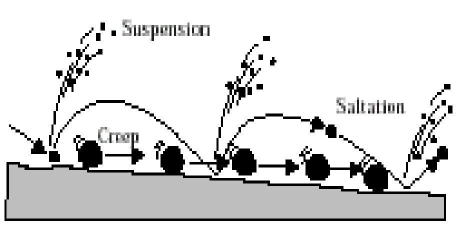
WEQ Introduction and Background

The wind erosion problem

Wind is an erosive agent. It detaches and transports soil particles, sorts the finer from the coarser particles, and deposits them unevenly. Loss of the fertile topsoil in eroded areas reduces the rooting depth and, in many places, reduces crop yield. Abrasion by airborne soil particles damages plants and constructed structures. Drifting soil causes extensive damage and, if deposited in drainage ditches or creeks, it can impair water quality from phosphorus attached to the soil particles. Sand and dust in the air can harm animals, plants, humans, and equipment.

Wherever the soil surface is loose and dry, vegetation is sparse or absent, and the wind sufficiently strong, erosion will occur unless control measures are applied (1957 Yearbook of Agriculture). In Michigan, the regions subject to damaging wind erosion are the muck and sand textured soil types. In some areas, the primary problem caused by wind erosion is crop damage. Some crops are tolerant enough to withstand or recover from erosion damage. Other crops, including many vegetables and specialty crops, are especially vulnerable to wind erosion damage. Wind erosion may cause significant short-term economic loss where sensitive crops are easily damaged by abrasion and desiccation from saltation. Plants are often severely damaged, even when erosion rates are below the soil loss tolerance (T) (Table 7).

Figure 502-1 The wind erosion process



The wind erosion process

The wind erosion process is complex. It involves detaching, transporting, sorting, abrading, avalanching, and depositing of soil particles. Turbulent winds blowing over erodible soils cause wind erosion. Field conditions conducive to erosion include:

- Loose, dry, and finely granulated soil;
- Smooth soil surface that has little or no vegetation present;
- Sufficiently large area susceptible to erosion; and
- Sufficient wind velocity to move soil.

Winds are considered erosive when they reach 13 miles per hour at 1 foot above the ground or about 18 miles per hour at a 30-foot height. This is commonly referred to as the threshold wind velocity (Lyles and Krauss 1971).

The wind transports primary soil particles or stable aggregates, or both, in three ways (Figure 502-1):

Saltation - Individual particles/aggregates ranging from 0.1 to 0.5 millimeter in diameter lift off the surface and follow distinct trajectories under the influence of air resistance and gravity and return to the surface. Whether they rebound or embed themselves, they initiate movement of other particles/aggregates to create the *avalanching* effect. Saltating particles are the abrading *bullets* that remove the protective soil crusts and clods. Most saltation occurs within 12 inches above the soil surface. From 50 to 80 percent of total transport is by saltation.

Suspension - The finer soil particles, less than 0.1 millimeter in diameter, are dislodged from an eroding area by saltation and remain in the air mass for an extended period. Some suspension-sized particles or aggregates are present in the soil, but many are created by abrasion of larger aggregates during erosion. From 20 percent to more than 60 percent of an eroding soil may be carried in suspension, depending on soil texture. As a general rule, suspension increases downwind and, on long fields, can easily exceed the amount of soil moved in saltation and creep.

Surface Creep - Sand-sized particles/aggregates are set in motion by the impact of saltating particles. Under high winds, the whole soil surface appears to be creeping slowly forward as particles are pushed and rolled by the saltation flow. Surface creep may account for 7 to 25 percent of total transport (Chepil 1945 and Lyles 1980).

Saltation and creep particles are deposited in vegetated strips, ditches, or other areas sheltered from the wind, as long as these areas have the capacity to hold the sediment. Particles in suspension, however, may be carried a great distance. The rate of increase in soil flow along the wind direction varies directly with erodibility of field surfaces.

The increase in erosion downwind (**avalanching*)*** is associated with the following processes:

- The increased concentration of saltating particles downwind increases the frequency of impacts and the degree of breakdown of clods and crusts, and
- The accumulation of erodible particles and breakdown of clods tends to produce a smoother (and more erodible) surface.

For any soil, the distance required for soil flow to reach a maximum soil is the same for any erosive wind. The more erodible the surface, the shorter the distance in which maximum flow is reached. Any factor that influences the erodibility of the surface influences the increase in soil flow.

Estimating wind erosion

Using the Wind Erosion Equation (WEQ), the Natural Resources Conservation Service (NRCS) estimates erosion rates to

- Provide technical assistance to land users,
- Inventory natural resources, and
- Evaluate the effectiveness of conservation programs and conservation treatment applied to the land.

Wind erosion is difficult to measure. Wind moves across the land in a turbulent, erratic fashion. Soil may blow into, within, and out of a field in several directions in a single storm. The direction, velocity, duration, and variability of the wind all affect the erosion that occurs from a windstorm. Much of the soil eroding from a field bounces or creeps near the surface; however, some of the soil blown from a field may be high above the ground in a dust cloud by the time it reaches the edge of a field (Chepil 1963).

Methods of estimating wind erosion

No precise method of measuring wind erosion has been developed. However, various dust collectors, remote and in-place sensors, wind tunnels, sediment samplers, and micro-topographic surveys before and after erosion have been used. Each method has its limitations. Research is continuing on new techniques and new devices, on modifications to older ones, and on means to measure wind erosion.

Estimates of wind erosion can be made by assigning numerical values to the site conditions describing wind erosion conditions and expressing their relationships mathematically. This is the basis of the current Wind Erosion Equation (WEQ) that considers soil erodibility, ridge roughness, climate, unsheltered distance, and vegetative cover.

The wind erosion equation (WEQ)

The Wind Erosion Equation (WEQ) erosion model is designed to predict long-term average annual soil losses from a field having specific characteristics. With appropriate selection of factor values, the equation will estimate average annual erosion.

The present Wind Erosion Equation is expressed as: **E = *f* (IKCLV)** where:

E = estimated average annual soil loss in tons per acre per year
f = indicates relationships that are not straight-line mathematical calculations
I = soil erodibility index
K = soil surface roughness factor
C = climatic factor
L = the unsheltered distance
V = the vegetative cover factor

The **I** factor, expressed as the average annual soil loss in tons per acre per year from a field area, accounts for the inherent soil properties affecting erodibility. These properties include texture, organic matter, and calcium carbonate percentage. I is the potential annual wind erosion for a given soil under a given set of field conditions. The given set of field conditions for which I is referenced is that of an isolated, unsheltered, wide, bare, smooth, level, loose, and noncrusted soil surface, and at a location where the climatic factor (C) is equal to 100. For a particular location, the following factors are used to estimate the wind erosion rate:

Table 3 contains knoll erodibility adjustment factors for the Soil Erodibility Index **I**. The **I** value for the Wind Erodibility Group is multiplied by the factor shown in column A. This adjustment expresses the average increase in erodibility along the knoll slope.

The **K** factor is a measure of the effect of ridges and cloddiness made by tillage and planting implements. It is expressed as a decimal from 0.1 to 1.0. K is obtained using the ridge spacing and height, and by defining the angle of deviation of the wind compared to equipment operation across the field.

The **C** factor characterizes climatic erosivity, specifically windspeed and surface soil moisture. It is a percentage of the wind forces measured by the Agricultural Research Service (ARS) research at Garden City, Kansas that has an assigned C value of 100.

The **L** factor considers the unprotected distance along the prevailing erosive wind direction across the area to be evaluated. It starts where no surface creep or saltation occurs and ends at the downwind edge of the contributing area. If the windward edge of the field is not stable, the measurement starts at the nearest stable point. It is measured across the field along the prevailing wind erosion direction on a map to scale. If the barrier is present on the windward side of the field, L is adjusted for the barrier's sheltered distance. Refer to Figure 502-7. Examples of stable areas include grass, hedges, roadways with grass borders 12 feet wide and 1 foot tall, or drainage ditches.

The **V** factor considers the kind, amount, and orientation of vegetation on the surface. The vegetative cover is expressed in pounds per acre of a Flat Small-Grain Residue Equivalent (SGE). It is obtained from determining the amount, kind, and orientation of cover, then estimating Flat Small-Grain Residue Equivalent (SGE) lbs./acre by converting existing cover to SGE Charts (Table 1).

Solving the equation involves five successive steps: Steps 1, 2, and 3 are solved by multiplying the factor values, steps 4 and 5, determining the affects of L and V, involve more complex functional relationships.

Step 1: Determine the Soil I Value.
Factor I is established for the specific soil. I may be increased for knolls less than 500 feet long facing into the prevailing wind, or decreased to account for surface soil crusting and irrigation.

Step 2: Determine the Soil Roughness Value.
Factor K adjusts the I factor for tillage-induced oriented roughness, Krd (ridges) and random roughness, Krr (cloddiness). The value of K is calculated by multiplying Krd times Krr. (K = Krd x Krr).

Step 3: Determine the Climatic Factor.
Factor C adjusts I and K for the local climatic factor.

Step 4: Determine the L - Length of the Unsheltered Distance.
Factor L adjusts I, K, and C for unsheltered distance.

Step 5: Determine the V Vegetative Factor (SGE).
Factor V adjusts I, K, C, and L for vegetative cover.

Step 6*:* Look up the E, Estimated Annual Erosion.

Limitations of the WEQ
When the unsheltered distance, L, *is sufficiently long, the transport capacity of the wind for saltation and creep is reached.* If the wind is moving all the soil it can carry across a given surface, the inflow into a downwind area is equal to the outflow for saltation and creep. The net soil loss is then only the suspension component. This does not imply a reduced soil erosion problem because, theoretically, there is still the estimated amount of soil loss in creep, saltation, and suspension leaving the downwind edge of the field. Surface armoring by gravel is not usually addressed in the I factor. The equation does not account for snow cover or seasonal changes in soil erodibility. The equation does not estimate erosion from single storm events.

Alternative procedures for using the WEQ
The WEQ Critical Period Procedure is based on use of the Wind Erosion Equation as described by Woodruff and Siddoway in 1965 (Woodruff and Siddoway 1965). The conditions during the critical wind erosion period are used to derive the estimate of annual wind erosion. This is the method used in Michigan and surrounding states. Farther west, a "Management Period Method" is used. The "Critical Period Method" best fits Michigan's climate situation.

- The Critical Wind Erosion Period is described as the time of year when the greatest wind erosion can be expected to occur from a field under an identified management system. It is the period when vegetative cover, soil surface conditions, and expected erosive winds result in the greatest potential for wind erosion.

- Erosion estimates developed using the critical period procedure are made using a single set of factor values in the equation to describe the critical wind erosion period conditions. Average annual estimates of erosion made using this method can be misleading since site conditions usually vary significantly during the year and; therefore, cannot be described accurately by a single set of factor values. The critical period procedure is currently used for resource inventories. NRCS usually provides specific instructions on developing wind erosion estimates for resource inventories.

Data to support the WEQ
ARS has developed benchmark values for each of the factors in the WEQ. However, NRCS is responsible for developing procedures and additional factor values for use of the equation. The Field Office Technical Guides (FOTG) contains the local data needed to make wind erosion estimates.

ARS has computed benchmark C factors for locations where adequate weather data are available (Lyles 1983). C factors used in the field office are to reflect local conditions as they relate to benchmark C factors.

ARS has developed soil erodibility I values based on size distribution of soil aggregates. Soils are sorted by texture classes into wind erodibility groups. Wind erodibility group numbers are included in the National Soil Information System (NASIS) database.

Using WEQ estimates with USLE or RUSLE calculations
The WEQ provides an estimate of average wind erosion from the field width along the prevailing wind erosion direction (L) entered in the calculation. USLE or RUSLE provide an estimate of average sheet and rill water erosion from the slope length (L) entered for the water erosion calculation. Although both wind and water erosion estimates are in tons per acre per year, they are only additive when L in the two equations represent identical flow paths and land areas. This occurs very rarely, if ever.

Tools for using the WEQ
Graphs and tables are used to determine factor values and the needed charts and graphs are included in this document.

E tables
The ARS (Wind Erosion) WEROS computer program has produced tables that give estimated erosion (E values) for most of the possible combinations of I, K, C, L, and V.

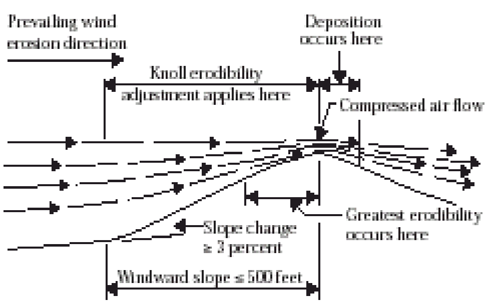


Figure 502-2 Graphic of knoll erodibility

Knoll erodibility - Knolls are topographic features characterized by short, abrupt windward slopes. Wind erosion potential is greater on knoll slopes than on level or gently rolling terrain because wind flow lines are compressed and wind velocity increases near the crest of the knolls. Erosion that begins on knolls often affects field areas downwind.

Adjustments of the Soil Erodibility Index (I) are used where windward-facing slopes are less than 500 feet long and the increase in slope gradient from the adjacent landscape is 3 percent or greater. Both slope length and slope gradient change are determined along the direction of the prevailing erosive wind (Figure 502-2).

Table 3 contains knoll erodibility adjustment factors for the Soil Erodibility Index I. The I value for the Wind Erodibility Group is multiplied by the factor shown in column A. This adjustment expresses the average increase in erodibility along the knoll slope. For comparison, column B shows the increased erodibility near the crest (about the upper 1/3 of the slope), where the affect is most severe. No adjustment of I for knoll erodibility is made on level fields, or on rolling terrain where slopes are longer and slope changes are less abrupt. Where these situations occur, the wind flow pattern tends to conform to the surface and does not exhibit the flow constriction typical of knolls.

Surface crusting - Erodibility of surface soil varies with changing tillage practices and environmental conditions (Chepil 1958). A surface crust forms when a bare soil is wetted and dried. Although the crust may be so weak that it has virtually no influence on the size distribution of dry aggregates determined by sieving, it can make the soil less erodible. The resistance of the crust to erosion depends on the nature of the soil, intensity of rainfall, and the kind and amount of cover on the soil surface. A fully crusted soil may erode only one-sixth as much as non-crusted soil. However, a smooth crusted soil with loose sand grains on the surface is more erodible than the same field with a cloddy or ridged surface.

Under erosive conditions, the surface crust and surface clods on fine sands and loamy fine sands tend to break down readily. On silt loam and silty clay loam soils, the surface crust and clods may be preserved. The relative erosion may be as little as one-sixth of I. Other soils react somewhere between these two extremes (Chepil 1959).

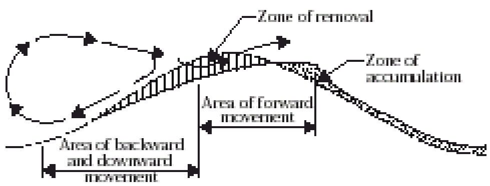
Because of the temporary nature of crusts, no adjustment for crusting is made for annual estimates based on the critical wind erosion period method (Woodruff and Siddoway 1973).

Irrigation adjustments - The **I** values for irrigated soils, as shown in Exhibit 502-2 [1/], are applicable throughout the year. **I** value adjustments for irrigation are applicable only where assigned **I** values are 180 or less.

1/ All exhibits referenced in this document can be found in the NRCS National Agronomy Manual (NAM).

Soil roughness factor K, ridge and random roughness

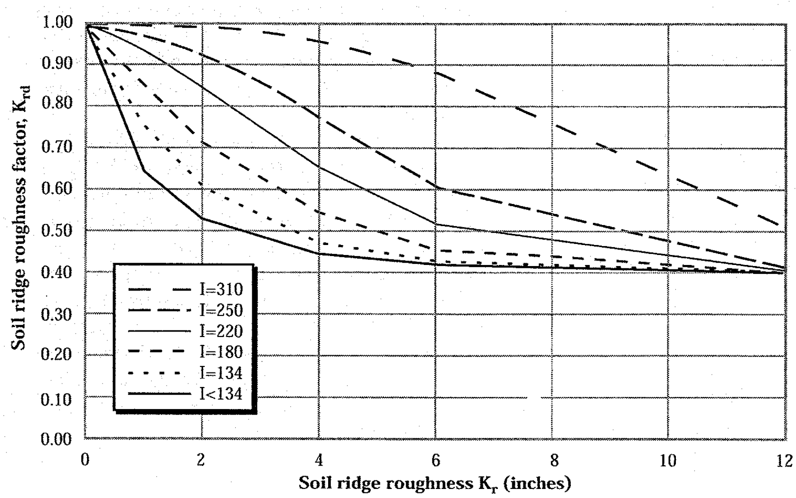
Figure 502-3 Detachment, transport, and deposition on ridges and furrows



Krd is a measure of the effect of ridges made by tillage and planting implements. Ridges absorb and deflect wind energy and trap moving soil particles (Figure 502-3). The Kr value is based on a standard ridge height to ridge spacing ratio of 1:4. Because of the difficulty of determining surface roughness by measuring surface obstructions, a standard roughness calibration using non-erodible gravel ridges in a wind tunnel was developed.

This calibration led to the development of curves, Figure 502-4 and Exhibit 502-4, that relate ridge roughness, Kr, to a soil ridge roughness factor, Krd (Skidmore 1965; Skidmore and Woodruff 1968; Woodruff and Siddoway 1965; and Hagen 1996). The Kr curves are the basis for charts and tables used to determine Krd factor values in the field (Exhibits 502-4 and 502-5). The effect of ridges varies as the wind direction and erodibility of the soil change. To take into account the change in wind directions across a field, we consider the angle of deviation. The angle of deviation is the angle between the prevailing wind erosion direction and a line perpendicular to the row direction. The angle of deviation is 0 (zero) degrees when the wind is perpendicular to the row and is 90 degrees when the wind is parallel to the row.

Figure 502-4 Chart to determine soil ridge roughness factor, K_{rd}, from ridge roughness, K_r, (inches). Only this chart, representing an angle of deviation of 0°, will be used for the WEQ **critical period procedure**. When using the **management period procedure**, see exhibit 502–4 for graphs representing additional angles of deviation. Note: This graph represents erosive wind energy 60% parallel and 40% perpendicular to the prevailing erosive wind.
—Hagen 1996



$$K_r = \frac{4(h \times h)}{s}$$

where:
h = ridge height in inches
s = ridge spacing in inches

In 1996, ARS scientists provided a method for adjusting the WEQ Krd factor with consideration for preponderance (erosive wind energy 60 percent parallel and 40 percent perpendicular to prevailing erosive wind direction) when using the Management Period Procedure. The use of preponderance recognizes that during the periods when the prevailing erosive winds are parallel to ridges, there are other erosive winds during the same period which are not parallel, thus making ridges effective during part of each period. Preponderance keeps the K factor value less than 1.0, when the **I** factor values are 134 or less.

The WEQ Krr factor accounts for random roughness. **<u>Note: The random roughness factor is not used with the "Critical Period Method," it is only to be used with the WEQ "Management Period Procedure."</u>** Random roughness is the nonoriented surface roughness that is sometimes referred to as cloddiness. Random roughness is usually created by the action of tillage implements. It is described as the standard deviation (in inches) of the soil surface elevations, measured at regular intervals from a fixed, arbitrary plane above a tilled soil surface; after oriented (ridge) roughness has been accounted for. Random roughness can reduce erosion significantly.

Unsheltered distance, L

Figure 502-5 Unsheltered distance L

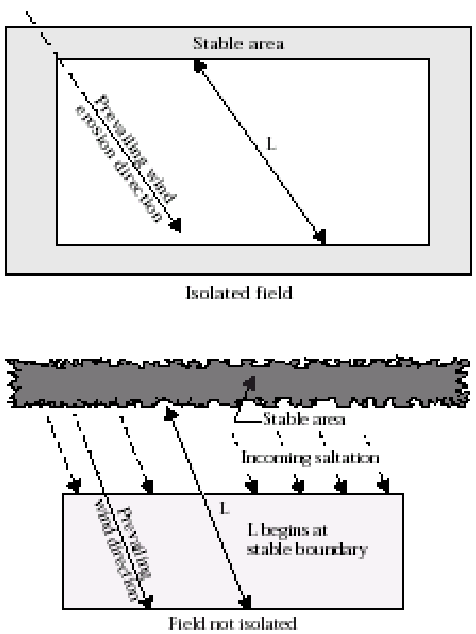


Figure 502-6 Unsheltered distance L, perennial vegetation (pasture or range)

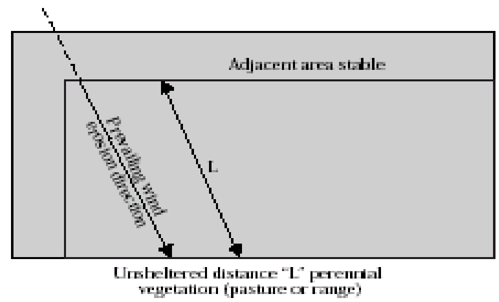
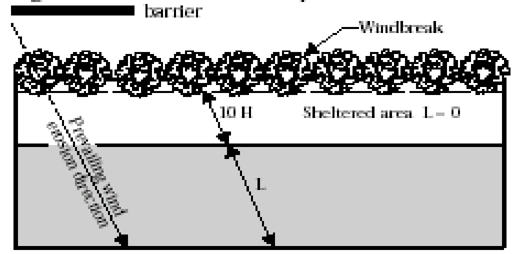


Figure 502-7 Unsheltered distaqnce L – windbreak or barrier



The L factor represents the unsheltered distance along the prevailing wind erosion direction for the field or area to be evaluated. Its place in the equation is to relate the *isolated, unsheltered, and wide* field condition of I to the size and shape of the field for which the erosion estimate is being prepared. Because V is considered after L in the 5-step solution of the equation, the unsheltered distance is always considered as if the field was bare except for vegetative barriers.

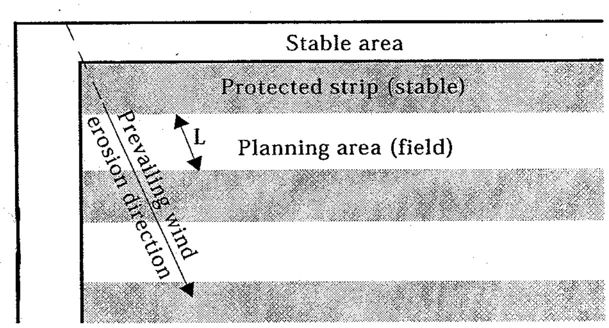
1. L begins at a point upwind where no saltation or surface creep occurs and ends at the downwind edge of the area being evaluated (Figure 502-5). The point may be at a field border or stable area where vegetation is sufficient to eliminate the erosion process. An area should be considered stable only if it is able to trap or hold virtually all expected saltation and surface creep from upwind. If vegetative barriers, grassed waterways, or other stable areas divide an agricultural field being evaluated, each area will be *isolated* and shall be evaluated as a separate *field*. For a grassed area to be stable, it must meet the following criteria: 1) Width of 12-15 feet and 2) Height of 1 to 2 feet. Refer to the appropriate NRCS Conservation Practice Standards to determine when practices are of adequate width, height, spacing, and density to create a stable area.

2. When erosion estimates are being calculated for cropland or other relatively unstable conditions, upwind pasture should be considered a stable border (Figure 502-6). The only case where L is equal to zero is where the area is fully sheltered by a barrier.

3. When a barrier is present on the upwind side of a field, measure L across the field along the prevailing wind erosion direction and subtract the distance sheltered by the barrier. Use 10 times the barrier height for the sheltered distance (Figure 502-7).

4. When a properly designed wind stripcropping system is applied, alternate strips are protected during critical wind erosion periods by a growing crop or by crop residue. These strips are considered stable. L is measured across each erosion-susceptible strip, along the prevailing wind erosion direction (Figure 502-8). The prevailing wind erosion direction is the direction from which the greatest amount of erosion occurs during the critical wind erosion period. The direction is usually expressed as one of the 16 compass points (Table 4B).

Figure 502-8 Unsheltered distance L, stripcropping system



L can be measured directly on a map:

- For uses of the Wind Erosion Equation involving a single annual calculation, L should be the measured distance across the area in the prevailing wind erosion direction from the stable upwind edge of the field to the downwind edge of the field.
- When the prevailing wind erosion direction is at an angle that is not perpendicular to the long side of the field, L can be determined by multiplying the width of the field by the appropriate conversion factor obtained from Table 4. Multiply the width of the field by the "Adjustment Factor." This is the L for the field.
- If a barrier is on the upwind side of the field, reduce L by a distance equal to 10 times the height of the barrier.

Vegetative cover factor, V

The effect of vegetative cover in the Wind Erosion Equation is expressed by relating the kind, amount, and orientation of vegetative material to its equivalent in pounds per acre of small grain residue in reference condition Small Grain Equivalent (SGE). This condition is defined as 10-inch long stalks of small grain, parallel to the wind, lying flat in rows spaced 10 inches apart, perpendicular to the wind. ARS has tested several crops in the wind tunnel to determine their SGE.

For other crops, small grain equivalency has been computed using various regression techniques (Armbrust and Lyles 1985; Lyles and Allison 1980; Lyles 1981; Woodruff et al. 1974; and Woodruff and Siddoway 1965). NRCS personnel have estimated SGE curves for other crops. SGE curves are referenced in this document. Orientation and anchoring of residue is important. In general, the finer and more upright the residue, the more effective it is for reducing wind erosion. Knowledge of these and other relationships can be used with benchmark values to estimate additional SGE values.

Research is underway to develop a method of estimating the relative erosion control value of short woody plants and other growing crops. Several methods are used to estimate the kind, amount, and orientation of vegetation in the field. Often the task is to predict what will be in the field in some future season or seasons. Amounts of vegetation may be predicted from production records or estimates and these amounts are then reduced by the expected or planned tillage. It may be desirable to sample and measure existing residue to determine quantity of residue. Local data should be developed to estimate surface residue per unit of crop yield and crop residue losses caused by tillage. (For Michigan, use the charts that use the Residue Conversion Procedure to Convert % Residue Cover to SGE.)

Procedure to Use the Wind Erosion Equation

The Wind Erosion Equation is expressed as: E = *f* (IKCLV) where:

E = estimated average annual soil loss in tons per acre per year
f = indicates relationships that are not straight-line mathematical calculations
I = soil erodibility index
K = soil surface roughness factor
C = climatic factor
L = the unsheltered distance
V = the vegetative cover factor

WEQ Procedural Steps:

Step 1: Determine the Soil "I" Value
Refer to the County Soils Data found in **Section II of the FOTG** to determine the "I" value or Field Office Technical Guide, Section I, Erosion Prediction-Water. The "I" is adjusted for knoll erodibility from Table 3, if applicable. The adjusted "I" value applies only to that area affected by knoll erosion.

Step 2: Determine the Soil Roughness (Ridge) Value (Krd)
Factor K adjusts the "I" factor for tillage-induced oriented roughness, Krd (ridges). Refer to Table 5 to determine the "K" value. It is expressed as a decimal from 0.5 to 1.0.

Step 3: Determine the Climatic Factor
Factor C adjusts "I" and "K" for the local climatic factor. See Table 2 for County Climatic Factors. C factors in Michigan range from 5-8; with 8 being 8 percent of the wind erosion that would occur at Garden City, Kansas under the reference condition.

Step 4: Determine the "L" - Length of the Unsheltered Distance
Factor L adjusts "I," "K," and "C" for unsheltered distance.

"L" can be measured directly on a map or calculated using a wind erosion direction factor:

For uses of the Wind Erosion Equation involving a single annual calculation, L should be the measured distance across the area in the prevailing wind erosion direction from the stable upwind edge of the field to the downwind edge of the field. When the prevailing wind erosion direction is at an angle that is not perpendicular to the long side of the field, L can be determined by multiplying the width of the field by the appropriate conversion factor obtained from Table 4.

Multiply the width of the field by the "Adjustment Factor." This is the L for the field. If a barrier is on the upwind side of the field, reduce L by a distance equal to 10 times the height of the barrier.

Step 5: Determine the "V" Vegetative Factor (SGE) for each crop in the rotation
Factor V adjusts "I," "K," "C," and "L" for vegetative cover.

a. Determine the amount of residue cover, if any.
b. Use Table 1 - Residue Conversion Procedure to Convert % Residue Cover to **SGe,** if appropriate.

Step 6: Determine "E" Estimated Annual Soil Loss by Wind
Refer to the appropriate "E" Tables. Multiply the "E" value by the Knoll Erodibility Factor, Table 3, if appropriate. See Table 7 - **Crop Tolerances to Blowing Soil** to determine the planned soil loss tolerance.

Wind Erosion Worksheet

Client:	Field #	Date:	County:

Step #1 — **Determine the Soil "I" Value** - Refer to Section II of the FOTG

Soil Type #1	"I" Value #1	Soil Type #2	"I" Value #2

Step #2 — **Determine the Soil Roughness (Ridge) Value (Krd) -** Refer to Table 5*

	Tillage Type used for Krd	Krd Value
Present		
Planned		

Step #3 — **Determine the Climatic Factor (See Table 2)**

Climatic Factor =

Step #4 — **Determine the "L" - Length of the Unsheltered Distance**

	Measured "L"	Or Calculated "L" (Table 4)			
		Angle of Deviation	Adj. Factor	Field Width	"L"
Present					
Planned					

Step #5 — **Determine the "V" Vegetative Factor (SGE) for each crop in the rotation**

#	Present Crop(s)	Type of Residue	% Residue Cover	Lbs. Of Residue Table 1	Table 1-SGe (NAM, Figures a1 through b6)
1					
2					
3					
4					
#	**Planned Crop(s)**	**Type of Residue**	**% Residue Cover**	**Lbs. Of Residue Table 1**	**Table 1-SGe (NAM, Figures a1 through b6)**
1					
2					
3					
4					

Step #6 — **Determine "E" - Estimated Annual Soil Loss by Wind**
Refer to the appropriate "E" Table (Table 6)
Adjust for Knoll Erodibility (if needed) (Table 3)

#	Present Crop(s)	Present (E) Soil Loss	Planned Crop(s)	Planned (E) Soil Loss
1				
2				
3				
4				

Comments

* For soils with an I value of 134 or greater, always use a K factor of 1(WEG 1 or 2); I =134, 220, 250, or 310.

Tables for WEQ - (Critical Period Method)

Index

TABLE 1 Residue Conversion Procedure to Convert % Residue Cover to SGe								
Corn			Soybeans			Small Grain - Alfalfa/Grass		
% Cover **2/**	Lbs. of Residue Per Acre	SGe	% Cover **2/**	Lbs. of Residue Per Acre	SGe	% Cover **2/**	Lbs. of Residue Per Acre	SGe
10	250	100	10	150	-	10	150	350
15	400	175	15	250	120	15	250	550
20	575	250	20	350	175	20	350	700
25	750	350	25	475	250	25	475	900
30	950	475	30	600	325	30	600	1100
35	1150	550	35	750	425	35	750	1300
40	1375	675	40	875	500	40	875	1400
45	1600	800	45	1025	600	45	1035	1600
50	1850	900	50	1200	700	50	1200	1800
55	2125	1100	55	1375	800	55	1375	2100
60	2400	1250	60	1600	1000	60	1550	2400
65	2900	1400	65	1750	1150	65	1875	2700
70	3425	1700	70	1950	1300	70	2175	2900
75	4000	2000	75	2175	1500	75	2550	3400
80	4650	2200	-	-	-	80	2990	3700
85	5325	2700	-	-	-	85	3400	4300
90	5325	3000	-	-	-	90	3850	4800
Other Crops and Residue SGes								
Growing Small Grain 45 Days After Emergence - SGe = 1500								
Corn Silage Stubble and Sorghum Stubble - SGe = 350								

1/ Sources
RUSLE2 - Pounds of Residue at 30%, 60%, 90%.
NRCS Field Measurements of corn, soybean, and wheat residues in Michigan.
Small Grain Equivalent Figures (National Agronomy Manual).

- A-1 Small Grain Residue (use for wheat, barley, rye, and oats) - Flat, Random Distribution.
- A-2 Growing Small Grain - 45 Days After Emergence.
- A-3 Corn Residue - Flat random distribution 60% stalk, 40% fines.
- A-4 Corn and Grain Sorghum Silage Stubble - 6.25 inches high 30" rows.
- B-2 Dry Bean, Lentil, Soybean, and Winter Pea Residue - Random flat residue.

2/ % Cover refers to the percent of the soil surface cover during critical erosion period.

3/ See charts for crops not listed above.

TABLE 2
Michigan County Climatic Factors
(Source: NAM, "Annual "C" Values of the Wind Erosion Equation.)

County	"C" Factor	County	"C" Factor	County	"C" Factor	County	"C" Factor
Alcona	5	Dickinson	6	Lake	7	Oceana	7
Alger	5	Eaton	7	Lapeer	8	Ogemaw	5
Allegan	8	Emmet	5	Leelanau	7	Ontonagon	5
Alpena	5	Genesee	8	Lenawee	7	Osceola	6
Antrim	7	Gladwin	6	Livingston	7	Oscoda	5
Arenac	6	Gogebic	5	Luce	5	Otsego	6
Baraga	5	GrandTraverse	7	Mackinac	5	Presque Isle	5
Barry	7	Gratiot	8	Macomb	8	Roscommon	5
Bay	8	Hillsdale	7	Manistee	7	Saginaw	8
Benzie	7	Houghton	5	Marquette	5	Sanilac	8
Berrien	8	Huron	8	Mason	7	Schoolcraft	5
Branch	7	Ingham	7	Mecosta	7	Shiawassee	8
Calhoun	7	Ionia	7	Menominee	6	St. Clair	8
Cass	7	Iosco	5	Midland	7	St. Joseph	7
Charlevoix	6	Iron	5	Missaukee	6	Tuscola	8
Cheyboygan	5	Isabella	7	Monroe	8	Van Buren	8
Chippewa	5	Jackson	7	Montcalm	7	Washtenaw	7
Clare	6	Kalamazoo	7	Montmorency	5	Wayne	8
Clinton	7	Kalkaska	7	Muskegon	8	Wexford	7
Crawford	6	Kent	7	Newaygo	7		
Delta	6	Keweenaw	6	Oakland	8		

TABLE 3 **Knoll Erodibility Adjustment Factor for "I"** (Adapted from NAM, Table 502-1) [(E) x (Adjustment Factor) = Knoll Erosion based on slope]	
Percent slope change in the prevailing wind erosion direction	**Increase at the crest area where erosion is most severe** (Adjustment Factor)
3%	1.5
4%	1.9
5%	2.5
6%	3.2
8%	4.8
10% or Greater	6.8

TABLE 4 **Calculated "L"** **Wind Erosion Direction Factors 1/** (Adapted from NAM, Table 502-3)	
Angle of Deviation 2/	**Adjustment Factor**
0^{o}	1.0
22.5^{o}	1.08
45^{o}	1.41
67.5^{o}	2.61
90^{o}	L = Length of the Field

1/ The adjustment factors are applicable when the preponderance is not considered. "L" cannot exceed the longest possible measured distance across the field.

2/ The angle of deviation of the prevailing erosive wind from a direction perpendicular to the long side of the field.

TABLE 4A
Prevailing Wind Erosion Direction and Preponderance of Wind Erosion Forces in the Prevailing Wind Erosion Direction
("Direction" means degrees, measured in a clockwise direction from north, which is 0^{o})

Location and Item	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Battle Creek, MI												
Direction	248	248	248	270	247	248	248	270	270	225	225	225
Preponderance	1.4	1.4	1.6	1.4	1.5	1.5	1.5	1.3	1.3	1.2	1.3	1.5
Cadillac, MI												
Direction	248	248	292	292	225	225	247	225	246	203	203	247
Preponderance	1.4	1.3	1.2	1.5	1.4	1.2	1.3	1.4	1.2	1.4	1.2	1.5
Duluth, MN												
Direction	292	270	293	90	90	248	270	68	270	248	293	293
Preponderance	1.9	1.6	1.3	1.7	1.7	2.0	1.7	1.5	1.8	1.3	1.6	1.7
Flint, MI												
Direction	225	270	248	248	247	248	248	225	225	225	225	225
Preponderance	1.4	1.4	1.6	1.4	1.3	1.6	1.4	1.8	1.2	1.2	1.6	1.5
Green Bay, WI												
Direction	292	228	225	247	225	225	225	225	225	225	270	227
Preponderance	1.2	1.3	1.4	1.2	1.4	1.5	1.3	1.9	1.7	1.3	1.3	1.2
Marquette, MI												
Direction	0	338	0	0	0	180	202	0	180	180	180	180
Preponderance	1.8	1.8	1.9	1.7	2.1	1.8	1.9	2.9	1.7	2.0	1.8	1.8
Mt. Clemens, MI												
Direction	225	225	225	203	180	201	202	180	180	202	203	225
Preponderance	1.5	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.6	1.5	1.4	1.4
Muskegon, MI												
Direction	248	270	248	225	205	225	225	203	203	203	225	270
Preponderance	1.7	1.6	1.4	1.2	1.5	1.7	1.4	2.3	1.4	1.4	1.5	1.1
Oscoda, MI												
Direction	338	315	270	239	227	270	202	225	248	224	226	315
Preponderance	1.2	1.2	1.2	1.3	1.1	1.1	1.1	1.3	1.2	1.2	1.1	1.0
Pellston, MI												
Direction	270	270	270	270	270	248	248	248	248	248	292	270
Preponderance	1.4	1.7	1.6	1.5	1.5	1.8	2.0	1.7	1.5	1.3	1.4	1.4
Sault Ste. Marie, MI												
Direction	292	293	293	293	293	293	293	293	293	293	293	292
Preponderance	1.8	2.3	2.5	2.9	2.5	2.6	3.1	2.2	2.3	2.3	1.9	2.1
South Bend, IN												
Direction	225	270	90	315	338	338	338	0	180	180	225	225
Preponderance	1.2	1.2	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.2	1.4	1.2
Toledo, OH												
Direction	247	247	248	247	247	225	204	225	248	225	220	225
Preponderance	1.4	1.5	1.4	1.6	1.7	1.4	1.1	1.3	1.4	1.5	1.6	2.0
Traverse City, MI												
Direction	203	202	202	202	203	225	203	203	202	202	180	225
Preponderance	1.3	1.3	1.4	1.4	1.6	1.7	1.6	1.6	1.5	1.7	1.7	1.3
Ypsilanti, MI												
Direction	248	270	270	270	270	270	270	270	270	248	248	248
Preponderance	1.5	1.6	1.9	1.8	1.5	1.6	1.6	1.3	1.5	1.3	1.6	1.5

- Prevailing Wind Erosion Direction - Direction of winds over 12 mph one foot above ground surface.
- Preponderance – Change of wind coming from a certain direction. A preponderance of 1.5 means that there is a 1.5 to 1.0 or 60% chance that the wind can come from the prevailing wind erosion direction.

TABLE 4B
Angle of Deviation
(The angle between the prevailing wind erosion direction and a line perpendicular to row direction when determining effect of wind direction on the ridge roughness factor.)

Prevailing Wind Erosion Direction in Degrees	East/West	North/South
0-360	0	90
22.5	22.5	67.5
45	45	45
67.5	67.5	22.5
90	90	0
112.5	67.5	22.5
135	45	45
157.5	22.5	67.5
180	0	90
202.5	22.5	67.5
225	45	45
247.5	67.5	22.5
270	90	0
292.5	67.5	22.5
315	45	45
337.5	22.5	67.5
360-0	0	90

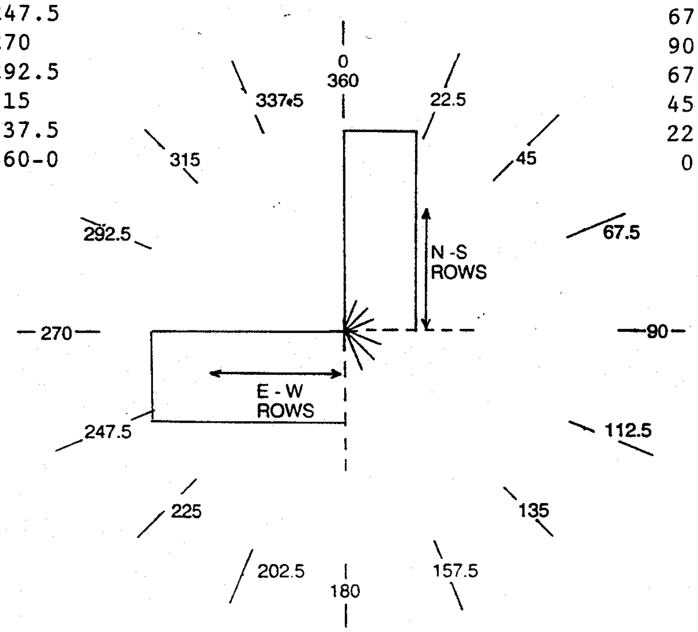


TABLE 5
Soil Roughness (Ridge) Values (Krd)
(Adapted from NAM, Tables 502-5A through 502-5T)

Tillage / Planting System	"K" Roughness / Ridge Factor*
Disk, Field Cultivate, Smooth	K = 1.0
Disk, Field Cultivate, 1-2 inch ridges by 12-18 inches wide	K = 0.9
Disk, Field Cultivate, 2-3 inch ridges by 12-18 inches wide	K = 0.8
Chisel Plow, 3-4 inch ridges by 18 inches wide	K = 0.7
Chisel Plow, 5-6 inch ridges by 18 inches wide	K = 0.6
Ridge Tillage, 4-6 inch ridges by 30 inches wide	K = 0.5
Tomato Bed, 4-6 feet wide, with furrow	K = 0.9
No Till Planting	K = 1.0

* For soils with a I value of 134 or greater always use a K factor of 1(WEG 1 or 2); I =134, 220, 250, or 310.

TABLE 6
(E) Tables - Climate Areas (5, 6, 7, 8), "I" Values (310, 250, 220, 134), K Values (1.0)
For "I "Value (86), K Values (1.0, 0.9, 0.8, 0.7, 0.6, 0.5)

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998
C = 5
SURFACE - K = 1.00 I = 310
(L) (V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	15.5	12.7	8.9	5.5	2.5	0.9							
8000	15.5	12.7	8.9	5.5	2.5	0.9							
6000	15.5	12.7	8.9	5.5	2.5	0.9							
4000	15.5	12.7	8.9	5.5	2.5	0.9							
3000	15.5	12.7	8.9	5.5	2.5	0.9							
2000	15.5	12.7	8.9	5.5	2.5	0.9							
1000	15.5	12.7	8.9	5.5	2.5	0.9							
800	15.5	12.7	8.9	5.5	2.5	0.9							
600	15.5	12.7	8.9	5.5	2.5	0.9							
400	15.5	12.7	8.9	5.5	2.5	0.9							
300	15.0	12.2	8.6	5.2	2.3	0.8							
200	13.8	11.3	7.8	4.8	2.1	0.7							
150	12.7	10.3	7.1	4.3	1.8	0.4							
100	11.6	9.4	6.4	3.8	1.6	0.3							
80	10.4	8.4	5.7	3.3	1.4	0.3							
60	8.6	6.9	4.6	2.6	1.1	0.2							
50	7.3	5.8	3.8	2.1	0.7								
40	6.0	4.8	3.1	1.7	0.6								
30	4.3	3.4	2.1	1.1	0.4								
20	2.7	2.1	1.3	0.6									
10	1.1	0.8	0.4										

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998
C = 5
SURFACE - K = 1.00 I = 250
(L) (V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	12.5	10.2	7.0	4.2	1.8	0.4							
8000	12.5	10.2	7.0	4.2	1.8	0.4							
6000	12.5	10.2	7.0	4.2	1.8	0.4							
4000	12.5	10.2	7.0	4.2	1.8	0.4							
3000	12.5	10.2	7.0	4.2	1.8	0.4							
2000	12.5	10.2	7.0	4.2	1.8	0.4							
1000	12.5	10.2	7.0	4.2	1.8	0.4							
800	12.5	10.2	7.0	4.2	1.8	0.4							
600	12.5	10.2	7.0	4.2	1.8	0.4							
400	11.7	9.5	6.5	3.9	1.7	0.4							
300	11.0	8.9	6.1	3.6	1.5	0.3							
200	9.5	7.6	5.1	3.0	1.2	0.3							
150	8.0	6.4	4.3	2.4	0.8								
100	6.5	5.2	3.4	1.9	0.6								
80	5.1	4.0	2.6	1.4	0.5								
60	3.4	2.7	1.7	0.8									
50	3.0	2.4	1.4	0.7									
40	2.6	2.0	1.2	0.6									
30	1.8	1.3	0.7										
20	1.1	0.8	0.4										

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 1.00 I = 220

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	11.0	8.9	6.1	3.6	1.5	0.3							
8000	11.0	8.9	6.1	3.6	1.5	0.3							
6000	11.0	8.9	6.1	3.6	1.5	0.3							
4000	11.0	8.9	6.1	3.6	1.5	0.3							
3000	11.0	8.9	6.1	3.6	1.5	0.3							
2000	11.0	8.9	6.1	3.6	1.5	0.3							
1000	11.0	8.9	6.1	3.6	1.5	0.3							
800	11.0	8.9	6.1	3.6	1.5	0.3							
600	10.2	8.3	5.6	3.3	1.4	0.3							
400	9.5	7.6	5.1	3.0	1.2	0.3							
300	8.6	6.9	4.6	2.6	1.1	0.2							
200	6.9	5.5	3.6	2.0	0.7								
150	5.2	4.1	2.6	1.4	0.5								
100	4.4	3.4	2.2	1.1	0.4								
80	3.7	2.9	1.8	0.9									
60	2.5	2.0	1.2	0.5									
50	1.9	1.5	0.8										
40	1.7	1.3	0.7										
30	1.2	0.9	0.5										
20	0.7	0.4											
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 1.00 I= 134

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	6.7	5.3	3.5	1.9	0.6								
8000	6.7	5.3	3.5	1.9	0.6								
6000	6.7	5.3	3.5	1.9	0.6								
4000	6.7	5.3	3.5	1.9	0.6								
3000	6.7	5.3	3.5	1.9	0.6								
2000	6.7	5.3	3.5	1.9	0.6								
1000	5.6	4.4	2.8	1.5	0.5								
800	5.2	4.1	2.6	1.4	0.5								
600	4.5	3.6	2.3	1.2	0.4								
400	3.8	3.0	1.9	0.9									
300	3.3	2.6	1.6	0.8									
200	2.3	1.8	1.1	0.5									
150	1.8	1.4	0.7										
100	1.4	1.1	0.6										
80	1.1	0.8	0.4										
60	0.8	0.5											
50	0.7	0.4											
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 1.00 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.3	3.4	2.1	1.1	0.4								
8000	4.3	3.4	2.1	1.1	0.4								
6000	4.3	3.4	2.1	1.1	0.4								
4000	4.3	3.4	2.1	1.1	0.4								
3000	4.2	3.3	2.1	1.1	0.4								
2000	3.9	3.1	1.9	0.9									
1000	3.1	2.4	1.5	0.7									
800	2.8	2.2	1.3	0.6									
600	2.1	1.6	1.0	0.4									
400	1.7	1.3	0.7										
300	1.4	1.0	0.5										
200	0.9	0.5											
150	0.7	0.4											
100	0.5	0.3											
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 0.90 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.9	3.0	1.9	0.9									
8000	3.9	3.0	1.9	0.9									
6000	3.9	3.0	1.9	0.9									
4000	3.8	3.0	1.8	0.9									
3000	3.6	2.8	1.8	0.8									
2000	3.3	2.6	1.6	0.7									
1000	2.5	1.9	1.1	0.5									
800	2.2	1.7	1.0	0.5									
600	1.8	1.4	0.7										
400	1.4	1.1	0.6										
300	1.1	0.8	0.4										
200	0.8	0.5											
150	0.6	0.4											
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 0.80 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.4	2.7	1.7	0.8									
8000	3.4	2.7	1.7	0.8									
6000	3.4	2.7	1.7	0.8									
4000	3.1	2.4	1.5	0.7									
3000	2.9	2.3	1.4	0.7									
2000	2.6	2.0	1.2	0.6									
1000	1.9	1.4	0.8										
800	1.7	1.3	0.7										
600	1.5	1.1	0.6										
400	1.2	0.9	0.5										
300	0.9	0.5											
200	0.7	0.4											
150													
100													
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5
SURFACE - K = 0.70 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.0	2.3	1.4	0.7									
8000	3.0	2.3	1.4	0.7									
6000	3.0	2.3	1.4	0.7									
4000	2.8	2.2	1.3	0.6									
3000	2.6	2.0	1.2	0.6									
2000	2.2	1.7	1.0	0.5									
1000	1.6	1.2	0.7										
800	1.5	1.2	0.6										
600	1.2	0.9	0.5										
400	0.9	0.5											
300	0.8	0.4											
200	0.5	0.3											
150													
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5

SURFACE - K = 0.60 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	2.6	2.0	1.2	0.6									
8000	2.6	2.0	1.2	0.6									
6000	2.6	2.0	1.2	0.6									
4000	2.3	1.8	1.0	0.5									
3000	2.0	1.6	0.8										
2000	1.8	1.4	0.8										
1000	1.4	1.1	0.6										
800	1.2	0.9	0.5										
600	1.0	0.5											
400	0.8	0.5											
300	0.6	0.4											
200													
150													
100													
80													
60													
50													
40													
30													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 5

SURFACE - K = 0.50 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	2.2	1.6	1.0	0.4									
8000	2.2	1.6	1.0	0.4									
6000	2.2	1.6	1.0	0.4									
4000	1.9	1.5	0.8										
3000	1.8	1.4	0.7										
2000	1.6	1.2	0.6										
1000	1.1	0.9	0.5										
800	1.0	0.5											
600	0.8	0.5											
400	0.6	0.4											
300													
200													
150													
100													
80													
60													
50													
40-10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 1.00 I = 310

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	18.6	15.3	10.9	6.9	3.2	1.2							
8000	18.6	15.3	10.9	6.9	3.2	1.2							
6000	18.6	15.3	10.9	6.9	3.2	1.2							
4000	18.6	15.3	10.9	6.9	3.2	1.2							
3000	18.6	15.3	10.9	6.9	3.2	1.2							
2000	18.6	15.3	10.9	6.9	3.2	1.2							
1000	18.6	15.3	10.9	6.9	3.2	1.2							
800	18.6	15.3	10.9	6.9	3.2	1.2							
600	18.6	15.3	10.9	6.9	3.2	1.2							
400	18.6	15.3	10.9	6.9	3.2	1.2							
300	18.1	14.9	10.6	6.6	3.0	1.2							
200	16.4	13.5	9.5	5.9	2.7	1.0							
150	14.9	12.2	8.5	5.2	2.3	0.8							
100	13.7	11.2	7.8	4.7	2.1	0.7							
80	12.6	10.2	7.0	4.2	1.8	0.4							
60	10.7	8.6	5.9	3.4	1.4	0.3							
50	9.4	7.5	5.1	2.9	1.2	0.3							
40	8.1	6.5	4.3	2.4	0.8								
30	5.5	4.4	2.8	1.5	0.5								
20	3.6	2.8	1.8	0.8									
10	1.5	1.1	0.6										

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 1.00 I = 250

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	15.0	12.3	8.6	5.3	2.3	0.8							
8000	15.0	12.3	8.6	5.3	2.3	0.8							
6000	15.0	12.3	8.6	5.3	2.3	0.8							
4000	15.0	12.3	8.6	5.3	2.3	0.8							
3000	15.0	12.3	8.6	5.3	2.3	0.8							
2000	15.0	12.3	8.6	5.3	2.3	0.8							
1000	15.0	12.3	8.6	5.3	2.3	0.8							
800	15.0	12.3	8.6	5.3	2.3	0.8							
600	15.0	12.3	8.6	5.3	2.3	0.8							
400	14.2	11.6	8.1	4.9	2.2	0.8							
300	13.5	11.0	7.6	4.6	2.0	0.7							
200	12.0	9.7	6.7	4.0	1.7	0.4							
150	10.5	8.4	5.7	3.4	1.4	0.3							
100	9.0	7.2	4.8	2.8	1.1	0.3							
80	7.5	6.0	4.0	2.2	0.7								
60	4.5	3.5	2.2	1.2	0.4								
50	4.1	3.2	2.0	1.0	0.3								
40	3.7	2.9	1.8	0.9									
30	2.5	1.9	1.2	0.5									
20	1.6	1.2	0.6										
10	0.6	0.4											

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 1.00 I = 220

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	13.2	10.7	7.4	4.5	2.0	0.4							
8000	13.2	10.7	7.4	4.5	2.0	0.4							
6000	13.2	10.7	7.4	4.5	2.0	0.4							
4000	13.2	10.7	7.4	4.5	2.0	0.4							
3000	13.2	10.7	7.4	4.5	2.0	0.4							
2000	13.2	10.7	7.4	4.5	2.0	0.4							
1000	13.2	10.7	7.4	4.5	2.0	0.4							
800	13.2	10.7	7.4	4.5	2.0	0.4							
600	12.4	10.1	7.0	4.2	1.8	0.4							
400	11.7	9.5	6.5	3.9	1.6	0.4							
300	10.8	8.7	5.9	3.5	1.5	0.3							
200	9.0	7.2	4.8	2.8	1.1	0.3							
150	7.4	5.9	3.9	2.2	0.7								
100	5.8	4.5	2.9	1.6	0.5								
80	4.6	3.6	2.3	1.2	0.4								
60	3.5	2.7	1.7	0.8									
50	2.8	2.2	1.3	0.6									
40	2.1	1.6	1.0	0.4									
30	1.6	1.2	0.6										
20	0.9	0.5											
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 1.00 I = 134

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	8.0	6.4	4.3	2.4	0.8								
8000	8.0	6.4	4.3	2.4	0.8								
6000	8.0	6.4	4.3	2.4	0.8								
4000	8.0	6.4	4.3	2.4	0.8								
3000	8.0	6.4	4.3	2.4	0.8								
2000	8.0	6.4	4.3	2.4	0.8								
1000	6.9	5.5	3.6	2.0	0.7								
800	6.6	5.2	3.4	1.9	0.6								
600	5.3	4.1	2.7	1.4	0.5								
400	4.4	3.5	2.2	1.2	0.4								
300	3.9	3.0	1.9	0.9									
200	2.9	2.3	1.4	0.6									
150	2.1	1.6	0.9	0.4									
100	1.7	1.3	0.7										
80	1.3	1.0	0.5										
60	0.9	0.5											
50	0.8	0.5											
40	0.6	0.4											
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 1.00 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	5.2	4.1	2.6	1.4	0.5								
8000	5.2	4.1	2.6	1.4	0.5								
6000	5.2	4.1	2.6	1.4	0.5								
4000	5.2	4.1	2.6	1.4	0.5								
3000	5.0	4.0	2.5	1.4	0.4								
2000	4.7	3.7	2.3	1.2	0.4								
1000	3.9	3.0	1.9	0.9									
800	3.6	2.8	1.7	0.8									
600	2.9	2.2	1.4	0.6									
400	2.0	1.5	0.8										
300	1.7	1.3	0.7										
200	1.2	0.9	0.5										
150	0.9	0.5											
100	0.7	0.4											
80	0.5	0.3											
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 0.90 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.6	3.6	2.3	1.2	0.4								
8000	4.6	3.6	2.3	1.2	0.4								
6000	4.6	3.6	2.3	1.2	0.4								
4000	4.6	3.6	2.3	1.2	0.4								
3000	4.4	3.5	2.2	1.1	0.4								
2000	4.1	3.2	2.0	1.0	0.3								
1000	3.2	2.5	1.5	0.7									
800	2.9	2.3	1.4	0.6									
600	2.3	1.7	1.0	0.5									
400	1.8	1.3	0.7										
300	1.5	1.1	0.6										
200	1.0	0.6											
150	0.8	0.5											
100	0.6	0.3											
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6

SURFACE - K = 0.80 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.1	3.2	2.0	1.1	0.4								
8000	4.1	3.2	2.0	1.1	0.4								
6000	4.1	3.2	2.0	1.1	0.4								
4000	3.8	3.0	1.9	0.9									
3000	3.6	2.8	1.8	0.8									
2000	3.3	2.6	1.6	0.8									
1000	2.4	1.8	1.1	0.5									
800	2.1	1.6	0.9	0.4									
600	1.8	1.4	0.7										
400	1.5	1.1	0.6										
300	1.2	0.9	0.5										
200	0.8	0.5											
150	0.6	0.4											
100													
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6

SURFACE - K = 0.70 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.6	2.8	1.7	0.8									
8000	3.6	2.8	1.7	0.8									
6000	3.6	2.8	1.7	0.8									
4000	3.4	2.7	1.7	0.8									
3000	3.2	2.5	1.5	0.7									
2000	2.8	2.2	1.3	0.6									
1000	1.9	1.4	0.8										
800	1.8	1.4	0.7										
600	1.5	1.1	0.6										
400	1.1	0.8	0.4										
300	0.9	0.5											
200	0.7	0.4											
150													
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 0.60 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.1	2.4	1.5	0.7									
8000	3.1	2.4	1.5	0.7									
6000	3.1	2.4	1.5	0.7									
4000	2.8	2.2	1.3	0.6									
3000	2.6	2.0	1.2	0.5									
2000	2.2	1.7	1.0	0.5									
1000	1.6	1.3	0.7										
800	1.5	1.1	0.6										
600	1.2	0.9	0.5										
400	0.9	0.5											
300	0.8	0.4											
200													
150													
100													
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 6
SURFACE - K = 0.50 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	2.6	2.0	1.2	0.6									
8000	2.6	2.0	1.2	0.6									
6000	2.6	2.0	1.2	0.6									
4000	2.2	1.7	1.0	0.5									
3000	2.0	1.5	0.8										
2000	1.8	1.3	0.7										
1000	1.3	1.0	0.5										
800	1.1	0.8	0.4										
600	0.9	0.5											
400	0.7	0.4											
300	0.5	0.3											
200													
150													
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 1.00 I = 310

(L) UNSHELTERED DISTANCE IN FEET / (V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
8000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
6000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
4000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
3000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
2000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
1000	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
800	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
600	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
400	21.7	18.0	13.0	8.3	4.0	1.6	0.6						
300	21.2	17.6	12.6	8.1	3.8	1.5	0.5						
200	19.6	16.2	11.6	7.3	3.4	1.3							
150	18.0	14.8	10.5	6.6	3.0	1.1							
100	16.3	13.4	9.4	5.8	2.6	1.0							
80	14.8	12.1	8.4	5.2	2.3	0.8							
60	12.9	10.5	7.2	4.4	1.9	0.4							
50	11.6	9.4	6.4	3.8	1.6	0.3							
40	10.3	8.3	5.6	3.3	1.4	0.3							
30	7.7	6.1	4.1	2.3	0.8								
20	4.6	3.6	2.3	1.2	0.4								
10	1.9	1.4	0.8										

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 1.00 I = 250

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	17.5	14.4	10.2	6.4	2.9	1.1							
8000	17.5	14.4	10.2	6.4	2.9	1.1							
6000	17.5	14.4	10.2	6.4	2.9	1.1							
4000	17.5	14.4	10.2	6.4	2.9	1.1							
3000	17.5	14.4	10.2	6.4	2.9	1.1							
2000	17.5	14.4	10.2	6.4	2.9	1.1							
1000	17.5	14.4	10.2	6.4	2.9	1.1							
800	17.5	14.4	10.2	6.4	2.9	1.1							
600	17.5	14.4	10.2	6.4	2.9	1.1							
400	16.4	13.5	9.5	5.9	2.7	1.0							
300	15.3	12.5	8.8	5.4	2.4	0.9							
200	13.7	11.2	7.8	4.7	2.1	0.7							
150	12.2	9.9	6.8	4.1	1.7	0.4							
100	10.7	8.6	5.9	3.4	1.4	0.3							
80	9.2	7.4	5.0	2.9	1.2	0.3							
60	5.5	4.4	2.8	1.5	0.5								
50	4.8	3.8	2.4	1.3	0.4								
40	4.4	3.5	2.2	1.2	0.4								
30	3.2	2.5	1.6	0.7									
20	1.9	1.4	0.8										
10	0.8	0.5											

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7

SURFACE - K = 1.00 I = 220

(L) UNSHELTERED DISTANCE IN FEET — (V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	15.4	12.6	8.8	5.4	2.4	0.9							
8000	15.4	12.6	8.8	5.4	2.4	0.9							
6000	15.4	12.6	8.8	5.4	2.4	0.9							
4000	15.4	12.6	8.8	5.4	2.4	0.9							
3000	15.4	12.6	8.8	5.4	2.4	0.9							
2000	15.4	12.6	8.8	5.4	2.4	0.9							
1000	15.4	12.6	8.8	5.4	2.4	0.9							
800	15.4	12.6	8.8	5.4	2.4	0.9							
600	14.5	11.9	8.3	5.0	2.2	0.8							
400	13.8	11.2	7.8	4.7	2.1	0.7							
300	12.9	10.5	7.2	4.3	1.9	0.4							
200	11.0	8.9	6.1	3.6	1.5	0.3							
150	9.4	7.6	5.1	2.9	1.2	0.3							
100	7.8	6.2	4.1	2.3	0.8								
80	6.2	4.9	3.2	1.7	0.6								
60	4.4	3.4	2.2	1.1	0.4								
50	3.7	2.9	1.8	0.9									
40	3.0	2.3	1.4	0.7									
30	1.9	1.5	0.8										
20	1.2	0.9	0.5										
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7

SURFACE - K = 1.00 I = 134

(L) UNSHELTERED DISTANCE IN FEET — (V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	9.4	7.5	5.1	2.9	1.2	0.3							
8000	9.4	7.5	5.1	2.9	1.2	0.3							
6000	9.4	7.5	5.1	2.9	1.2	0.3							
4000	9.4	7.5	5.1	2.9	1.2	0.3							
3000	9.4	7.5	5.1	2.9	1.2	0.3							
2000	9.4	7.5	5.1	2.9	1.2	0.3							
1000	8.2	6.6	4.4	2.5	0.8								
800	7.9	6.3	4.2	2.4	0.8								
600	6.6	5.2	3.4	1.9	0.6								
400	5.0	4.0	2.5	1.3	0.4								
300	4.5	3.5	2.2	1.2	0.4								
200	3.5	2.7	1.7	0.8									
150	2.7	2.0	1.2	0.6									
100	1.9	1.5	0.8										
80	1.6	1.2	0.6										
60	1.1	0.8	0.4										
50	0.9	0.5											
40	0.8	0.4											
30	0.5	0.3											
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 1.00 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	6.0	4.8	3.1	1.7	0.6								
8000	6.0	4.8	3.1	1.7	0.6								
6000	6.0	4.8	3.1	1.7	0.6								
4000	6.0	4.8	3.1	1.7	0.6								
3000	5.9	4.7	3.0	1.6	0.5								
2000	5.1	4.0	2.6	1.4	0.5								
1000	4.2	3.3	2.1	1.1	0.4								
800	3.9	3.1	1.9	0.9									
600	3.3	2.5	1.6	0.7									
400	2.4	1.8	1.1	0.5									
300	1.8	1.4	0.8										
200	1.4	1.0	0.6										
150	1.0	0.6											
100	0.8	0.4											
80	0.6	0.4											
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 0.90 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	5.4	4.3	2.7	1.5	0.5								
8000	5.4	4.3	2.7	1.5	0.5								
6000	5.4	4.3	2.7	1.5	0.5								
4000	5.2	4.1	2.6	1.4	0.5								
3000	5.0	3.9	2.5	1.3	0.4								
2000	4.6	3.6	2.3	1.2	0.4								
1000	3.8	2.9	1.8	0.9									
800	3.5	2.7	1.7	0.8									
600	2.8	2.2	1.3	0.6									
400	2.0	1.5	0.8										
300	1.7	1.3	0.7										
200	1.2	0.9	0.5										
150	0.9	0.5											
100	0.7	0.4											
80	0.5	0.3											
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 0.80 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.8	3.8	2.4	1.3	0.4								
8000	4.8	3.8	2.4	1.3	0.4								
6000	4.8	3.8	2.4	1.3	0.4								
4000	4.5	3.5	2.2	1.2	0.4								
3000	4.3	3.4	2.1	1.1	0.4								
2000	4.0	3.1	2.0	1.0	0.3								
1000	3.0	2.4	1.4	0.7									
800	2.8	2.1	1.3	0.6									
600	2.2	1.7	1.0	0.5									
400	1.8	1.3	0.7										
300	1.5	1.1	0.6										
200	1.0	0.6											
150	0.8	0.5											
100	0.6	0.4											
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 0.70 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.2	3.3	2.1	1.1	0.4								
8000	4.2	3.3	2.1	1.1	0.4								
6000	4.2	3.3	2.1	1.1	0.4								
4000	4.1	3.2	2.0	1.0	0.3								
3000	3.8	3.0	1.9	0.9									
2000	3.4	2.7	1.7	0.8									
1000	2.4	1.8	1.1	0.5									
800	2.1	1.6	1.0	0.4									
600	1.7	1.3	0.7										
400	1.4	1.0	0.6										
300	1.1	0.8	0.4										
200	0.8	0.5											
150	0.6	0.4											
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 0.60 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.6	2.8	1.7	0.8									
8000	3.6	2.8	1.7	0.8									
6000	3.6	2.8	1.7	0.8									
4000	3.3	2.6	1.6	0.8									
3000	3.1	2.4	1.5	0.7									
2000	2.7	2.1	1.3	0.6									
1000	1.9	1.4	0.8										
800	1.7	1.3	0.7										
600	1.4	1.0	0.6										
400	1.0	0.8	0.4										
300	0.9	0.5											
200	0.6	0.4											
150													
100													
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 7
SURFACE - K = 0.50 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.0	2.3	1.4	0.7									
8000	3.0	2.3	1.4	0.7									
6000	3.0	2.3	1.4	0.7									
4000	2.6	2.0	1.2	0.6									
3000	2.4	1.8	1.1	0.5									
2000	1.9	1.5	0.8										
1000	1.5	1.1	0.6										
800	1.3	1.0	0.5										
600	1.0	0.6											
400	0.8	0.5											
300	0.6	0.4											
200													
150													
100													
80													
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR   JANUARY, 1998

C = 8
SURFACE - K = 1.00   I = 310

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
8000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
6000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
4000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
3000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
2000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
1000	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
800	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
600	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
400	24.8	20.7	15.1	9.8	4.8	2.0	0.7						
300	24.3	20.2	14.7	9.6	4.6	1.9	0.7						
200	22.7	18.9	13.7	8.8	4.2	1.7	0.6						
150	21.2	17.5	12.6	8.1	3.8	1.5	0.5						
100	19.6	16.2	11.6	7.3	3.4	1.3							
80	17.9	14.8	10.5	6.6	3.0	1.1							
60	15.2	12.5	8.7	5.4	2.4	0.9							
50	13.8	11.3	7.8	4.8	2.1	0.7							
40	12.5	10.2	7.0	4.2	1.8	0.4							
30	9.9	7.9	5.4	3.1	1.3	0.3							
20	6.2	4.9	3.2	1.7	0.6								
10	2.6	2.0	1.2	0.6									

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR   JANUARY, 1998

C = 8
SURFACE - K = 1.00   I = 250

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
8000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
6000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
4000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
3000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
2000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
1000	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
800	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
600	20.0	16.5	11.8	7.5	3.5	1.4	0.5						
400	18.9	15.6	11.1	7.0	3.3	1.2							
300	17.8	14.7	10.4	6.5	3.0	1.1							
200	15.7	12.8	9.0	5.5	2.5	0.9							
150	13.9	11.4	7.9	4.8	2.1	0.7							
100	12.4	10.1	6.9	4.2	1.8	0.4							
80	10.9	8.8	6.0	3.5	1.5	0.3							
60	7.2	5.7	3.8	2.1	0.7								
50	6.3	5.0	3.2	1.8	0.6								
40	5.4	4.2	2.7	1.5	0.5								
30	4.0	3.1	1.9	0.9									
20	2.4	1.9	1.1	0.5									
10	1.0	0.5											

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8
SURFACE - K = 1.00 I = 220

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	17.6	14.5	10.3	6.4	2.9	1.1							
8000	17.6	14.5	10.3	6.4	2.9	1.1							
6000	17.6	14.5	10.3	6.4	2.9	1.1							
4000	17.6	14.5	10.3	6.4	2.9	1.1							
3000	17.6	14.5	10.3	6.4	2.9	1.1							
2000	17.6	14.5	10.3	6.4	2.9	1.1							
1000	17.6	14.5	10.3	6.4	2.9	1.1							
800	17.6	14.5	10.3	6.4	2.9	1.1							
600	16.5	13.6	9.6	5.9	2.7	1.0							
400	15.4	12.6	8.9	5.4	2.4	0.9							
300	14.4	11.8	8.2	5.0	2.2	0.8							
200	12.6	10.2	7.0	4.2	1.8	0.4							
150	10.9	8.8	6.0	3.5	1.5	0.3							
100	9.3	7.4	5.0	2.9	1.2	0.3							
80	7.6	6.1	4.0	2.3	0.8								
60	5.0	3.9	2.5	1.3	0.4								
50	4.3	3.4	2.1	1.1	0.4								
40	3.7	2.8	1.8	0.8									
30	2.5	1.9	1.2	0.5									
20	1.5	1.2	0.6										
10	0.6	0.4											

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8
SURFACE - K = 1.00 I = 134

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE 0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	10.7	8.7	5.9	3.5	1.5	0.3							
8000	10.7	8.7	5.9	3.5	1.5	0.3							
6000	10.7	8.7	5.9	3.5	1.5	0.3							
4000	10.7	8.7	5.9	3.5	1.5	0.3							
3000	10.7	8.7	5.9	3.5	1.5	0.3							
2000	10.7	8.7	5.9	3.5	1.5	0.3							
1000	9.6	7.7	5.2	3.0	1.2	0.3							
800	9.2	7.4	5.0	2.9	1.2	0.3							
600	7.9	6.3	4.2	2.4	0.8								
400	6.3	5.0	3.3	1.8	0.6								
300	5.1	4.0	2.6	1.4	0.5								
200	4.1	3.2	2.0	1.0	0.3								
150	3.2	2.5	1.5	0.7									
100	2.4	1.8	1.1	0.5									
80	1.8	1.4	0.8										
60	1.4	1.0	0.5										
50	1.1	0.8	0.4										
40	0.9	0.5											
30	0.6	0.4											
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8

SURFACE - K = 1.00 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	6.9	5.5	3.6	2.0	0.7								
8000	6.9	5.5	3.6	2.0	0.7								
6000	6.9	5.5	3.6	2.0	0.7								
4000	6.9	5.5	3.6	2.0	0.7								
3000	6.8	5.4	3.5	2.0	0.7								
2000	6.0	4.7	3.1	1.7	0.6								
1000	4.6	3.6	2.3	1.2	0.4								
800	4.3	3.4	2.1	1.1	0.4								
600	3.6	2.8	1.8	0.8									
400	2.7	2.1	1.3	0.6									
300	2.0	1.5	0.8										
200	1.5	1.2	0.6										
150	1.1	0.8	0.4										
100	0.8	0.5											
80	0.7	0.4											
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8

SURFACE - K = 0.90 I = 86

(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE

(L) UNSHELTERED DISTANCE IN FEET	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	6.2	4.9	3.2	1.7	0.6								
8000	6.2	4.9	3.2	1.7	0.6								
6000	6.2	4.9	3.2	1.7	0.6								
4000	6.0	4.8	3.1	1.7	0.6								
3000	5.7	4.5	2.9	1.6	0.5								
2000	5.0	3.9	2.5	1.3	0.4								
1000	4.1	3.2	2.0	1.1	0.3								
800	3.8	3.0	1.9	0.9									
600	3.2	2.4	1.5	0.7									
400	2.3	1.8	1.1	0.5									
300	1.8	1.4	0.8										
200	1.4	1.0	0.6										
150	1.0	0.6											
100	0.8	0.4											
80	0.6	0.4											
60													
50													
40													
30													
20													
10													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8
SURFACE - K = 0.80 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	5.5	4.3	2.8	1.5	0.5								
8000	5.5	4.3	2.8	1.5	0.5								
6000	5.5	4.3	2.8	1.5	0.5								
4000	4.9	3.9	2.5	1.3	0.4								
3000	4.7	3.7	2.4	1.2	0.4								
2000	4.4	3.5	2.2	1.2	0.4								
1000	3.5	2.7	1.7	0.8									
800	3.2	2.5	1.5	0.7									
600	2.6	2.0	1.2	0.6									
400	1.9	1.5	0.8										
300	1.7	1.3	0.7										
200	1.2	0.9	0.5										
150	0.9	0.5											
100	0.7	0.4											
80	0.5	0.3											
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR JANUARY, 1998

C = 8
SURFACE - K = 0.70 I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.8	3.8	2.4	1.3	0.4								
8000	4.8	3.8	2.4	1.3	0.4								
6000	4.8	3.8	2.4	1.3	0.4								
4000	4.7	3.7	2.3	1.2	0.4								
3000	4.4	3.5	2.2	1.2	0.4								
2000	4.0	3.2	2.0	1.0	0.3								
1000	3.0	2.3	1.4	0.7									
800	2.7	2.1	1.3	0.6									
600	2.0	1.5	0.8										
400	1.6	1.2	0.7										
300	1.3	1.0	0.5										
200	0.9	0.5											
150	0.7	0.4											
100	0.5	0.3											
80													
60													
50													
40													
30													
20													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.
** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR   JANUARY, 1998

C = 8

SURFACE - K = 0.60   I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	4.1	3.2	2.0	1.1	0.4								
8000	4.1	3.2	2.0	1.1	0.4								
6000	4.1	3.2	2.0	1.1	0.4								
4000	3.8	3.0	1.9	0.9									
3000	3.6	2.8	1.7	0.8									
2000	3.2	2.5	1.5	0.7									
1000	2.2	1.7	1.0	0.5									
800	1.9	1.5	0.8										
600	1.6	1.2	0.7										
400	1.3	1.0	0.5										
300	1.0	0.6											
200	0.7	0.4											
150													
100													
80													
60													
50													
40													
30													
20													
10													

(E)* SOIL LOSS FROM WIND EROSION IN TONS PER ACRE PER YEAR   JANUARY, 1998

C = 8

SURFACE - K = 0.50   I = 86

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	3.4	2.7	1.7	0.8									
8000	3.4	2.7	1.7	0.8									
6000	3.4	2.7	1.7	0.8									
4000	3.1	2.4	1.5	0.7									
3000	2.8	2.2	1.3	0.6									
2000	2.3	1.8	1.1	0.5									
1000	1.7	1.3	0.7										
800	1.5	1.1	0.6										
600	1.2	0.9	0.5										
400	0.9	0.5											
300	0.7	0.4											
200													
150													
100													
80													
60													
50													

* NOTE: SOIL LOSS FOR VALUES WHERE 'E' IS LESS THAN 0.1 OR GREATER THAN 440.0 ARE NOT SHOWN; OTHER VALUES NOT SHOWN ARE INVALID.

** NOTE: VALUES SHOWN ARE FLAT SMALL GRAIN EQUIVALENT, NOT 'V'.

E Tables for I values 56, 48, and 38 are available to estimate wind erosion. Contact the local NRCS office for this information or the State Office in East Lansing, Michigan.

TABLE 7 **Crop Tolerances* to Blowing Soil**			
Tolerant "T" 2.5-6 ton	Mod. Tolerance 1.0-2.0 t/ac	Low Tolerance 1 t/ac	Very Low Tolerance 0 - 0.5 t/ac
Barley	Alfalfa (mature)	Apples	Alfalfa (seedlings)
Buckwheat	Corn	Broccoli	Asparagus
Flax	Onions (>30 days)	Cherries	Beans
Grain Sorghum	Sunflowers	Cucumbers	Black Beans
Millet	Sweet corn	Garlic	Bluegrass
Oats		Grapes	Broccoli
Rye		Green/Snap beans	Cabbage
Wheat		Lima beans	Cantaloupe
		Peaches	Cantaloupe
		Pears	Carrots
		Plums	Celery
		Sweet potatoes	Cucumbers
			Eggplant
			Green Peas
			Flowers
			Lettuce
			Muskmelons
			Onions (seedlings)
			Peas
			Peppers
			Potatoes
			Soybeans
			Spinach
			Squash
			Strawberries
			Sugar beets
			Table beets
			Tomatoes
			Watermelons
			Young Orchards

Developed in consultation with ARS Researchers, Manhattan, KS (3/00).

* **Crop tolerance** is defined as the maximum wind erosion (tons/acre) that a growing crop can tolerate, from crop emergence to field stabilization, without an economic loss to crop stand, crop yield, or crop quality. Crops can be damaged by blowing soil particles, exposure of plant roots, burial of plants by drifting soil, or desiccation and twisting of plants by the wind. Crops may tolerate greater amounts of blowing soil than shown above, but yield and quality will be adversely affected.

EXAMPLE PROBLEM AND SOLUTION
FOR THE CRITICAL PERIOD METHOD

PROBLEM

Farmer Jones is concerned about his soil loss problem, not a crop damage problem. He raises continuous potatoes with a fall cover crop of rye. The soil is Kalkaska loamy sand. The slope is 2 percent and 200 ft. long. The critical period is May. There are no barriers and the shortest distance across the field is 1300 ft. with a length of 2600 ft. Crop residue is 0 because of spring plowing. The west edge of the field is stable due to a fence row.

SOIL LOSS DETERMINATION FROM THE TECHNICAL GUIDE

Kalkaska loamy sand has a Soil Loss Tolerance (T) value of 5. Wind Erodibility Group (WEG) is 2. Soil Erodibility Index (I) is 134 T/Ac/Yr.

The soil ridge roughness (K) factor is 1.0 because of the smooth surface after planting.

The critical period climatic factor is 7.

The prevailing wind erosion direction is 203 degrees during the critical period and the field direction is north-south. The measured unsheltered distance along the prevailing wind erosion direction is 2800 ft.

With residue of 0 and "L" of 2800 ft., the potential wind erosion soil loss per acre per year is 9.4 tons.

FACTORS AFFECTING ALTERNATIVES

Factors we can consider in reducing wind erosion to an acceptable (T) of 5 tons per acre per year for Mr. Jones are:

1. We can't change the WEG.
2. We can't change the (K) on WEG of l and 2.
3. We can't change the (C).
4. We can change the (L) by using windstrips, tree windbreaks, shrub windbreaks, and herbaceous barriers.
5. We can change the (V) by using mulch tillage, no-till, or mulching.
6. We can change the orientation of wind barriers.
7. If crop tolerance is the limiting factor we can change the crop planted.

WIND EROSION CONTROL ALTERNATIVES

Working backwards in the technical guide to determine acceptable alternatives.

1. If pounds of flat, small grain residue equivalent can be increased to the maximum needed for total protection we can read direct from table 7 for C of 7, I of 134, and K of 1.0 that we will need just over 500 pounds of residue at an (L) of 2800 feet to get us down to an acceptable (T) of 5.

2. For stripcropping, without residue we have to drop down to an (L) of 400 feet to be within an acceptable T of 5. Measure 400 feet to scale along the prevailing wind erosion direction of 203 degrees. For the north-south oriented field this results in a strip width of 150 feet.

3. If residue can't be adjusted and the farmer isn't interested in wind stripcropping, then let’s assume we can provide protection by planting barriers. Barriers can be trees, shrubs or herbaceous vegetation.

4. We know the maximum acceptable unsheltered distance (L) is 400 feet for a (T) of 5 for Mr. Jones. Barriers will have to be designed to break the field up into increments of 400 feet plus the area of protection derived from the barrier, which is ten times the barrier height.

   With barriers 20 feet high, 20 times 10 equals 200 feet of shelter. Add the 200 feet of shelter to the acceptable unsheltered distance of 400 feet to get a total of 600 feet measured along the prevailing wind erosion direction (203 degrees). Measure this to scale on the north-south oriented field along the 203 degree line. This results in a perpendicular width of 230 feet between barriers.

METHODS OF CONTROLLING WIND EROSION

1. Conservation Tillage - No-till, is one of the most effective ways to control wind erosion and conserve moisture. This practice is increasing in popularity and has proved feasible with several crops. Weeds are controlled by herbicides commonly used on the crop being grown in conjunction with a contact herbicide for quick kill of small grains and/or weeds. Other types of conservation tillage systems are also effective in preventing wind erosion.

2. Cover crops - A cover crop is usually broadcast or drilled for soil protection when regular crops are harvested. Small grains, ryegrass, sorghums, vetch and legumes are good cover crops. Leave as much of the cover crop residues as possible on the surface when preparing for the next crop.

3. Wind Stripcropping - Crop strip direction will be at right angles to prevailing winds when practical. Both wind and water must be considered when designing the wind erosion control measures.

   Stripcropping does not remove any land from cultivation. Wind erosion-resistant crops are alternated with erosion-susceptible crops.

   The soil is one factor that determines the width of the strips. The height of crops in strips, distance between strips and ridging are other variables influencing the amount of wind erosion that occurs.

4. Windbreaks - A strip or belt of trees or shrubs within or adjacent to a field. Windbreaks should be planted as nearly as possible at right angles to damaging prevailing winds.

5. Vegetative Barriers - Tall perennial herbaceous vegetation is planted at calculated intervals across the field. Barriers should be planted as nearly as possible at right angles to prevailing winds.

6. Crop Rotations - A sequence of growing crops. High residue-producing crops are alternated in a regular sequence on a given area for protection against wind erosion.

7. Mulching (Hauled-in) - Hauled-in mulches can be used to treat highly erosive knolls and blowouts. Animal manures with bedding can also be used to treat erosive areas.

8. Miscellaneous Control Measures - Use of heavy rollers and maintaining high water tables will provide some protection from soil blowing in areas where these controls can be applied.

EROSION INDEX FOR WIND EROSION (EI)

C	I	T=1	T=2	T=3	T=4	T=5
8	310	24.8	12.4	8.3	6.2	5.0
8	134	10.7	5.4	3.6	2.7	2.1
8	86	6.9	3.4	2.3	1.7	1.4
8	56	4.5	2.2	1.5	1.1	0.9
8	48	3.8	1.9	1.3	1.0	0.8
8	38	3.0	1.5	1.0	0.8	0.6
7	310	21.7	10.9	7.2	5.4	4.3
7	134	9.4	4.7	3.1	2.3	1.9
7	86	6.0	3.0	2.0	1.5	1.2
7	56	3.9	2.0	1.3	1.0	0.8
7	48	3.4	1.7	1.1	0.8	0.7
7	38	2.7	1.3	0.9	0.7	0.5
6	310	18.6	9.3	6.2	4.7	3.7
6	134	8.0	4.0	2.7	2.0	1.6
6	86	5.2	2.6	1.7	1.3	1.0
6	56	3.4	1.7	1.1	0.8	0.7
6	48	2.9	1.4	1.0	0.7	0.6
6	38	2.3	1.1	0.8	0.6	0.5
5	310	15.5	7.8	5.2	3.9	3.1
5	134	6.7	3.4	2.2	1.7	1.3
5	86	4.3	2.2	1.4	1.1	0.9
5	56	2.8	1.4	0.9	0.7	0.6
5	48	2.4	1.2	0.8	0.6	0.5
5	38	1.9	1.0	0.6	0.5	0.4

The formula to determine the erosion index for wind erosion is $EI = \frac{C \times I}{T}$

EI is the erosion index, C is the wind climatic factor, I is the wind soil erodibility factor and T is soil tolerance factor.

EI is being used with special programs to determine potentially highly erodible soils and eligibility.

When making the EI calculation remember that the C factor taken from Figure 1, Section I WIND-A-12 is expressed as a factor of 100. Thus, C of 8 is really .08 when used in the calculation.