CHAPTER THREE

K Factor: Soil Erodibility

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What K Represents

The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. The standard condition is the unit plot, 72.6 ft long with a 9 percent gradient, maintained in continuous fallow, tilled up and down the hillslope. K values reflect the rate of soil loss per rainfall-runoff (R) erosion index [ton · acre · h(hundreds of acre · foot · tonf · in)$^{-1}$]. Hereafter, the term "**soil**" is used in the broad context to include true soils and other surface materials serving as a plant-growth medium, sometimes referred to as soil substitute, resoil material, or other such terms.

RUSLE requires an initial K value that is based on soil properties. This value is either hand-entered or computed using the soil-erodibility nomograph equations in RUSLE. For the eastern two-thirds of the United States, RUSLE then computes an adjusted K value based on the seasonal variation of climate.

When the soil properties are the same at two locations, the initial K is the same for both locations, but the adjusted K (the one used in the RUSLE soil-loss calculations) may be different between the two locations due to the differences in climate. Therefore, the RUSLE program should be used to compute the K value for each location rather than simply hand-entering an initial K value in the RUSLE "Soil Loss and Sediment Yield Computation Worksheet" screen.

Relationship of K Factor to Soil Properties

Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45

and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff.

Organic matter in the soil reduces erodibility because it produces compounds that bind particles together, increasing aggregation and reducing the susceptibility of the particles to detachment by raindrop impact and surface runoff. Also, organic matter improves biological activity and increases infiltration rates, which reduces runoff and erosion. The K values published by the Natural Resources Conservation Service (NRCS), formerly Soil Conservation Service, (SCS) reflect "native" organic-matter levels, not organic matter levels that are the result of management activities, such as long-term no-till cultivation, or long-term additions of manure. The percent organic matter often is very low in disturbed soils. Coal is not considered organic matter in the context of the K factor.

Permeability of the soil profile affects K because it affects runoff rates. Soil structure affects K because it affects detachment and infiltration rates. Mineralogy has a significant effect on K for some soils, including subsoils. For example, soils dominated by kaolinite normally have greater permeability than those dominated by montmorillonite. Sodic soils seal quickly, causing the permeability to decrease.

When using the soil-erodibility nomograph for soils that seal, it is recommended that the permeability be lowered by one or two classes.

Determination of K values

Values of K for undisturbed soils should be selected from soil-survey information published by the NRCS. Values of K for disturbed soils should be computed using the soil-erodibility nomograph. Determination of any K value should be based on how a unit-plot placed on the given soil would behave over an extended period of at least 10 years. It should be kept in mind that the definition of a unit-plot includes annual tillage with a primary tool, such as a moldboard plow to a depth of about 8 inches, and periodic secondary tillage operations that break any surface crust and control weeds. Tillage operations typically disrupt a compacted zone immediately beneath the soil surface that might exist following the placement of the last lift of a fill operation.

The handling and management of soil material on mined lands, construction sites, and reclaimed lands often results in near-surface properties analogous to those of tilled agricultural soils for which the RUSLE K factor was developed. Differences in most soil properties, such as texture and organic-matter content, can be taken into account using the soil-erodibility nomograph.

After soil material is placed, deep ripping sometimes is used to alleviate soil compaction, improve water infiltration and transmission through the root zone, and enhance vegetation growth. The effects of deep ripping would be considered in the determination of a K value only if the effects of the deep ripping persist over a period of 10 years or longer.

Inputs to the soil-erodibility nomograph for undisturbed soils should be based on the long-term conditions of the near-surface soil and the soil profile that exists when the soil is managed in accordance with the unit-plot condition.

Vegetation growth, or any management operation that leaves the soil in a condition different from that of the unit-plot, is taken into account by the cover-management (C) factor, discussed in Chapter 5. It should be understood that the K value is independent of land use.

K-Factor Classes

The K values published by NRCS are based on classes. The classes are 0.02, 0.05, 0.10, 0.15, 0.17, 0.20, 0.24, 0.28, 0.32, 0.37, 0.43, 0.49, 0.55, 0.64. The range of these classes indicates the uncertainty associated with the K value for each class. For example, if a K value is 0.28, the next highest K value is 0.32, and the next lowest K value is 0.24, so the width of the class is 0.04. The uncertainty in K is therefore ±0.02 erodibility units which provides an indication of the certainty in soil erodibility for the RUSLE soil-loss estimate.

When using initial K values obtained from NRCS soil-survey information or other sources, it is necessary to determine whether or not these K values have already been adjusted for rock fragments. K values for the fine-earth fraction (K_f) obtained from NRCS data sources are based only on soil fines less than 2 mm in diameter and are unadjusted for the effect of rock fragments. K values for the whole soil (K_w), including all soil-particle sizes, have been adjusted for rock fragments.

Soil-erodibility Nomograph

K values usually are not available for the disturbed soils of mined lands, construction sites, or reclaimed lands. For those soils, a K value can be estimated using the soil-erodibility nomograph program in RUSLE, based on data obtained from soil samples and field observations by qualified soil scientists or engineers who have experience in the area. NRCS personnel can provide valuable advice.

From the "Soil Loss and Sediment Yield Computation Worksheet" screen, place the cursor on the K variable, then press *F4* to enter the *Seasonally Variable K Factor* program (**Figure 3-1**). To reach the screen used for entering inputs and displaying

outputs (**Figure 3-2**), select K-factor option 1, *using Soil Interpretation Record/K-nomograph* by pressing *ENTER*. To reach the screen for the soil-erodibility nomograph (**Figure 3-3**), move the cursor to the *estimated K* and press *F4.*

The effect of rock fragments in the profile (discussed later in this chapter) can be accounted for in the soil-erodibility nomograph screen. Select *coarse fragment correction* Option 2 (**Figure 3-4**) on this screen.

The nomograph, though it is the most widely-used method for estimating K values, applies best to the medium-textured soils of the Midwest. It should not be employed beyond the limits which are programmed into the nomograph and discussed in Agricultural Handbook 703 (AH 703, Renard et al., 1997).

The nomograph also does not apply to soils of volcanic origin or organic soils, such as muck and peat. Results may be questioned for subsoils, Oxisols, low activity clay soils, calcareous soils, and soils high in mica.

```
       File        Exit        Help        Screen
+-------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦        +-------------------------------------------------------+             ¦
¦        ¦ To calculate the seasonally variable K factor values   ¦             ¦
¦        ¦ for non-volcanic soils, an initial K factor value is   ¦             ¦
¦        ¦ estimated.  This value is obtained by using either     ¦             ¦
¦        ¦ the Soil Interpretation Record (SIR) or the nomograph. ¦             ¦
¦        ¦ Option 1 continues with this procedure.                ¦             ¦
¦        ¦ K factor values for volcanic soils in Hawaii           ¦             ¦
¦        ¦ may be obtained by using option 2.                     ¦             ¦
¦        +-------------------------------------------------------+             ¦
¦                                                                              ¦
¦            +-----------------------------------------------------+           ¦
¦            ¦     K factor options: 1                             ¦           ¦
¦            ¦-----------------------------------------------------¦           ¦
¦            ¦ -->   1. using Soil Interpretation Record/K-nomograph¦           ¦
¦            ¦       2. for volcanic soils (Hawaii only)           ¦           ¦
¦            +-----------------------------------------------------+           ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
+---------------------------------< Esc exits >--------------------------------+
Tab  Esc F1   F3   F9   End
FUNC esc help cont info last
```

Figure 3-1. RUSLE screen for Seasonally Variable K Factor. This screen is entered from the Soil Loss and Sediment Yield Computation Worksheet screen by pressing *F4*. Two options for calculating K values are available on this screen.

```
       File        Exit        Help        Screen
+-------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦     city code: 6001    DENVER               CO       estimated K: 0____       ¦
¦ % rock cover: 0     # yrs to consolidate: 17   hyd. group: 2                ¦
¦ soil series:                     surface texture: silt loam                  ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
+--------------< F4 to calculate K Nomograph value, F3 when done >-------------+
Tab  Esc F1   F2  F3   F4   F9
FUNC esc help clr cont call info
```

Figure 3-2. RUSLE screen for entering inputs and displaying outputs for non-volcanic soils. This screen can be used for entering K values obtained from soil surveys or tables, or for calculating K values using the soil-erodibility nomograph.

```
       File        Exit        Help        Screen
+-------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦   % of silt and very fine sand  (e.g. 66): 20                                ¦
¦                         % clay  (e.g. 17): 20                                ¦
¦           % of organic matter  (e.g. 2.8): 0.5                               ¦
¦                     soil structure code #: 4                                 ¦
¦                 soil permeability class #: 2                                 ¦
¦              coarse fragment correction #: 2                                 ¦
¦                                                                              ¦
¦                          +-------------------------------------------+       ¦
¦                          ¦       1. permeability already includes the ¦       ¦
¦                          ¦         effect of fragments in the soil    ¦       ¦
¦                          ¦         profile per NSH.                   ¦       ¦
¦                          ¦       2. the effect of fragments in the    ¦       ¦
¦                          ¦         soil profile on permeability will  ¦       ¦
¦                          ¦         be considered per Chapter 3, AH703.¦       ¦
¦                          +-------------------------------------------+       ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
+---------------------------------< Esc exits >--------------------------------+
Tab  Esc F1   F2  F3   F6   F9
FUNC esc help clr cont list info
```

Figure 3-3. RUSLE screen for estimating K values using the soil-erodibility nomograph. To reach this screen, move the cursor to the *estimated K* input field and press *F4*. After inputs have been made, press *F3* to display the calculated K factor from the nomograph.**.**

```
       File        Exit        Help        Screen
+------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦   % of silt and very fine sand  (e.g. 66): 20                                ¦
¦                          % clay  (e.g. 17): 20                              ¦
¦           % of organic matter  (e.g. 2.8): 0.5                              ¦
¦                     soil structure code #: 4                                ¦
¦                 soil permeability class #: 2                                ¦
¦              coarse fragment correction #: 2                                ¦
¦                                                                             ¦
¦                          +-------------------------------------------+      ¦
¦                          ¦       1. permeability already includes the ¦      ¦
¦                          ¦         effect of fragments in the soil    ¦      ¦
¦                          ¦         profile per NSH.                   ¦      ¦
¦                          ¦       2. the effect of fragments in the    ¦      ¦
¦                          ¦         soil profile on permeability will  ¦      ¦
¦                          ¦         be considered per Chapter 3, AH703.¦      ¦
¦                          +-------------------------------------------+      ¦
¦                                                                             ¦
¦                                                                             ¦
¦                                                                             ¦
¦                                                                             ¦
+--------------------------------< Esc exits >-------------------------------+
Tab  Esc F1   F2  F3   F6   F9
FUNC esc help clr cont list info
```

Figure 3-4. The effect of rock fragments in the soil profile can be accounted for on the soil-erodibility nomograph screen. Select coarse fragment correction option 2 on this screen. The effect of these rock fragments, when selecting Option 2, is to decrease permeability and may result in an increase in K values. Rock fragments are discussed later in this chapter with detailed documentation in Chapter 3 of AH-703.

Other Sources of K Values

Soils on lands that have been mined or subjected to construction and reclamation activities have been altered so that the K values in the NRCS soil surveys or databases are no longer applicable. Use the soil-erodibility nomograph to estimate the initial K for these conditions. Where K values are not available and the nomograph does not apply, other relationships may be useful for estimating K values of soils in disturbed areas. Special regression equations are available in AH-703 for specific soil conditions, such as the soils of the upper Midwest that are high in montmorillonite, for clay subsoil in the Midwest, and for volcanic soils in Hawaii, A program for calculating K values for volcanic soils in Hawaii is available in RUSLE (**Figure 3-5**). After *CALL*ing the K-factor routine, select option 2 *for volcanic soils for Hawaii*. Inputs can be made on the *Volcanic Soils K Factor* screen and the calculated K value is displayed by pressing *F3* (**Figure 3-6**).

```
       File        Exit        Help        Screen
+-------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦        +-------------------------------------------------------+             ¦
¦        ¦ To calculate the seasonally variable K factor values   ¦             ¦
¦        ¦ for non-volcanic soils, an initial K factor value is   ¦             ¦
¦        ¦ estimated.  This value is obtained by using either     ¦             ¦
¦        ¦ the Soil Interpretation Record (SIR) or the nomograph. ¦             ¦
¦        ¦ Option 1 continues with this procedure.                ¦             ¦
¦        ¦ K factor values for volcanic soils in Hawaii           ¦             ¦
¦        ¦ may be obtained by using option 2.                     ¦             ¦
¦        +-------------------------------------------------------+             ¦
¦                                                                              ¦
¦            +-----------------------------------------------------+           ¦
¦            ¦     K factor options: 2                             ¦           ¦
¦            ¦-----------------------------------------------------¦           ¦
¦            ¦       1. using Soil Interpretation Record/K-nomograph¦          ¦
¦            ¦ -->   2. for volcanic soils (Hawaii only)           ¦           ¦
¦            +-----------------------------------------------------+           ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
+--------------------------------< Esc exits >-------------------------------+
Tab  Esc F1   F3   F9   Home
FUNC esc help cont info 1st
```

Figure 3-5. RUSLE screen for selecting K-factor option for volcanic soils in Hawaii.

```
       File        Exit        Help        Screen
+----------------------< Volcanic Soils K Factor 1.06 >-----------------------+
¦                                                                              ¦
¦                                                                              ¦
¦                   unstable aggregates (%): 10                                ¦
¦                       base saturation (%): 40                                ¦
¦                  silt-sized particles (%): 40                                ¦
¦                    sand > 100 microns (%): 5                                 ¦
¦                        very fine sand (%): 10                                ¦
¦                                                                              ¦
¦                   +-------------------------------------+                    ¦
¦                   ¦ K Factor for volcanic soils: 0.108 ¦                    ¦
¦                   ¦                                    ¦                    ¦
¦                   ¦ (press Esc to dismiss)             ¦                    ¦
¦                   +-------------------------------------+                    ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
¦                                                                              ¦
+--------------------------------< Esc exits >-------------------------------+
Tab  Esc F1   F9
FUNC esc help info
```

Figure 3-6. RUSLE screen for volcanic soils in Hawaii, showing sample inputs and output. The calculated K-factor value for volcanic soils is displayed by pressing *F3*.

Examples of Measured K Values from Reclamation Sites

Data for the erodibility of spoils from 38 reclamation sites at the Black Mesa Mine Complex in northern Arizona (Peabody Western Coal Company, PWCC, 1995) indicate that K values for dominantly clay loam spoils range from 0.04 to 0.21, with a mean of 0.12. The volumetric rock fragment content for these sites ranged from 15 to 70 percent, with a mean of 40 percent. At another reclamation site, K values for dominantly very fine sandy loam, and sandy clay loam soils averaged 0.33, with 0 to 20 percent rock fragments. In comparison, K values for cultivated soils having these textures would generally fall in the range of 0.24 to 0.37.

In another study of K values from Appalachian coal mine spoil in Ohio, K values averaged 0.18 for undisturbed topsoil, and 0.12 for subsoil and resoil material (Warner, 1996). For a similar study in Kentucky, K values averaged 0.27 for undisturbed topsoil, 0.18 for recently placed spoil, and 0.19 for spoil after 6 months of weathering (Warner, 1997). Other examples can be found in the references cited in **Table 1-1** of Chapter 1.

During construction or reclamation, the soil-erodibility (K) value should represent the upper 6 inches of the final fill material re-spread as the last lift. When K values on construction sites or reclaimed lands are known to be low (K_f values <0.1), use the permeability portion of the nomograph, but do not use the structure portion. A general rule to follow on mined land and construction sites -- if a K value is 0.08 or less, use a value of 0.08.

Rock Fragments

Rock fragments are unattached pieces of rock 2 mm in diameter or larger that are strongly cemented or resistant to fracturing. Rock fragments can have a major effect on soil erosion. Rock fragments on the soil surface and in the soil profile require special considerations.

Only the effects of rock fragments within the soil profile are considered in the estimation of the K value. Rock fragments resting upon the soil surface that protect the soil from raindrop impact and runoff are taken into account in the Cover-management (C) factor.

Although the percent rock cover on the surface is entered on a screen in the K-factor program, the effect of those rocks in reducing soil-loss rates is computed in the C factor.

While soil scientists consider a rock fragment to be an unattached piece 2 mm in diameter or larger, the smallest of these rocks may not reduce runoff and erosion, especially on steep hillslopes. It is generally agreed that rocks with a diameter of 5 mm or

larger will not move due to rainsplash or overland flow, even on steep and long hillslopes, and therefore do provide protection from runoff and erosion processes. Hence, the 5 mm diameter may be the appropriate size to use in estimating the percent rock fragment cover on hillslopes with gradients of 20% or more. The minimum fragment size that effectively reduces erosion rates in a particular situation requires careful consideration.

Effects of Rock Fragments in the Profile: Rock fragments in undisturbed soil tend to be small, and it is generally believed that their presence reduces the infiltration rate, increasing runoff and erosion rates. Research reported in AH-703 indicates that rocks in the profile of sandy soils tend to increase K factor values by reducing the permeability and increasing runoff, thus increasing erosion (increasing the K value). The adjustment in RUSLE for the effects of rock fragments in the soil profile is based on this research.

Rocks at mine reclamation and construction sites generally are large in size and volume. A soil-profile description from a typical mine reclamation site in northern Arizona is shown in **Table 3-1**.

Table 3-1. Typical pedon of a reclaimed mine soil in northern Arizona. The amount and size distribution of rock fragments is mentioned in each horizon in this soil profile description.

0-12 inches	Topsoil, brown (7.5YR 4/4, moist) sandy loam; moderate medium to coarse subangular blocky parting to moderate medium to coarse granular structure; friable; 5% gravel; many fine and very fine roots; gradual, smooth boundary.
12-24 inches	Topsoil, brown (7.5YR 4/4, moist) sandy loam; massive; 5% gravel; common fine and very fine, and few medium and coarse roots; abrupt, smooth boundary.
24-40 inches	Spoil, dark grayish brown (10YR 4/2, moist) and dark gray (10YR 4/1, moist) sandy clay loam; massive; few fine, medium, and coarse roots; firm; 25% gravel, 10% cobble, and 5% stone-sized rock fragments; clear, smooth boundary.
40-60 inches	Spoil, dark grayish brown (10YR 4/2, moist) and dark gray (10YR 4/1, moist) sandy clay loam; massive, firm; 25% gravel, 10% cobble, and 5% stone-size rock fragments; clear, smooth boundary.

Many soil scientists (USDA, SCS, National Soils Handbook, 1983) and mined-land reclamation experts agree that, in general, with high percentages of rock in the profile ($\geq$50-75% by volume) infiltration will increase and K values will decrease. However, insufficient data are available to document this premise.

The increase in infiltration due to coarse rock fragments in the soil profile depends on the properties of the topsoil and its thickness. If the topsoil controls infiltration, the amount of rock fragments in the underlying material will have little effect on infiltration and thus K values. The following recommendations can be used as a guide to account for rock fragments in the soil profile. These recommendations are based exclusively on experience and judgment.

For sandy soils, having K_f values (before adjusting for rock fragments) of less than 0.15, the user should adjust K values upward according to the K-factor program in RUSLE. For soils with K_f values of 0.15 or greater, the user should ignore the rock effects in the K factor. The RUSLE program does not make this adjustment automatically; the adjustment must be made external to the program by the user. In both instances, the user should include the percentage of rock cover on the soil surface in the C - factor calculation. This will reduce the RUSLE soil-loss estimate.

Temporal Variability in K

Soil erodibility varies during the year. In many areas where freeze-thaw conditions persist, erodibility tends to be high early in the spring, during and immediately following thawing, and during periods when moisture is above average for the soil. Values for K tend to be low in the fall, partially because the soil is drier than at other times and because biological activity is greater during the warm seasons than during the cold seasons. This variability is shown in **Figure 3-7**.

The adjustment of K values to account for temporal variability is applicable only in the eastern United States, generally east of the 105° W. longitude. The areas for which time-varying K should not be applied are shown in **Figure 3-5** of AH-703. Soil erodibility varies during the year in the western United States as well, but acceptable relationships have not yet been developed to describe these variations due to the diverse and complex topography and its influence of climate conditions.

RUSLE computes K values that vary by "half-month" periods, as shown in **Figure 3-8**. These time-varying K values are computed using the published, or initial K value and climate information for the number of freeze-free days and temperature. The K value used in RUSLE to compute soil loss is the sum of the product of all half-month K values multiplied by each corresponding half-month EI value.

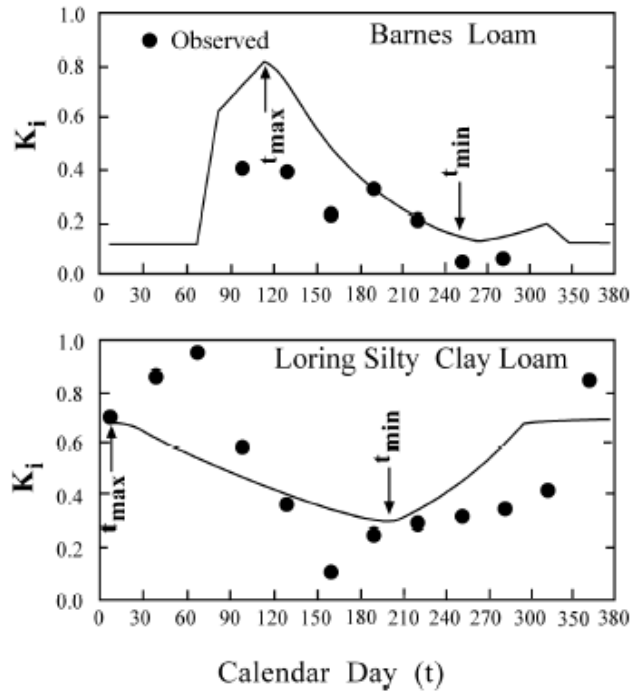

Figure 3-7. Seasonal variability of K is shown for the Barnes soil near Morris, MN and the Loring soil near Holly Springs, MS. Values for K_i tend to be high early in the spring and immediately following thawing, and during periods when soil moisture is above average. Values for K_i will be low in the fall if the soil is dry and undisturbed.

Soils on mine lands, construction sites, and reclaimed lands experience periods of vulnerability to erosion processes, both during freeze-thaw cycles and when soils are left bare. Keep sites covered with vegetation or mulch material whenever possible during these periods.

In addition to calculating the average annual K value adjusted for temporal variability, RUSLE also calculates the maximum and minimum K value (see **Figure 3-8**). The ratio of maximum to minimum K is computed as a function of rainfall-runoff erosivity, R. This ratio decreases as the R value increases. That is, RUSLE will compute a greater variation in K at locations where the R value is low than at locations where the R value is high.

The date when the maximum K value occurs also varies with R. In general, the date of maximum K is later in the year at locations having low R values. The date of minimum K is determined by adding the length of the freeze-free days to the date of the maximum K.

The dates and values for maximum and minimum K have important implications for erosion and sediment control on mined lands, construction sites, and reclaimed lands, because soil cover or lack thereof during these periods greatly affects erosion rates.

```
       File        Exit        Help        Screen
+-------------------< Seasonally Variable K Factor 1.06 >----------------------+
¦     city code: 14001   EVANSVILLE           IN       estimated K: 0.28_      ¦
¦ % rock cover: 0     # yrs to consolidate: 17   hyd. group: 2                ¦
¦ soil series:                     surface texture: silt loam                 ¦
¦                                                                             ¦
¦  1/1-1/15        1.0      0.359     ¦   7/1-7/15          7.0       0.193    ¦
¦  1/16-1/31       2.0      0.411     ¦   7/16-7/31         7.0       0.17     ¦
¦  2/1-2/15        3.0      0.475     ¦   8/1-8/15          7.0       0.148    ¦
¦  2/16-2/28       3.0      0.544     ¦   8/16-8/31         6.0       0.13     ¦
¦  3/1-3/15        3.0      0.55      ¦   9/1-9/15          4.0       0.12     ¦
¦  3/16-3/31       4.0      0.484     ¦   9/16-9/30         4.0       0.137    ¦
¦  4/1-4/15        5.0      0.422     ¦   10/1-10/15        3.0       0.157    ¦
¦  4/16-4/30       5.0      0.371     ¦   10/16-10/31       3.0       0.18     ¦
¦  5/1-5/15        5.0      0.326     ¦   11/1-11/15        2.0       0.208    ¦
¦  5/16-5/31       6.0      0.287     ¦   11/16-11/30       2.0       0.238    ¦
¦  6/1-6/15        6.0      0.25      ¦   12/1-12/15        2.0       0.272    ¦
¦  6/16-6/30       7.0      0.22      ¦   12/16-12/31       3.0       0.311    ¦
¦                                                                     -----   ¦
¦   EI DIST.: 105        FREEZE-FREE DAYS: 216    AVERAGE ANNUAL K:   0.27     ¦
¦    R VALUE: 200    Kmin = 0.117 on 9/5     Kmax = 0.56 on 3/6               ¦
+---------------------------------< Esc exits >-------------------------------+
Tab  Esc F1   F2  F3   F4   F9
FUNC esc help clr cont call info
```

Figure 3-8. RUSLE screen for displaying the seasonally variable K value. The initial K value (estimated K = 0.28) is entered in the upper right of this screen. The calculated seasonally variable K value (AVERAGE ANNUAL K = 0.27) is displayed in the lower right of the screen. The minimum (K_{min} = 0.12 on 9/5) and maximum (K_{max} = 0.56 on 3/6) K values are displayed on lower portion of the screen. The half-month periods and the corresponding EI and K values are also displayed.

Soil Properties Affecting Erosion Not Included in the K Factor

Rocks on the surface act as surface mulch, much like crop residue and plant litter. These surface covers reduce soil loss and are accounted for in the C factor. Increases in organic matter that are related to management activities, such as long-term cover of grass or other full vegetation, are also accounted for in the C factor. Finally, compaction or disturbance caused by machinery also is a management effect that must be accounted for in the C factor.

Do not adjust K values to account for rocks on the soil surface or increases in soil organic matter related to management activities. The effects of surface rock cover and management practices are taken into account by the Cover-management (C) factor discussed in Chapter 5.