This final rule sets forth the USLE and RUSLE which will also be used due to water has been refined. The equations are used. Since the first WEQ used by the Department as of this date of publication. The Natural Resources Conservation Service (NRCS) utilizes factors from the USLE, the revised universal soil loss equation (RUSLE) and the WEQ in equations to predict soil erosion due to water and wind. The Department was first required to use the factors from the USLE and WEQ to make highly erodible land (HEL) determinations under the Food Security Act (FSA) of 1985, Pub. L. 99–198. The FSA defined HEL as land that has the potential for an excessive annual rate of erosion in relation to the soil loss tolerance level as determined by the Secretary through application of factors from the USLE and WEQ. This final rule sets forth the USLE and WEQ used by the Department as of this date and the circumstances under the equations are used. Since the first mandated use of the USLE in 1985, the technology used to predict soil erosion due to water has been refined. The refinement is reflected in a revised USLE (RUSLE) which will also be used under the circumstances described in this rule.

**SUMMARY:** Section 301(c) of the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA) requires the Secretary of Agriculture to publish in the Federal Register, within 60 days of the enactment of FAIRA, the universal soil loss equation (USLE) and wind erosion equation (WEQ) used by the Department of Agriculture (the Department) as of the date of publication. The Natural Resources Conservation Service (NRCS) utilizes factors from the USLE, the revised universal soil loss equation (RUSLE) and the WEQ in equations to predict soil erosion due to water and wind. The Department was first required to use the factors from the USLE and WEQ to make highly erodible land (HEL) determinations under the Food Security Act (FSA) of 1985, Pub. L. 99–198. The FSA defined HEL as land that has the potential for an excessive annual rate of erosion in relation to the soil loss tolerance level as determined by the Secretary through application of factors from the USLE and WEQ.

**EFFECTIVE DATE:** This rule is effective June 3, 1996.

**FOR FURTHER INFORMATION CONTACT:**
David L. Schertz, National Agronomist, Natural Resources Conservation Service, P.O. Box 2890, Washington, D.C. 20013; Fax 202–720–2646 or Internet:dschertz@usda.gov.

**SUPPLEMENTARY INFORMATION:**

**Rulemaking Analyses**

- **Regulatory Flexibility Act:** No significant impact.
- **Paperwork Reduction Act:** Does not apply.
- **National Environmental Policy Act:** Not applicable.
- **Civil Rights Impact Analysis:** Not applicable.
- **Federalism Assessment:** Does not have sufficient federalism implications to warrant an assessment.
- **Unfunded Mandate:** Not applicable.

**Background And Purpose**

The Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (the Department), utilizes the universal soil loss equation (USLE), the revised universal soil loss equation (RUSLE) and the wind erosion equation (WEQ) to predict soil erosion due to water and wind. Section 301(c) of the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA), which was enacted April 4, 1996, requires the Secretary of Agriculture to publish in the Federal Register by June 3, 1996, the USLE and WEQ used by the Department as of the date of publication. NRCS is publishing the equations and the rules under which the USLE, RUSLE, and WEQ factors are used for administering programs.

The equation for predicting soil loss due to erosion for both the USLE and RUSLE is \( E = f(IKCLV) \). The factors in the equation have the following definitions:

1. \( I \) indicates the equation includes functional relationships that are not straight-line mathematical calculations.
2. \( K \) is the soil erodibility factor.
3. \( C \) is the cover and management factor.
4. \( L \) is the slope length and steepness factor.
5. \( V \) is the support practice factor.

- **P Factor:** USLE uses P factors for contouring, contour strip cropping, and terracing from table values established for field slope ranges; and for terraces, the P factor is also based on channel gradients. RUSLE uses P factors for farming across the slope and includes new process-based routines to determine the effect of strip cropping and buffer strips. Values for farming across the slope are based on slope length and steepness, row grade, ridge height, storm severity, soil infiltration, and the cover and roughness conditions. The strip cropping P factor is based on the amount and location of soil deposition.

The equation for predicting soil loss due to wind erosion is \( E = f(IKCLV) \). The factors in the equation have the following definitions:

1. \( E \) is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.
2. \( R \) is the rainfall erosivity factor.
3. \( K \) is the soil erodibility factor.
4. \( L \) is the slope length and steepness factor.
5. \( C \) is the cover and management factor.
6. \( P \) is the support practice factor.

- **R Factor:** RUSLE includes more R values for the Western United States than the USLE. For the eastern United States, R values are generally the same as those used in the USLE but includes some revisions.

- **K Factor:** Values used in RUSLE are similar to the USLE values but are adjusted to account for changes, such as freezing and thawing, and soil moisture. These adjustments are calculated at one-half month intervals for use in RUSLE and are applicable in the northern and southern plains, midwest, southern, and eastern United States.

- **LS Factor:** USLE uses one LS table; RUSLE uses four LS tables, as determined by the relationship of till to interrill erosion. Although both the USLE and RUSLE can account for the effects of complex slopes, RUSLE simplifies this LS determination through the use of computer technology.

- **C Factor:** USLE provides estimates of soil changes for 4–5 crop stage periods throughout the year. RUSLE provides estimates of cover and soil changes on one-half month intervals, especially in relation to canopy, surface residue, residue just under the surface, and the effects of climate on residue decomposition, roughness, roots, and soil consolidation.

- **P Factor:** USLE uses P factors for contouring, contour strip cropping, and terracing from table values established for field slope ranges; and for terraces, the P factor is also based on channel gradients. RUSLE uses P factors for farming across the slope and includes new process-based routines to determine the effect of strip cropping and buffer strips. Values for farming across the slope are based on slope length and steepness, row grade, ridge height, storm severity, soil infiltration, and the cover and roughness conditions. The strip cropping P factor is based on the amount and location of soil deposition.

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**SUPPLEMENTARY INFORMATION:**

- **Rulemaking Analyses**

  - **Regulatory Flexibility Act:** No significant impact.
  - **Paperwork Reduction Act:** Does not apply.
  - **National Environmental Policy Act:** Not applicable.
  - **Civil Rights Impact Analysis:** Not applicable.
  - **Federalism Assessment:** Does not have sufficient federalism implications to warrant an assessment.
  - **Unfunded Mandate:** Not applicable.
implementing the HEL and wetland and conservation provisions of the FSA, 7 CFR Part 12 (see Federal Register, Vol. 52, No. 180, pages 35194, September 17, 1987). Section 12.21 provides that land in a soil map unit will be considered to be highly erodible if the quotient of either the RKL/T or the CI/T exceeds 8. The factors, R, K, and LS are from the USLE. The USLE factors are explained in the U.S. Department of Agriculture Handbook 537. The factors C and I are from the WEQ. The WEQ factors are explained in a paper by N.P. Woodruff and F.H. Siddaway, 1965. The soil loss tolerance (T) value represents the average annual rate of soil loss that could occur without causing a decline in long term productivity. The specific factors values which are used for determining whether soil map units are considered to be highly erodible are published in the local Field Office Technical Guide (FOTG) which is maintained in each NRCS field office. The values published as of January 1, 1990, in the FOTG are the basis for all HEL determinations. The FOTG is available for review in each NRCS field office. The values vary across the country to correspond to differences in climate, soil types, and topography.

Since the publication of the USLE in 1985, additional research on erosion processes has resulted in refined technology for determining the factor values in the USLE. RUSLE represents a revision of the USLE technology in how the factor values in the equation are determined. RUSLE is explained in the U.S. Department of Agriculture Handbook 703, “Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE).” Copies may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

Since the passage of the FSA in 1985, USLE and WEQ have been used to compile the highly erodible soils list and to make highly erodible field determinations. USLE has been used to develop conservation plans and revisions and to conduct status reviews. As new understanding is gained through research on erosion processes, updates of erosion prediction equations can occur. Changing the highly erodible soils list and field determinations each time these technologies are updated would be disruptive to farmers and impractical for long range planning. Therefore, no changes to the existing highly erodible soils list or field determinations will be made as a result of the implementation of RUSLE. However, as technology is improved, such as with RUSLE, NRCS will use it to develop new conservation plans, plan revisions, and to conduct status reviews. NRCS will not require producers to meet more restrictive levels of erosion reduction that might result from using RUSLE instead of USLE while carrying out existing conservation plans. Therefore, all existing conservation plans developed using USLE, that have been implemented, will remain acceptable plans for purposes of the HEL conservation provisions of the FSA.

List of Subjects in 7 CFR Part 610

Soil conservation, Technical assistance, Water resources.

For the reasons set forth above, 7 CFR Part 610 is amended as follows:

PART 610—TECHNICAL ASSISTANCE

1. The authority for Part 610 is revised to read as follows:

Authority: 16 U.S.C. 590a-590f, 590q, 3801(a)(9).

§ 610.1—10.5. [Designated as Subpart A]

2. Sections 610.1 through 610.5 are designated as subpart A—Conservation Operations.

3. Section 610.1 is revised to read as follows:

§ 610.1 Purpose.

This subpart sets forth Natural Resource Conservation Service (NRCS) policies and procedures for furnishing technical assistance in conservation operations.

4. Subpart B—Soil Erosion Prediction Equations containing §§ 610.11 through 610.14 is added to read as follows:

Subpart B—Soil Erosion Prediction Equations

Sec. 610.11 Purpose and scope.

610.12 Equations for predicting soil loss due to water erosion.

610.13 Equations for predicting soil loss due to wind erosion.

610.14 Use of USLE, RUSLE, and WEQ.

Subpart B—Soil Erosion Prediction Equations

§ 610.11 Purpose and scope.

This subpart sets forth the equations and rules for utilizing the equations that are used by the Natural Resources Conservation Service (NRCS) to predict soil erosion due to water and wind. Section 301 of the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA) and the Food Security Act, as amended, 16 U.S.C. 3801-3813 specified that the Secretary would publish the universal soil loss equation (USLE) and wind erosion equation (WEQ) used by the Department within 60 days after enactment of FAIRA. This subpart sets forth the equations, definition of factors, and provides the rules under which NRCS will utilize the USLE, the revised universal soil loss equation (RUSLE), and the WEQ.

§ 610.12 Equations for predicting soil loss due to water erosion.

(a) The equation for predicting soil loss due to erosion for both the USLE and the RUSLE is \( A = R \times k_s \times L_s \times C \times P \). (For further information about USLE see the U.S. Department of Agriculture Handbook 537, “Predicting Rainfall Erosion Losses—A Guide to Conservation Planning.”) Copies of this document are available from the Natural Resources Conservation Service, P.O. Box 2890, Washington, DC 20013. For further information about RUSLE see the U.S. Department of Agriculture Handbook 703, “Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE).” Copies may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

(b) The factors in the USLE equation are:

1. \( A \) is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.

2. \( R \) is the rainfall erosivity factor. Accounts for the energy and intensity of rainstorms.

3. \( K \) is the soil erodibility factor. Measures the susceptibility of a soil to soil erosion.

4. \( LS \) is the slope length and steepness factor. Accounts for the effect of length and steepness of slope on erosion.

5. \( C \) is the cover and management factor. Estimates the soil loss ratio for each of 4 or 5 crop stage periods throughout the year, accounting for the combined effect of all the interrelated cover and management variables.

6. \( P \) is the support practice factor. Accounts for the effect of conservation support practices, such as contouring, contour stripcroppings, and terraces on soil erosion.

(c) The factors in the RUSLE equation are defined as follows:

1. \( A \) is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.

2. \( R \) is the rainfall erosivity factor. Accounts for the energy and intensity of rainstorms.

3. \( K \) is the soil erodibility factor. Measures the susceptibility of a soil to soil erosion.

4. \( LS \) is the slope length and steepness factor. Accounts for the effect of length and steepness of slope on erosion.

5. \( C \) is the cover and management factor. Estimates the soil loss ratio for each of 4 or 5 crop stage periods throughout the year, accounting for the combined effect of all the interrelated cover and management variables.

6. \( P \) is the support practice factor. Accounts for the effect of conservation support practices, such as contouring, contour stripcroppings, and terraces on soil erosion.

(d) \( T \) is the topography factor. Accounts for the effect of length and steepness of slope on erosion.

(e) \( A \) is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.
erosion based on 4 tables reflecting the relationship of rill to interrill erosion. 

(5) C is the cover and management factor. Estimates the soil loss rate at one-half month intervals throughout the year, accounting for the individual effects of prior land use, crop canopy, surface cover, surface roughness, and soil moisture.

(6) P is the support practice factor. Accounts for the effect of conservation support practices, such as cross-slope farming, stripcropping, buffer strips, and terraces on soil erosion.

§ 610.13 Equations For Predicting Soil Loss Due To Wind Erosion.

(a) The equation for predicting soil loss due to wind in the Wind Erosion Equation (WEQ) is:

\[ E = \sum \left( \frac{C \cdot P \cdot K \cdot S \cdot D \cdot G \cdot D \cdot I \cdot S \cdot T \cdot W}{100} \right) \]

(b) RUSLE will be used to:

(i) Evaluate the soil loss estimates of systems actually applied, where those systems were applied differently than specified in the conservation plan adopted by the producer or where a conservation plan was not developed, in determining whether a producer has complied with the HEL conservation provisions of the Food Security Act of 1985, as amended, 16 U.S.C. § 3801 et seq., set forth in 7 CFR Part 12; and

(ii) Develop new or revised conservation plans.


Paul W. Johnson,
Chief, Natural Resources Conservation Service.

FOR FURTHER INFORMATION CONTACT:
Mary Kate Nelson, Marketing Assistant, California Marketing Field Office, Fruit and Vegetable Division, AMS, USDA, 2202 Monterey Street, suite 102B, Fresno, California 93721, telephone (209) 487-5901, FAX (209) 487-5901, or Charles L. Rush, Marketing Specialist, Marketing Order Administration Branch, Fruit and Vegetable Division, AMS, USDA, P.O. Box 96456, room 2523-S, Washington, DC 20090-6456, telephone (202) 720-5127, FAX (202) 720-5698.

SUPPLEMENTARY INFORMATION: This rule is issued under Marketing Agreement No. 928 and Order No. 928, both as amended (7 CFR part 928), regulating the handling of papayas grown in Hawaii, hereinafter referred to as the “order.” The marketing agreement and order are effective under the Agricultural Marketing Agreement Act of 1937, as amended (7 U.S.C. 601-674), hereinafter referred to as the “Act.” The Department of Agriculture (Department) is issuing this rule in conformance with Executive Order 12866.

This rule has been reviewed under Executive Order 12778, Civil Justice Reform. Under the marketing order now in effect, handlers of papayas grown in Hawaii are subject to assessments. Funds to administer the order are derived from such assessments. It is intended that the assessment rate as issued herein will be applicable to all assessable papayas beginning July 1, 1996, and continuing until amended, suspended, or terminated. This rule will not preempt any State or local laws.