winter wheat, spring barley and lentils is followed. The last crop in the rotation is lentils which are harvested on October 1. The first tillage operation following the harvest of lentils is a chisel operation which is performed on October 15th. The first operation on the list of tillage operations is the chisel.

List **each** operation in sequence that is performed including fertilizer and pesticide applications, haying, if the rotation includes a sod crop seeding, and harvest operations.

Date of Each Operation	Operation

- How do you conduct your tillage operations (check one)?
  - ❑ Round and round the field.
  - ❑ Across the slope.
  - ❑ On the contour.
- Have you installed or do you maintain a strip of grass or grass and shrubs &/or trees that is at least 24 feet wide along the edge of a field(s) adjacent to a stream, water body, or road?

  Y ___ N __
- Identify the fields that have filter strips.

APPENDIX D

OPERATIONS DATABASE

The Operations Database is extremely large and so is not included in the text of this manual. A "hotlink" has been provided to link to the database. It provides basic information about each operation in the database which includes:

- Description
- % Surface disturbance
- Tillage Type
- Process, i.e., kill crop or begin growth
- Recommended speed
- Recommended depth
- Flatten ratio
- Bury ratio
- Tillage intensity fraction

APPENDIX E

STIR DOCUMENTATION

The Soil Tillage Intensity Rating (STIR)

(1) The Soil Disturbance Rating, used in the original version of the Soil Conditioning Index (SCI) has been replaced with the Soil Tillage Intensity Rating (STIR). In doing so, this facilitates incorporating the Soil Conditioning Index into the Revised Universal Soil Loss Equation, Version 2 (RUSLE2), eliminating the need to repeat inputs for climate, soil, crop rotation, tillage, etc. when both soil erosion from water and the SCI index needed to be determined. RUSLE2 fully incorporates both of these estimates while entering the required data only once. With the SCI in RUSLE2, the previously subjective Soil Disturbance Rating used in the SCI has been replaced with the Soil Tillage Intensity Rating containing more scientifically based parameters.

The STIR rating in the Soil Conditioning Index can function as a stand-alone rating to evaluate tillage and/or planting systems on parameters other than the traditional ground cover and surface disturbance parameters. It replaces the subjective ratings contained in the Soil Disturbance Rating component of the SCI with more scientifically supported parameters. It utilizes the various operations database parameters in RUSLE2 to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences between systems across the spectrum from true no-till all the way to conventional plow systems. It does so better than do surface cover or surface disturbance criteria since the kind, severity and number of ground disturbing passes is evaluated rather than just the end result or a snapshot of conditions after planting.

The components of the STIR rating are the following parameters from the RUSLE2 operations database.

1. Recommended Operating Speed:

This process represents the recommended speed for this operation. RUSLE2 can compute how speed of an implement affects residue burial. Speed between the range of a minimum and maximum can be entered in the management screen. The recommended speed that the manufacturer suggests for the implement is the default speed for this operation in RUSLE2, and indicates the assumed condition under which the flattening, burial, and re-surfacing values are defined.

2. Tillage Type:

Tillage type describes how the operation mixes the soil and associated residue. This variable refers to the type of mechanical disturbance on the soil, and how that affects the distribution of residue within the soil. The distribution of material, like plant residue, incorporated into the soil depends on the type of mechanical disturbance, referred to as tillage type. Also, tillage type affects the distribution of material within the soil as subsequent mechanical disturbances, i.e., tillage operations, occur.

The following values are assigned to individual tillage types in the STIR rating:
1.0 Inversion + some mixing
0.8 Mixing + some inversion
0.4 Lifting and fracturing
0.7 Mixing only
0.15 Compression

Inversion with some mixing places most of the surface material in the lower half of the depth of soil disturbance (tillage depth). In effect, the soil in disturbance depth is "flipped over" with some mixing in the soil. A moldboard plow is an example of an implement that inverts the soil with some mixing.

Mixing with some inversion places most of the surface material in the upper half of the depth of soil disturbance (tillage depth). The next operation leaves a somewhat uniform distribution of the material in the soil. Tandem disk, chisel plows and field cultivators are examples of implements that are a tillage type of mixing with some inversion.

Lifting and fracturing places most of the surface material in the upper three-tenths of the depth of soil disturbance (tillage depth). The next operation or two leaves a somewhat uniform distribution of the material in the soil. Subsoilers, fertilizer and manure injectors and scarifiers are examples of implements of lifting and fracturing.

Mixing only places most of the surface material in the upper three-tenths of the depth of soil disturbance (tillage depth). The next operation or two leaves a somewhat uniform distribution of the material in the soil. The material becomes increasingly concentrated with subsequent operations and moves down in the soil in a "lump." Rotary tillers are an example of implements of mixing only.

Compression "pushes" surface material into the soil without the soil being disturbed. The initial distribution of material in the soil is the same as the mixing only tillage type. Examples of implements that are a compression type include sheep foot's rollers used on construction sites and cattle trampling.

3. Recommended Tillage Depth:

Many site operations disturb the soil, causing changes in soil properties and incorporation of surface residue. One of the key parameters is the depth to which the residue is incorporated. Note that this may or may not be the same as the actual depth of tillage. Typical implements work best at a particular tillage depth recommended by the manufacturer.

4. Surface area disturbed:

The value sought here is used to determine the impact of the operation on long-term soil consolidation. A plow assumed to completely invert the surface layer would receive a

value of 100%, while a no-till planter which cuts a 3-inch slot every 30 inches could be assumed to disturb 10% of the surface.

Disturbing the soil causes erosion to increase. Soil that has not been disturbed for an extended period (the time to soil consolidation—typically assumed to be seven years) is assumed in RUSLE2 to only be about 45% as erodible as soil that has been recently disturbed. Operations like planters and drills typically disturb the soil in strips. The fraction (percent) of the total soil surface that is disturbed is the value entered.

Selection of a value for the fraction of the surface disturbed sometimes requires special consideration. In general, the area actually disturbed plus the area receiving soil "thrown" (displaced) by the soil disturbance is used for the input. However, if the displaced soil is very thin, the area of disturbance may be limited to the fraction of the soil surface (source area) that produces (generates) the displaced soil. This consideration is especially important in certain no-till cropping systems where the displaced soil doesn't interfere with the typical effects of no-till with a buildup of organic matter in an upper surface layer of soil of about 2 inches (50 mm).

Another special consideration is in the Northwest Wheat and Range Region (NWRR) where most of the erosion is by surface runoff. Erosion by surface runoff, which is rill erosion, is concentrated on much less than the total surface. In this situation, a value less than the surface actually disturbed and that actually receives displaced soil can be used so that the proper effects of no-till are represented by RUSLE2.

(2) The parameters used in the STIR rating are derived from the RUSLE2 operations database. Those values are based on a set of Agricultural Research Service (ARS) core operations which the RUSLE2 model developers obtained from various research studies. The STIR rating for an individual operation is calculated by multiplying the individual parameter values and by applying "weighting" factors for each. They are speed times 0.5; tillage type times 3.25; average depth times 1; and surface soil disturbance times 1.

This was done in order to calibrate the STIR component of the SCI back to the original systems and the base location and calibration sites so the resulting SCI answer would be the same as the original SCI before the Soil Disturbance Rating (SDR) parameter was replaced by the STIR rating. All of the operations involved in tilling, fertilizing, planting, controlling pests, harvesting the crop and managing residues are evaluated in the STIR rating for a tillage system for a given crop. STIR ratings can be calculated for single crops or for crop rotations. Higher STIR ratings are shown for systems with greater disturbance and more frequent operations. Comparison of STIR ratings for different tillage and planting systems provides insight into the carbon loss, moisture depletion and fugitive dust issues related to tillage of the soil.

Example:

Operation Name	# of Trips	STIR
Year 1		
Grain Sorghum		
Shredder, flail or rotary	1	0.15
Manure spreader, solid and semi-solid	1	0.20
Disk, tandem secondary op.	1	32.50
Disk, tandem light finishing	1	19.50
Planter, runner opener	1	2.60
Cultivator, row 1 in ridge	1	14.63
Cultivator, row, high residue	1	8.13
Harvest, killing crop 50pct standing stubble	1	0.15
Year 2		
Winter Wheat		
Shredder, flail or rotary	1	0.15
Sweep plow 20-40 in wide	1	9.75
Disk, tandem secondary op.	1	32.50
Disk, tandem light finishing	1	19.50
Drill or air seeder, hoe/chisel openers. 6-12 in spacing	1	23.40
Harvest, killing crop 50pct standing stubble	1	0.15
Year 3		
Cotton		
Disk, tandem secondary op.	1	32.50
Disk, tandem secondary op.	1	32.50
Disk, tandem light finishing	1	19.50
Planter, runner opener	1	2.60
Cultivator, row 1 in ridge	1	14.63
Cultivator, row 1 in ridge	1	14.63
Cultivator, row 1 in ridge	1	14.63
Cultivator, row, high residue	1	8.13
Harvest, cotton	1	0.15
Cumulative (Total) Soil Disturbance Rating (SDR)		302.55

Average Annual SDR = 302.55 / 3 = 100.85 for the rotation