What is **RUSLE2**?

**Revised Universal Soil Loss Equation, Version 2**

- NRCS erosion prediction tool used for conservation planning
- Estimates soil loss from rill and interrill erosion caused by rainfall and overland flow
RUSLE2 Features

Intended to describe changes/scenarios for implementing conservation practices.

Intended to describe main effects (what is actually happening in the field).
RUSLE2 Features

- Measures the Soil Loss compared to (T) Expressed as Average Annual Soil Loss in Tons/Acre/Year
- Measures the Soil Conditioning Index or SCI
- Measures the Soil Tillage Intensity Rating or STIR
- Fuel or Energy Use

- EQIP Soil Quality & CSP Program
- Also used in calculating the MD P-Index
Sheet & Rill (Rill & Interrill) Erosion Prediction

RUSLE2

1. Climate
2. Soil
3. Management (Crops and Field Operations)
4. Length of Slope
5. Slope Steepness
6. Supporting Practices
RUSLE2 Factors
Daily Soil Loss
\[ a = r k l s c p \]

Daily Factors
- \( r \) - Rainfall/Runoff
- \( k \) - Soil erodibility
- \( l \) - Slope length
- \( s \) - Slope steepness
- \( c \) - Cover-management
- \( p \) - Supporting practices

Average annual soil loss = sum of daily soil loss values

Different formulation from USLE and RUSLE1
Climate - r factor

- Based per county
  - 10-yr, 24-hr rainfall, in
  - Annual precipitation, in
- Annual-sum of daily values
- Daily value=average annual fraction that occurs on a given day
  - Varies during the year
Soil Erodibility – k factor

- Based on type of soil
- Based on factors such as
  - Drainage class (well drained, poorly drained, etc…)
  - Capability class
  - Capability subclass
  - Highly erodible
Cover-Management – c factor

- Crop & Crop Rotation
- Tillage
- Canopy cover
- Crop residue
- Application of surface and buried materials
  - Examples
    - Live plant material
    - Plant residue and litter
    - Applied mulch
    - Rock
CMZ (Crop Management Zones) RUSLE2 allows for area specific management including tillage, planting and harvesting dates
Crop Management Effects

Raindrops intercepted by canopy cover

Canopy cover

Intercepted rainfall falling from canopy cover

Random roughness

Soil consolidation

Ground cover

Buried residue

Ridges

Raindrops not intercepted by residue cover

Live roots

Dead roots
Tillage

Conventional till system

Reduced till – Chisel Plow
Tillage

Reduced till – Turbo-till

No-till
Crops & Crop Rotation

- High vs Low residue crops
- Yields (average)

Previous Crop in the field
Crop Residue
SLOPE LENGTH – I factor
SLOPE STEEPNESS – s factor

- Field measurement
- Measurement of Slope lengths for eroding portions of hillslopes
- Measurement of Overland flow slope length
- Measurement of Steepness
Overland Flow Slope Length

Overland flow slope length

Eroding portion
slope length

RUSLE2
ESTIMATES
TO HERE

Deposition
Supporting Practices – p factor

- Contouring
- Terrace/Diversion, Grassed waterway
- Strip systems
Cover Crops

- Keep the soil covered, reduce erosion
- Take up excess nutrients
- Increase Organic Matter
So where can I get help with RUSLE2 questions?

- Maryland NRCS RUSLE2 Website:
  http://www.md.nrcs.usda.gov/technical/agronomy/rusle.htm
  - Goal: One-stop shopping for all your RUSLE2 guidance needs.
  - Home for all RUSLE2 information including: MD Users Manual, Database set-up instructions, Data collection sheets, etc…
  - Please call Heather Hutchinson
    - If you can’t find what you are looking for
    - If you have any questions
    - If you have any suggestions
Welcome to the NRCS Maryland and District of Columbia web site.

**Chesapeake Bay Farm Bill Listening Session Set for July 14**

On Monday, July 14, the Natural Resources Conservation Service will hold a public listening session in Annapolis, Maryland, on the Chesapeake Bay provisions of the 2008 Farm Bill. Stakeholders and the public are encouraged to bring their ideas about practices, programs, and geographic areas they see as priorities under these provisions.

**NRCS Maryland Sponsors Pasture Walks on July 7 and July 8, 2008**

On Monday, July 7th there will be a pasture walk in Baltimore County. This is a unique operation that utilizes almost 40 acres of native warm season grasses in a rotational grazing system with bison.

On Tuesday, July 8th there is a pasture walk in Calvert County that will feature pasture management on a horse farm.

**Chesapeake Bay Watershed in Maryland**

The Chesapeake Bay Watershed is a large ecosystem that encompasses approximately 64,000 square miles in six states and the District of Columbia. Nearly all of Maryland lies within the watershed.

2006 Chesapeake Bay Watershed Activities Report
Maryland NRCS Technical Resources

Last Modified: 09/20/2007

Technical Information, Resources, Tools, Models and Data:

Draft Conservation Practice Standards

Maryland NRCS periodically revises existing Maryland conservation practice standards or develops new standards. Draft conservation practice standards are posted for review and comment at the Electronic Field Office Technical Guide (eFOTG).

eFOTG - Electronic Field Office Technical Guide

The Maryland Electronic Field Office Technical Guide (MD-eFOTG) is the primary technical reference tool used in accomplishing the Natural Resources Conservation Service (NRCS) mission. MD-eFOTG contains technical reference material to be used when planning, designing, applying, and maintaining conservation practices.

Biology

A collection of references related to plants, wetlands, and wildlife

Conservation Planning & Resources

A collection of references related to conservation planning, Toolkit, resource stewardship and NRCS state and federal policies.

Conservation Agronomy


Energy

NRCS in Maryland is providing conservation technical assistance to farmers to help them conserve natural resources by realizing energy savings in their farm operations.

Engineering

A collection of references and tools related to the planning, design, and construction of engineering conservation practices in Maryland.
Conservation Agronomy

Last Modified: 03/14/2007

Revised Universal Soil Loss Equation - Version 2 (RUSLE2)

The Revised Universal Soil Loss Equation - Version 2 (RUSLE2) was developed primarily to guide conservation planning, inventory erosion rates and estimate sediment delivery. Values computed by RUSLE2 are supported by accepted scientific knowledge and technical judgment, are consistent with sound principles of conservation planning, and result in good conservation plans.

Comprehensive Nutrient Management Planning

Resources and references to help develop a Comprehensive Nutrient Management Plan (CNMP). These plans document the practices and strategies adopted by the land owner or operator to address the natural resource concerns related to soil erosion, water quality, utilization of manure, and disposal of organic by-products.

Pest Management Planning

Integrated Pest Management (IPM) is a sustainable approach to pest control that combines the use of prevention, avoidance, monitoring and suppression strategies to maintain pest populations below economically damaging levels, minimize pest resistance, and minimize harmful effects of pest control on human health and environmental resources.

Nutrient Management Planning

Nutrient Management Planning manages the amount, form, placement, timing and application of animal manure, commercial fertilizer, biosolids, and other plant nutrients used in the production of agricultural products to prevent pollution, maintain soil productivity, and achieve realistic yield goals.
RUSLE2 Handbook - This Handbook describes RUSLE2, its factors, selection of input values and meanings, to compute its factor values, and application of RUSLE2. It provides detailed information on the mathematical equations, input parameters, input values, how to obtain them, and how to interpret output. (PDF; 244 KB)

Instructions and User Guide - provides step by step instructions (with screen shots) on downloading use of RUSLE2 for Maryland. (PDF; 4.5 MB)

Set Up Guide - How to download the RUSLE2 program and set up the database for use in Maryland. (PDF; 1.6 MB)

Proficiency Exercises - designed to help the user become familiar with the functions of RUSLE2. Exercises include:
- Crop Management Zone 65 (PDF; 109 KB)
- Crop Management Zone 65 - Answers - Includes all answers to CMZ 65 Exercises so user can check their work. (PDF; 15 KB)

RUSLE2 Field Data Collection Sheet - This sheet is designed to help the conservation planner capture field specific data needed to complete a RUSLE2 erosion calculation. Contains an example (PDF; 25 KB)

Maryland Tillage Practice Guide - This guide is designed to provide conservation planners with a quick reference for NRCS Residue and Tillage Management Practices - No-Till/Strip-Till/Direct-Seed (Code 329), Mulch-Till (Code 345), and Residue Management - Seasonal (Code 344). (PDF; 606 KB)

Tillage Equipment Identification Guide - purpose of this guide is to help you identify commonly used tillage equipment. The color photos and drawings will help facilitate communication by providing common definitions and RUSLE2 terminology with NRCS and our customers. (PDF; 7 MB)

How to Develop a Multi-Year Crop Rotation "The Easy Way" - step-by-step instruction on developing multi-year crop rotations for RUSLE2. (PDF; 985 KB)

How to Modify a Multi-Year Crop Rotation - step-by-step instruction on modifying multi-year crop rotations for RUSLE2. (PDF; 495 KB)
Thank you for your attention!

Any questions???