

WIND EROSION FORCES IN THE UNITED STATES AND THEIR USE IN PREDICTING SOIL LOSS

Agriculture Handbook No. 346

**Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
in cooperation with
Kansas Agricultural Experiment Station**

Contents

	Page
Source and description of wind data	1
Method of analysis	2
Magnitude of wind erosion forces	2
Prevailing wind erosion direction	2
Preponderance of wind erosion forces in prevailing wind erosion direction	2
Distance across field along direction of wind erosion force vectors ..	3
Results and discussion	3
Relative magnitude of wind erosion forces	3
Orientation of barriers, stripcrops, and other erosion control prac- tices	3
Equivalent field width	4
Examples of field applications	6
Determination of potential wind erodibility of farm fields	6
Determination of barrier spacing	8
Literature cited	8
Appendix	16

Washington, D.C.

Issued April 1968

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 25 cents

WIND EROSION FORCES IN THE UNITED STATES AND THEIR USE IN PREDICTING SOIL LOSS

By E. L. SKIDMORE, *research soil scientist*, and N. P. WOODRUFF, *research investigations leader*, Soil and Water Conservation Research Division, Agricultural Research Service

Soil blowing of agricultural lands is a serious problem in arid and semiarid regions and on sandy soils of the United States. Soil loss from a given cultivated field depends on cloddiness, surface roughness, and surface moisture of the soil; on amount, kind, and orientation of the vegetation; on wind velocity or force; and on distance across the field along the direction of the wind force (11).¹ Information on soil and residue effects on erosion is available in considerable detail (7, 11). However, published information on wind forces for use in determining amounts of wind erosion and for designing wind erosion control practices is meager and is limited to specific areas of the United States (6, 8).

This handbook furnishes detailed information on wind erosion forces for locations throughout the

United States for use in assessing erodibility of field soils and in designing control practices to combat the ravages of wind erosion.

The data presented include (1) relative magnitude of wind erosion forces or the capacity of the wind to cause erosion on unprotected soils, (2) prevailing wind erosion direction, and (3) preponderance of wind erosion forces in the prevailing wind erosion direction. These factors indicate, respectively, potential need for wind erosion protection, proper orientation of erosion control measures, and relative merits of proper orientation of the control methods. The data are presented by months for 212 locations.

A brief description of analysis is presented. Method of analysis in more detail is available elsewhere (10).

SOURCE AND DESCRIPTION OF WIND DATA

Determining magnitude and direction of wind erosion forces requires analyses of detailed wind data. Detailed wind data of hourly observations of windspeed and direction are scarce. Of the many stations reporting climatological data, only a few record these hourly observations. Those that do are generally airports or military bases. Percent frequency of windspeed and direction are given in Air Force Summaries of Surface Weather Observations (A-B Summaries); Navy Summaries of Monthly Aerological Records (SMAR); and Environmental Data Service publications, Local Climatological Data—Supplement and Summary of Hourly Observations. These wind-data summaries were obtained from the National Records

Center, Asheville, N.C., and were used in the analysis described here.

Available data are for relatively short periods of time, especially data from military installations that were active only during World War II. The recording period for most of the data used ranged from 5 to 10 years, as detailed in table 1 (Appendix).

No effort was made to correct heights of observations to a standard because they were not known at all locations and an attempted correction might not be accurate. Windspeed-height relationships must be known to make valid corrections. Since these relationships are affected by such factors as temperature gradients, surrounding buildings, and surface conditions, they cannot be predicted accurately for the sundry unknown conditions.

¹ Italic numbers in parentheses refer to Literature Cited, p. 8.

METHOD OF ANALYSIS

The analysis is based on the principle that the capacity of a wind to cause soil movement is proportional to windspeed cubed times the duration of the wind.

Several investigators (1, 3, 12) found that when windspeed was greater than that required barely to move the soil, the rate of soil movement was directly proportional to friction velocity cubed. Friction velocity U_* is related to velocity profile as expressed by

$$U_* = \frac{U_z}{5.75 \log z/k} \quad (1)$$

where U_z is the windspeed at height z and k is roughness length. Over a specified type of surface and height, z and k are constant (1, 5). Therefore, U_* is proportional to U_z , and rate of soil movement is proportional to windspeed cubed after the windspeed attains some minimum or threshold speed required to initiate soil movement.

Threshold speeds were reported by Chepil (2) to range from 13 to 30 miles per hour at 1-foot height, depending on the history of the field. A threshold speed of about 11 miles per hour at 1.2 feet was indicated for the conditions of another investigation (3). Malina (9) reported data of O'Brien and Rindlaub in which the amount of sand transported was proportional to windspeed cubed after windspeed reached a "critical velocity" of 13.4 feet per second (9.1 miles per hour).

Wind data are commonly reported in climatological records by speed groups. One common division is between 12 and 13 miles per hour. That corresponds closely to the reported minimum windspeed required to initiate soil movement. Therefore, windspeeds 12 miles per hour and less are considered nonerosive and were not used in computations reported here.

Magnitude of Wind Erosion Forces

The magnitude of a wind erosion force vector r_j is obtained by summing, for all speed groups with windspeeds greater than 12 miles per hour, the product of mean windspeed cubed and a duration factor for a specified direction as expressed by equation 2

$$r_j = \sum_{i=1}^n \bar{U}_i^3 f_i \quad (2)$$

where \bar{U}_i^3 is the mean windspeed within the i th speed group cubed. f_i is a duration factor expressed as the percentage of total observations that occur in the j th direction within the i th speed group. The sub j 's indicate direction and take values from 0 to 15, inclusive, representing the 16 principal compass directions. They are numbered counterclockwise starting with east, which is

arbitrarily taken as the initial side of the coordinate system. Hence, $r_{j=0}$ and $r_{j=1}$ are wind erosion force vectors pointing east and east-northeast, respectively.

The sum of the magnitudes of the wind erosion force vectors for all directions gives the total magnitude of wind erosion forces for the location and is expressed by equation 3. The value obtained by evaluating equation 3 for some location indicates the relative capacity of the wind to cause soil blowing at the particular location.

$$F_T = \sum_{j=0}^{15} \sum_{i=1}^n \bar{U}_{ij}^3 f_{ij} \quad (3)$$

Prevailing Wind Erosion Direction

The magnitude of erosion forces parallel to a particular direction can be obtained from the wind erosion force vectors. If p is an imaginary straight line intersecting at the origin of a polar coordinate system and ϕ_j is the angle between r_j and the imaginary line p , the amount of erosion forces caused by r_j that occur parallel to p is $r_j \cos \phi_j$. The total wind erosion forces parallel to p as a function of the orientation of p are

$$F_{||} = \sum_{j=0}^{15} r_j |\cos (j \times 22.5 - \theta)| \quad (4)$$

where θ is the angle between p and the initial side. Similarly, the sum of the wind erosion forces perpendicular to p is

$$F_{\perp} = \sum_{j=0}^{15} r_j |\sin (j \times 22.5 - \theta)| \quad (5)$$

Obtaining an orienting line p so the ratio of the wind erosion forces parallel to line p to those perpendicular to line p , symbolized by R , is maximum tends to maximize wind erosion forces parallel to p and to minimize wind forces perpendicular to p . Hence, when R is maximum, p is oriented in the prevailing wind erosion direction θ_R .

Preponderance of Wind Erosion Forces in Prevailing Wind Erosion Direction

The value of R maximum (R_m) indicates the preponderance of wind erosion forces in the prevailing wind erosion direction. The greater the value of R_m , the greater the prevalence of the prevailing wind erosion direction. A value for R_m of 1.0 indicates no prevailing wind erosion direction and a wind barrier would be equally effective in any direction, whereas an R_m of 2.0 indicates a prevailing wind erosion direction with wind erosion forces twice as great parallel as perpendicular to prevailing wind erosion direction.

Distance Across Field Along Direction of Wind Erosion Force Vectors

Since rate of soil movement begins at zero on the windward sides of isolated strips of land and increases with distance downwind (4, 5), it is necessary to know the distance across the field along the direction of wind erosion force vectors.

The distance depends on the angle of deviation of the wind erosion force vectors from right angles to field strip. That is visualized when one represents a field strip by drawing parallel lines on two sides of a wind erosion rose and extending each arm of the rose to the boundaries. The length of the arm then represents the distance wind would travel in traversing the field strip along the direction of the wind erosion force vector. When a force vector is at right angles to the field strip, the distance traveled is equal to field width. As the angles of deviation increase, the distance across the field increases as the reciprocal of the cosine (secant) of the angle of deviation.

It is convenient to express the angle of deviation of wind erosion force vector from right angles to field strip as a function of prevailing wind erosion

direction, and angle of deviation of prevailing wind erosion direction from right angles to field strip.

$$A_j = j \times 22.5 - \theta_R \pm A \quad (6)$$

where A_j is angle of deviation of j th wind erosion force vector from right angles to field strip, θ_R is prevailing wind erosion direction with east as zero reference, and A is angle of deviation of prevailing wind erosion direction from right angles to field strip. When θ_R is clockwise and counter-clockwise of right angles to barrier, A is subtracted and added, respectively, in equation 6.

Therefore, the distance across field of width W along the direction of wind erosion force vector r_j is

$$D_j = W \sec (j \times 22.5 - \theta_R \pm A) \quad (7)$$

By multiplying the distance across field along the direction associated with each vector by the portion of the total wind erosion forces represented by each wind erosion vector, a distribution of wind erosion forces traveling various distances to traverse the field is obtained.

RESULTS AND DISCUSSION

The data were analyzed on a high-speed digital computer by the previously described methods. Magnitude of wind erosion forces, prevailing wind erosion direction, and preponderance of wind erosion forces in the prevailing wind erosion direction are presented in table 1 (Appendix) for 212 locations in the United States.

Relative Magnitude of Wind Erosion Forces

The magnitude of wind erosion forces was above 1,000 for some months at some locations in the Great Plains (e.g., Wichita, Kans.; Great Falls, Mont.). Some coastal areas never reached 100 (e.g., Tallahassee and Jacksonville, Fla.), whereas other locations were never below 400 (e.g., Wichita and Great Falls).

Generally wind erosion forces are greatest in the spring and least in the summer; however, that is not true for all locations. Wind erosion forces were greatest in the summer for some (e.g., Laredo, Tex.; Riverside, Calif.) and greatest in the winter for others (e.g., Great Falls, Mont.; Windsor Locks, Conn.).

Orientation of Barriers, Stripcrops, and Other Erosion Control Practices

For maximum protection against wind erosion forces, an erosion control practice should be oriented perpendicular to the prevailing wind erosion direction. The prevailing wind erosion direction is consistently the same throughout the year for some locations but varies considerably for others.

One should orient wind barriers, stripcrops, and other erosion control practices for the time of year when field and climatic conditions are most conducive to blowing, i.e., when wind forces are maximum, when soil is dry and deficient in cover and cloddiness, and when crops are most susceptible to damage.

The protection given by a barrier depends not only on the characteristics of the barrier and its orientation relative to the prevailing wind erosion direction but also on the preponderance of wind erosion forces in the prevailing wind erosion direction R_m .

As an example, in figure 1 we compare the percent of wind erosion forces traveling various distances to traverse a field in December at Great Falls, Mont. ($R_m=3.6$) and in April at Midland, Tex. ($R_m=1.1$).

In figure 1, *a*, for Midland at $A=0^\circ$ (field strip at right angles to prevailing wind erosion direction), 80 percent of the wind erosion forces travel distances equal to or greater than 1.1 W , and 32 percent travel twice the field width. However, for Great Falls when R_m is larger (3.6), only 40 and 11 percent of the wind erosion forces travel distances equal to or greater than 1.1 and 2.0 W , respectively. In figure 1, *b*, where the field strip deviates 40° from right angles to prevailing wind erosion direction, the angle of deviation makes very little difference at Midland where R_m is small. However, the percentages for Great Falls at $A=40^\circ$ are much larger than for $A=0^\circ$ and are slightly larger than for Midland.

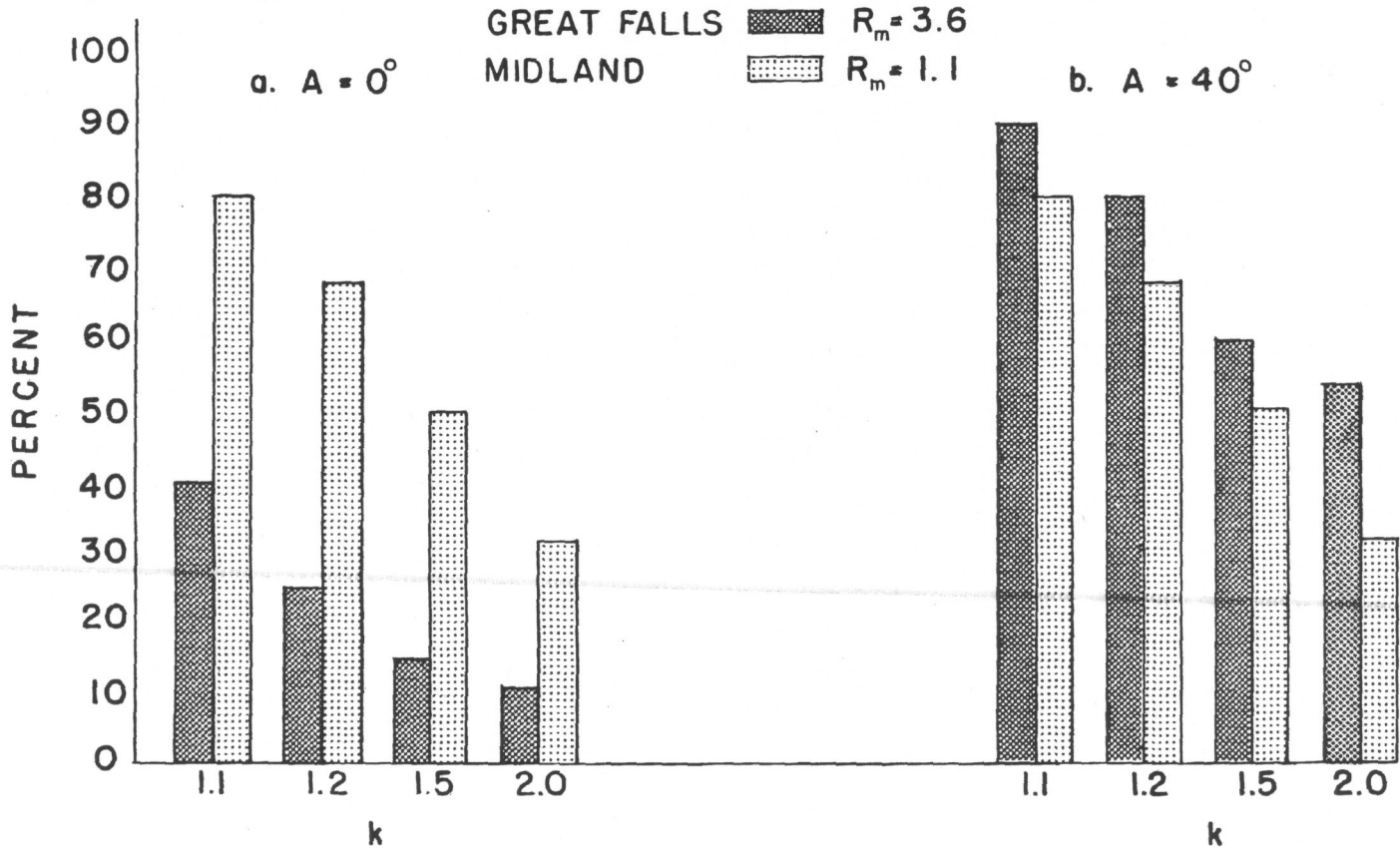


FIGURE 1.—Percent of wind erosion forces traveling distances equal to or greater than some value k times field width in traversing field strip of width W , when angle of deviation of prevailing wind erosion direction from right angles to field strip is 0° and 40° for (a) and (b), respectively, at Great Falls, Mont., and Midland, Tex.

As R_m approaches unity (the smallest value possible for R_m), the importance of a particular barrier orientation lessens. Wind erosion forces that occur parallel are equal to those that occur perpendicular to barrier regardless of barrier orientation.

It follows that as R_m gets larger, more attention should be given to proper orientation of the barrier, as illustrated in figures 2-6. These charts give the percent of wind erosion forces that travel some specified multiple k of field width in traversing a field strip as a function of R_m and A . In general, as R_m gets larger, the percent of wind erosion forces traveling more than 1.5 times the field width decreases for small angles of deviation of the prevailing wind erosion direction from right angles to field strip. However, for large angles of deviation, the percent of wind erosion forces traveling 1.5 times the field width in traversing field strip increases. That fact should be considered when determining equivalent field width for use in the wind erosion equation and the distance between barriers.

Equivalent Field Width

Use of distance L' across the field along the prevailing wind erosion direction in the wind erosion equation is based on the wind traveling

distance L' in traversing the field. Unless all wind erosion forces occur along the prevailing wind erosion direction, some of the wind will travel distances greater than L' in traversing the field. Also, at angles of deviation greater than zero, some wind will travel less than L' in traversing a field strip. A measure of equivalent field width based on the preponderance of wind erosion forces in the prevailing wind erosion direction as well as deviation of right angle of the strip from prevailing wind erosion direction would be more meaningful.

Suppose that by using the wind erosion equation (11) we have determined that the travel distance L' of wind in traversing a field strip should not exceed 150 feet to control erosion to a tolerable amount. We now desire to determine the width of a field strip so that no more than 50 percent of the wind erosion forces will travel more than 150 feet in traversing the field strip. Some percentage other than 50 could be selected, but 50 is desirable because half of the wind erosion forces will travel farther and half not so far, so 50 represents the median travel distance; also, it is the percentage best used with figures 2-6.

To illustrate, let us use R_m of 1.1 and 3.6 in combination with A values of 0° and 40° . The median distances that wind erosion forces will travel in traversing the field strip are determined by interpolation from figures 2-6.

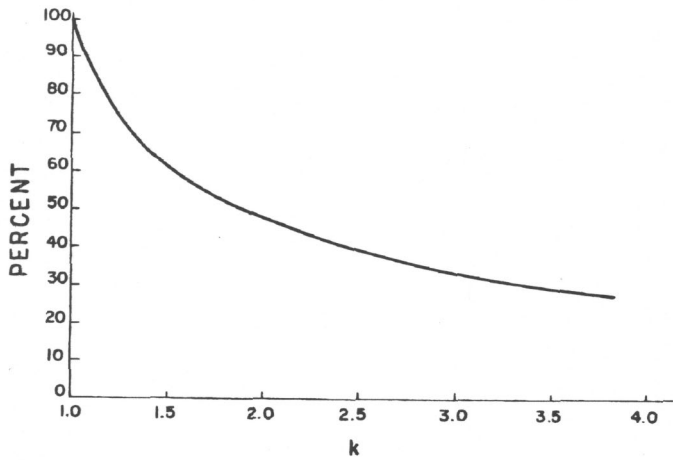


FIGURE 2.—Percent of wind erosion forces traveling distances equal to or greater than k times field width in traversing field strip for conditions of nonexisting prevailing wind erosion direction ($R_m=1.0$) and all values of A . R_m is ratio of wind erosion forces that are parallel to those that are perpendicular to prevailing wind erosion direction. Magnitude of R_m indicates preponderance of wind erosion forces in prevailing wind erosion direction. A is angle of deviation of prevailing wind erosion direction from right angles to field strip.

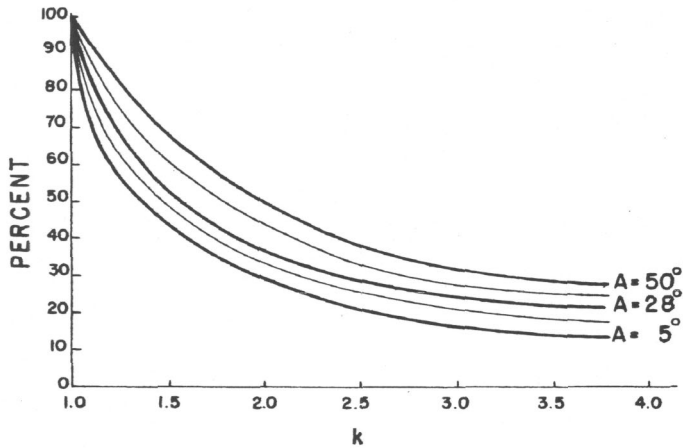


FIGURE 3.—Percent of wind erosion forces traveling distances equal to or greater than k times field width in traversing field strip for $R_m=1.5$ and various values of A .

Remember that k times field width equals distance traveled by a specified percentage of wind erosion forces in traversing field strip and $k_{50}W$ equals median travel distance. Therefore, divide 150 by k_{50} to obtain width of field strip W_{50} required if no more than 50 percent of the wind erosion forces travel more than 150 feet in traversing the field—the specified conditions of R_m and A .

Results are given in table 2 and are compared with width of field W_L , based on distance across the field along the prevailing wind erosion direction with disregard of the preponderance of wind erosion forces in the prevailing wind erosion direction.

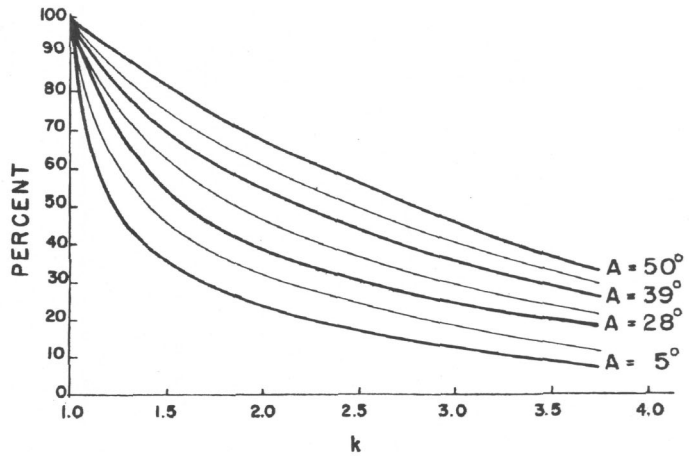


FIGURE 4.—Percent of wind erosion forces traveling distances equal to or greater than k times field width in traversing field strip for $R_m=2.1$ and various values of A .

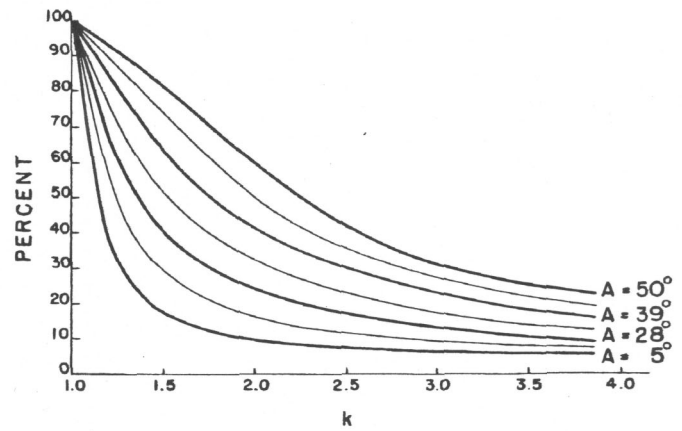


FIGURE 5.—Percent of wind erosion forces traveling distances equal to or greater than k times field width in traversing field strip for $R_m=3.0$ and various values of A .

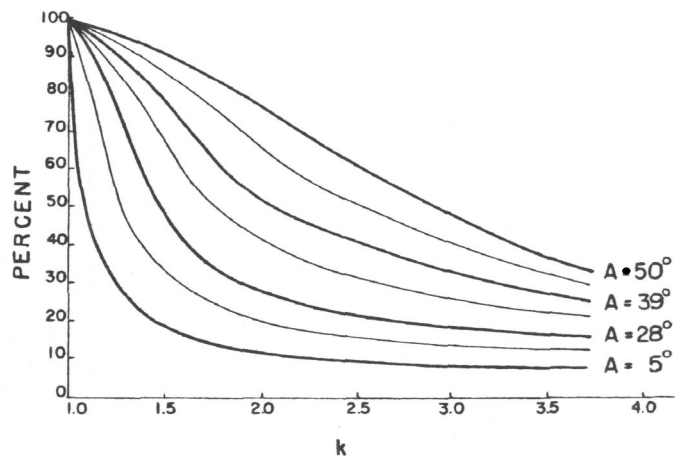


FIGURE 6.—Percent of wind erosion forces traveling k times field width or greater in traversing field strip for $R_m=3.8$ and various values of A .

TABLE 2.—Determination of width of field strip W_{50} for median travel distance of 150 feet and of width of field strip W_L , so distance across field in prevailing wind erosion direction is 150 feet when preponderance of wind erosion forces (R_m) is 1.1 and 3.6 and angle of deviation (A) is 0° and 40°

R_m	A	k_{50}	W_{50}	W_L
	($^\circ$)		Feet	Feet
1.1	0	1.8	83	150
	40	1.9	79	116
3.6	0	1.1	136	150
	40	2.1	71	116

When R_m equals 1.1, the angle of deviation of strip from right angles to prevailing wind erosion direction only slightly affects W_{50} , whereas when R_m equals 3.6, an increase in angle of deviation from 0° to 40° reduces W_{50} from 136 to 71 feet.

EXAMPLES OF FIELD APPLICATIONS

Data in this handbook can be used in several ways to design wind erosion control practices. Two examples are illustrative.

Determination of Potential Wind Erodibility of Farm Fields

The amount of erosion E , expressed in tons per acre per annum, that could occur from a given agricultural field can be expressed as $E=f(I',K',C',L',V)$, where I' is a soil erodibility index, K' is a soil ridge roughness factor, C' is a climatic factor, L' is field length along the prevailing wind erosion direction, and V is equivalent quantity of vegetative cover (11).

Assume we wish to use the equation and the information given in this handbook to determine the potential erosion E that might occur in March and October from a field with a 1,320-foot north-south width in the vicinity of Midland, Tex. Since the field is flat and smooth, soil ridge rough-

ness $K_r=0$ and soil ridge roughness factor $K'=1.0$ (fig. 7). Because it has 800 pounds per acre of flat wheat stubble, V , the equivalent vegetative cover, is 2,500 (fig. 8). (For other vegetative covers, refer to figs. 9 and 10.) Since dry sieving indicates that 25 percent of the soil fractions are greater than 0.84 mm. in diameter, $I'=86$ (table 3). C' , the climatic factor, appears in figures 11-22 for January through December. The factor is 102 percent for March and 64 percent for October. In this example we shall use median travel distance D_{50} for L' . D_{50} may be determined from this handbook in the following manner:

(1) Refer to data in table 1 (Appendix) for Midland, Tex. Find direction equal to 45° in March and 90° in October, thus indicating the prevailing wind erosion direction has an angle of

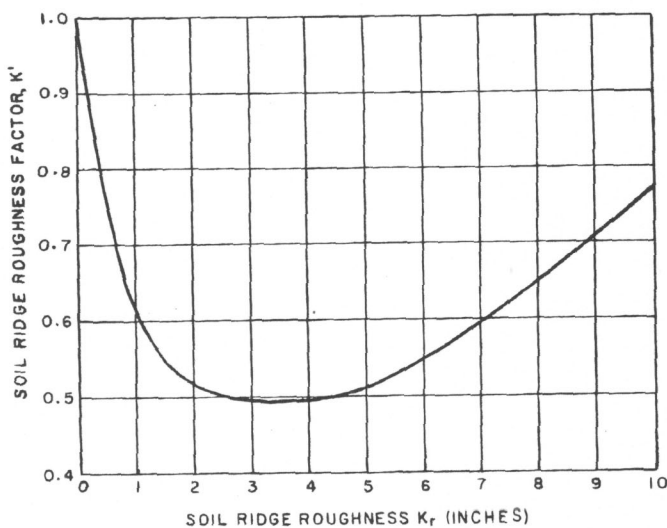


FIGURE 7.—Chart to determine soil ridge roughness factor K' from soil ridge roughness K_r .

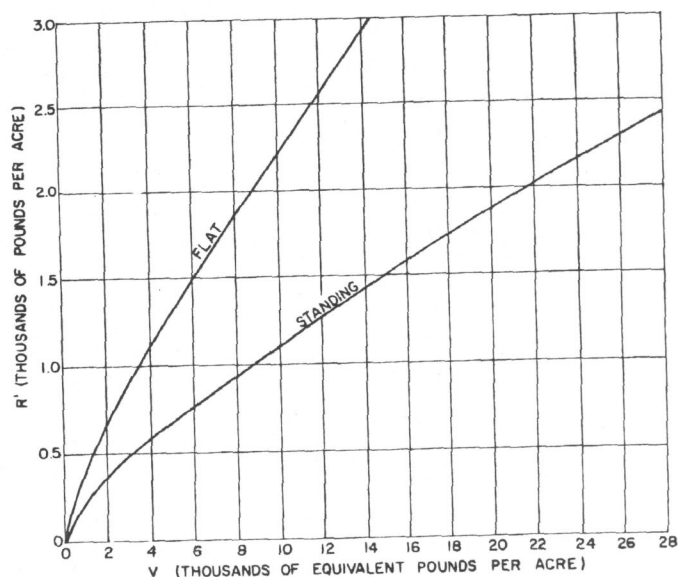


FIGURE 8.—Chart to determine V from R' or R' from V of standing and flat anchored small grain stubble with any row width up to 10 inches, including stover.

TABLE 3.—Soil erodibility I for soils with different percentages of nonerodible fractions as determined by standard dry sieving¹

Dry soil fractions >0.84 mm. (percent) Units → Tens ↓	0	1	2	3	4	5	6	7	8	9
	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre	Tons per acre
0.....		310	250	220	195	180	170	160	150	140
10.....	134	131	128	125	121	117	113	109	106	102
20.....	98	95	92	90	88	86	83	81	79	76
30.....	74	72	71	69	67	65	63	62	60	58
40.....	56	54	52	51	50	48	47	45	43	41
50.....	38	36	33	31	29	27	25	24	23	22
60.....	21	20	19	18	17	16	16	15	14	13
70.....	12	11	10	8	7	6	4	3	3	2
80.....	2									

¹ For fully crusted soil surface, regardless of soil texture, erodibility I is, on the average, about one-sixth of that shown.

deviation A with reference to the north-south field width of 45° in March and 0° in October. Also note from these data that preponderance or R_m equals 1.2 in March and 1.9 in October.

(2) To find D_{50} for March, use figures 2 and 3 to determine k_{50} . For $A=45^\circ$, find $k_{50}=1.90$ when $R_m=1.0$ and 1.85 when $R_m=1.5$. Since actual $R_m=1.2$, then by interpolation $k_{50}=1.88$ and $D_{50}=k_{50}$ field width $=1.88 \times 1,320=2,480$.

(3) To find D_{50} for October, use figures 3 and 4 to determine k_{50} . For $A=0^\circ$, find $k_{50}=1.30$ when $R_m=1.5$ and 1.18 when $R_m=2.1$. Since actual $R_m=1.9$, then by interpolation $k_{50}=1.22$ and $D_{50}=1.22 \times 1,320=1,610$.

Values of $I'=86$, $K'=1.0$, $C'=102$ in March and 64 in October, $D_{50}=2,480$ in March and 1,610 in October, and $V=2,500$ may now be used in the wind erosion equation $E=f(I',K',C',L',V)$ to determine potential soil losses of 40 tons per acre in March and 21 tons per acre in October. The procedure for making these calculations is as follows:

(1) Determine $E_2=I'K'$. $E_2=86 \times 1.0=86$ tons per acre.

(2) Determine $E_3=I'K'C'$. $E_3=86 \times 1.0 \times 1.02=88$ tons per acre in March. $E_3=86 \times 1.0 \times 0.64=55$ tons per acre in October.

(3) Determine $E_4=I'K'C'f(L')$

(a) $L'=D_{50}=2,480$ feet in March and 1,610 feet in October.

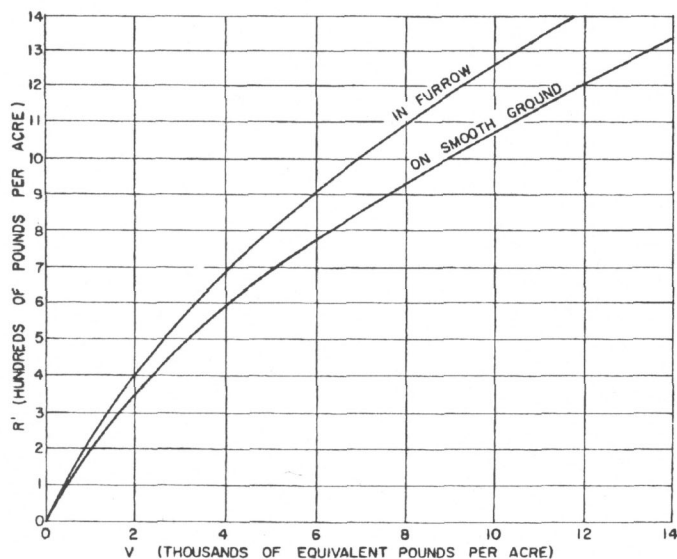


FIGURE 9.—Chart to determine V from R' or R' from V of live or dead small grain crops in seedling and stoling stage, above surface of ground, for crop in 3-inch-deep furrow as created by deep-furrow drill on smooth ground.

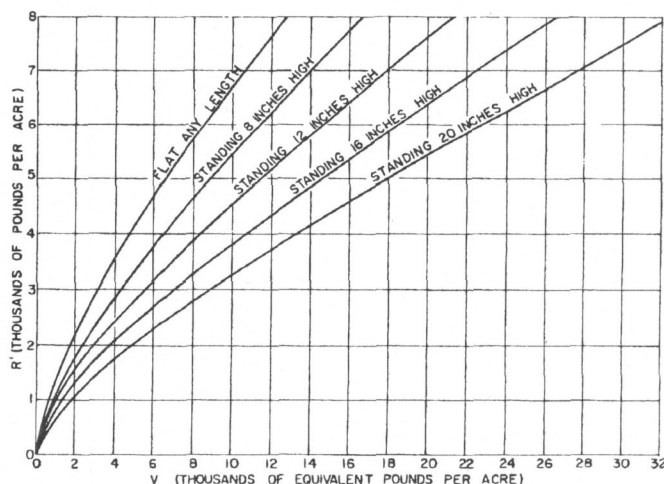


FIGURE 10.—Chart to determine V from R' or R' from V of standing and flat grain sorghum stubble of average stalk thickness, leafiness, and quantity of tops on ground.

(b) Use figure 23 to obtain E_4 . Cut out movable $E_3=I'K'C'$ scale. For March, place it along $E_2=I'K'$ ordinate so that 88 on movable scale coincides with 86 on ordinate. From movable scale move to right down along 86 interpolated between curved lines 80 and 90 to intersection of $L'=2,480$ feet, then move horizontally left to movable E_3 scale and read $E_4=I'K'C'f(L')=82$ tons per acre. For October, place movable scale E_2 ordinate so that 55 on movable scale coincides with 86 on ordinate. Again from movable scale move to right down along 86 interpolated between curved lines 80 and 90 to intersection of $L'=1,610$ feet, then move horizontally left to movable E_3 scale and read $E_4=50$ tons per acre.

(4) Determine $E_5=E=I'K'C'f(L')f(V)$

(a) V as determined from figure 8 for 800 pounds per acre of residue R' is 2,500 equivalent pounds per acre.

(b) Use figure 24 to determine $E_5=E$. For March, start with $E_4=82$ on abscissa of figure 24. Move vertically upward to intersection of $V=2,500$, then move horizontally left to ordinate E . $E=40$ tons per acre. For October, start with $E_4=50$ on abscissa of figure 24, move vertically to intersection of $V=2,500$ and horizontally to ordinate and read $E=21$ tons per acre.

Because these soil loss values are rather high, a farm operator might next logically ask "How much additional residue above the 800 pounds per acre would this field need to prevent soil losses from exceeding a tolerable 5 tons per acre?" That question can be answered by substituting 5 tons per acre for E in the equation and solving for V . If that is done using the field conditions for I' , K' , C' , and L' indicated above, one finds that 1,800 pounds per acre of flattened wheat stubble would be required in March and 1,320 pounds per acre

in October. Thus, 1,000 pounds per acre more residue than the existing 800 pounds would be required for adequate protection in March, but only an additional 520 pounds per acre would be needed in October.

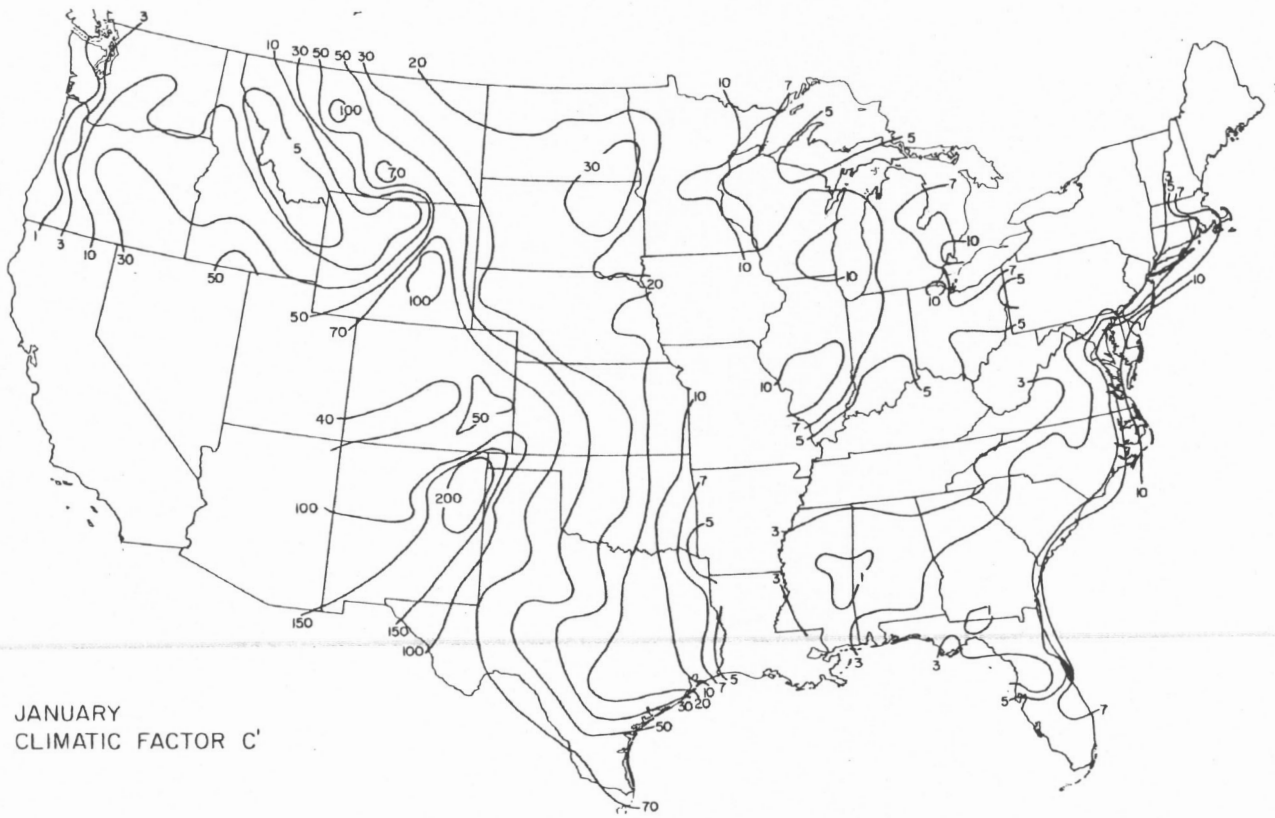
Determination of Barrier Spacing

For an example of determining barrier spacing, assume we desire to establish windbreaks to reduce wind erosion of wheat and fallow fields near Goodland, Kans. Information from table 1 indicates that wind erosion forces are greatest in March and April when fields are susceptible to wind erosion. It is decided to design for conditions when wind erosion forces are greatest. Other pertinent information from table 1 indicates that the prevailing wind erosion direction is 112° , north-northwest, and preponderance or R_m is 2.5 and 2.1 for March and April, respectively. Since the field lies along grid lines and prevailing wind erosion direction is only 22° from north-south, it is decided to orient the barrier east-west.

It is decided to base the distance between barrier strips on the distance traveled by 50 percent of the wind in traversing the field strip, or the median travel distance. Based on properties of the barrier to be established and degree of protection desired, it is decided that the median travel distance should not exceed $30H$. H is barrier height. By using figure 4 and interpolating, it is found for $R_m=2.1$ and $A=22^\circ$ that median travel distance is $1.5(k_{50})$ times the field width W . If we equate that distance ($1.5W$) to $30H$ and solve for W , we obtain $20H$. Therefore, based on the design criteria and average wind conditions of the area, wind barriers should be spaced 20 times their height.

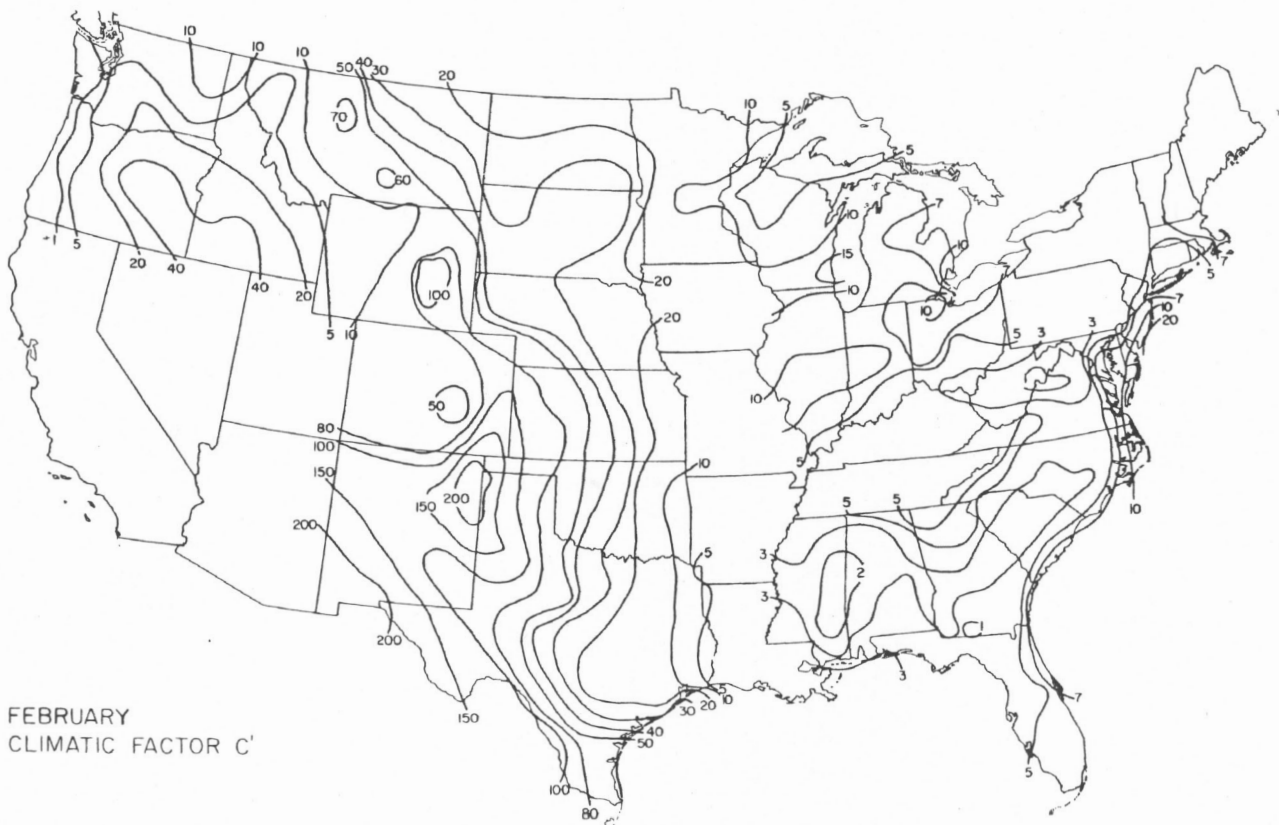
LITERATURE CITED

- (1) BAGNOLD, R. A.
1943. THE PHYSICS OF BLOWN SAND AND DESERT DUNES. 265 pp. William Morrow & Co., New York.
- (2) CHEPIL, W. S.
1945. DYNAMICS OF WIND EROSION: II. INITIATION OF SOIL MOVEMENT. Soil Sci. 60 (5): 397-411.
- (3) ———
1945. DYNAMICS OF WIND EROSION: III. THE TRANSPORT CAPACITY OF THE WIND. Soil Sci. 60 (6): 475-480.
- (4) ———
1957. WIDTH OF FIELD STRIPS TO CONTROL WIND EROSION. Kans. Agr. Expt. Sta. Tech. Bul. 92, 16 pp.
- (5) ——— and MILNE, R. A.
1941. WIND EROSION OF SOIL IN RELATION TO SIZE AND NATURE OF EXPOSED AREA. Sci. Agr. 21 (8): 479-487.
- (6) ——— SIDDOWAY, F. H., and ARMBRUST, D. V.
1964. PREVAILING WIND EROSION DIRECTION IN THE GREAT PLAINS. Jour. Soil and Water Conserv. 19 (2): 67-70.
- (7) ——— and WOODRUFF, N. P.
1963. THE PHYSICS OF WIND EROSION AND ITS CONTROL. Adv. in Agron. 15: 211-302.
- (8) JOHNSON, W. C.
1965. WIND IN THE SOUTHWESTERN GREAT PLAINS. U.S. Agr. Res. Serv. Conserv. Res. Rpt. No. 6, 65 pp.
- (9) MALINA, F. J.
1941. RECENT DEVELOPMENTS IN THE DYNAMICS OF WIND EROSION. Amer. Geophys. Union Trans., pp. 262-284.
- (10) SKIDMORE, E. L.
1965. ASSESSING WIND EROSION FORCES: DIRECTION AND RELATIVE MAGNITUDES. Soil Sci. Soc. Amer. Proc. 29 (5): 587-590.
- (11) WOODRUFF, N. P., and SIDDOWAY, F. H.
1965. A WIND EROSION EQUATION. Soil Sci. Soc. Amer. Proc. 29 (5): 602-608.
- (12) ZINGG, A. W.
1953. WIND-TUNNEL STUDIES OF THE MOVEMENT OF SEDIMENTARY MATERIAL. 5th Hydraul. Conf. Proc., Iowa Inst. Hydraul. Bul. 34, pp. 111-135.



JANUARY
CLIMATIC FACTOR C'

FIGURE 11.—Wind erosion climatic factor C' (percent) for January.



FEBRUARY
CLIMATIC FACTOR C'

FIGURE 12.—Wind erosion climatic factor C' (percent) for February.

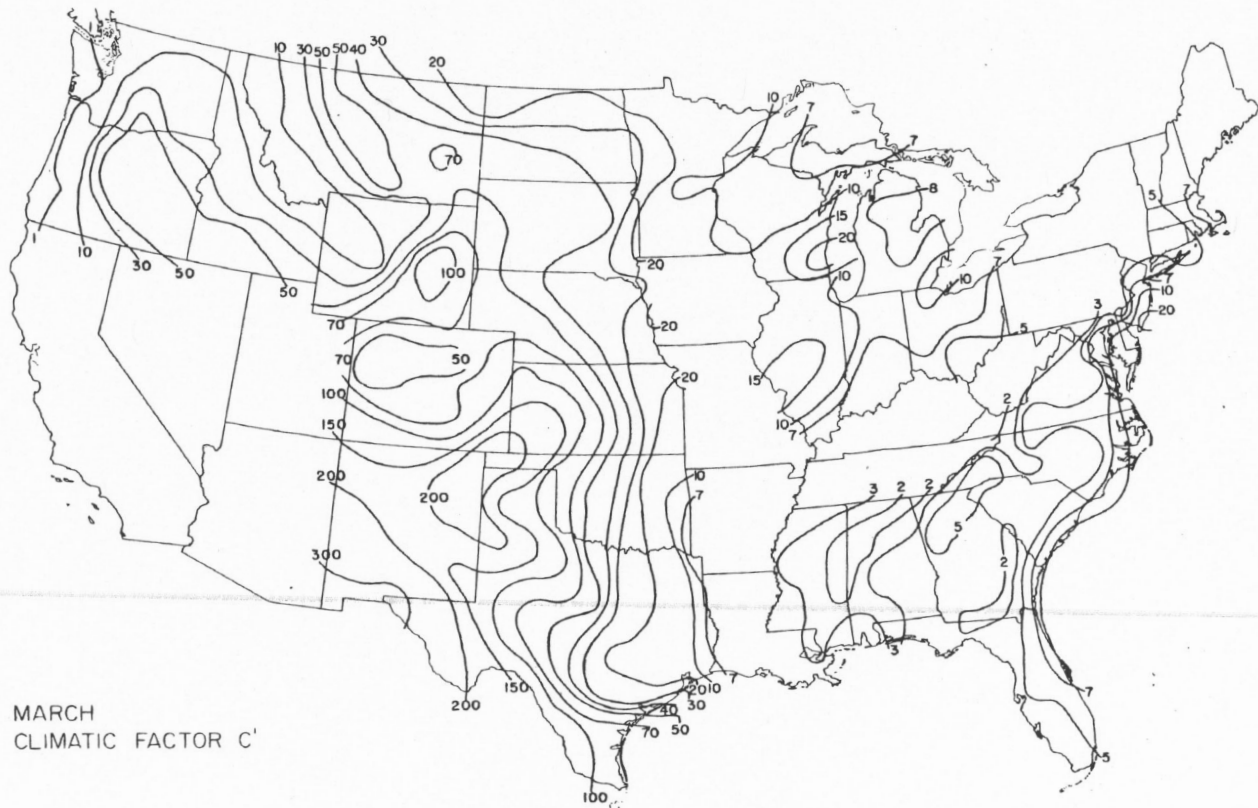


FIGURE 13.—Wind erosion climatic factor C' (percent) for March.

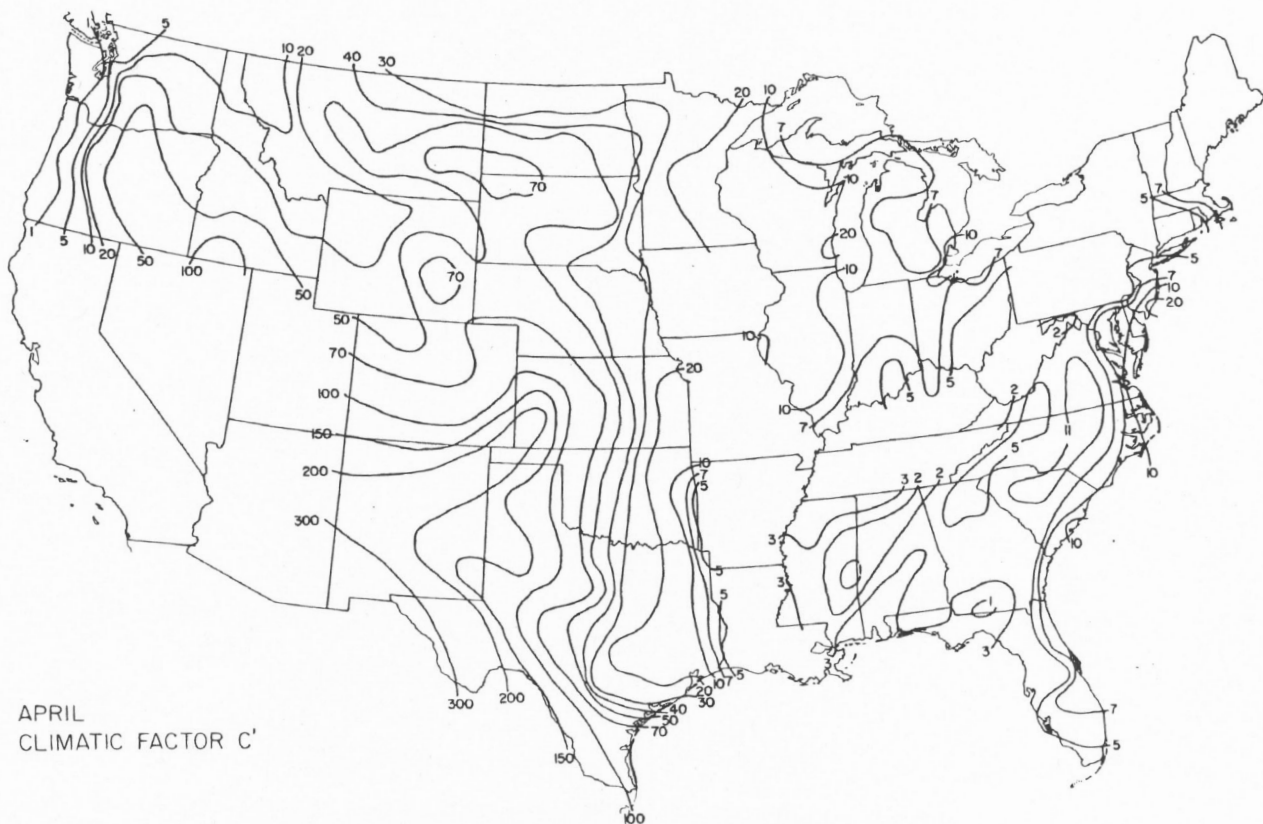


FIGURE 14.—Wind erosion climatic factor C' (percent) for April.

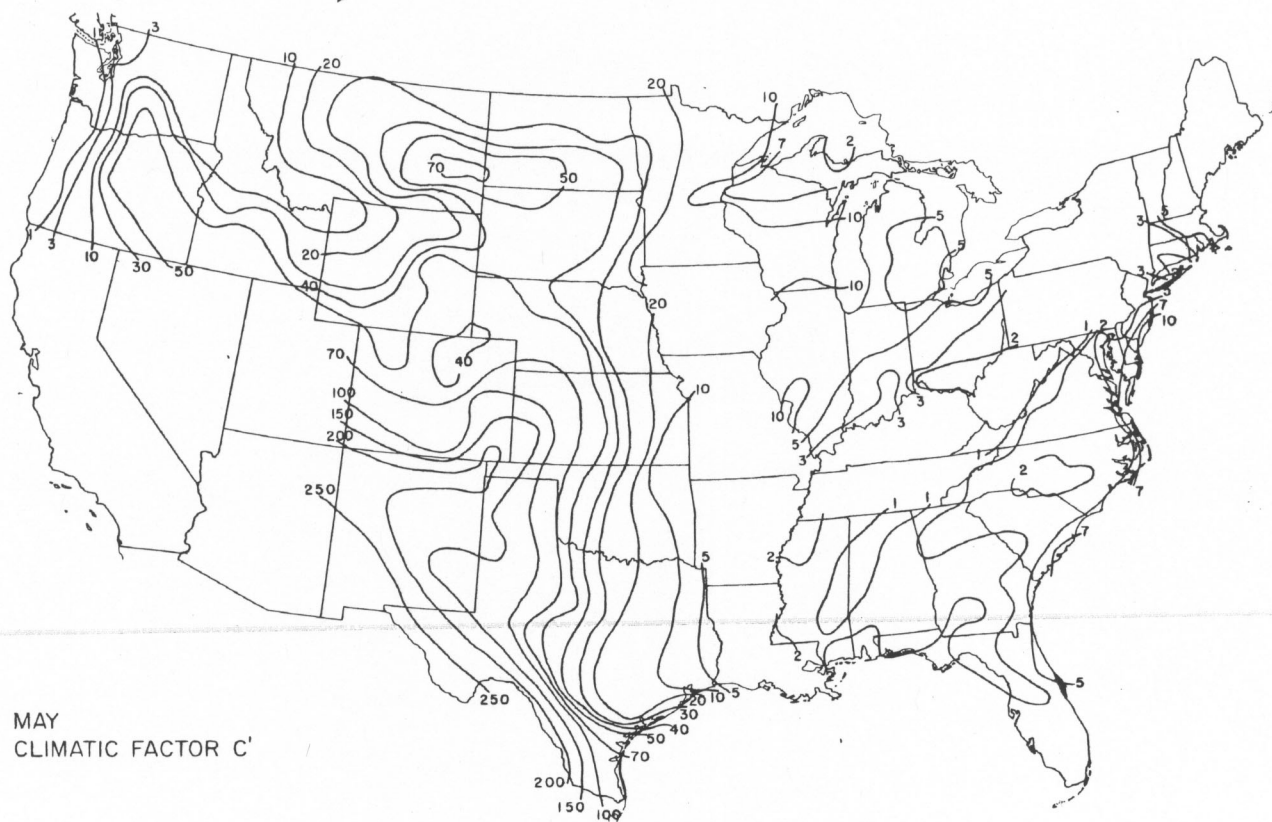


FIGURE 15.—Wind erosion climatic factor C' (percent) for May.

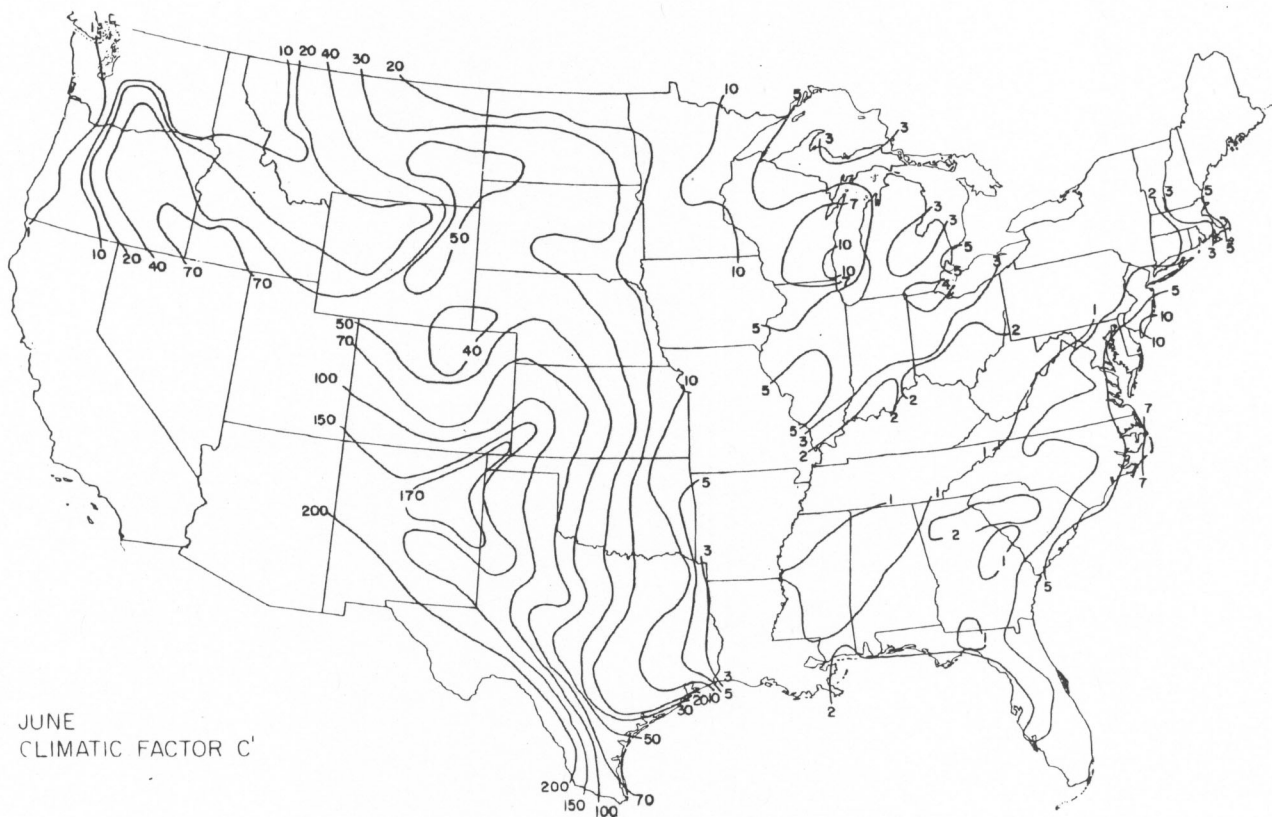
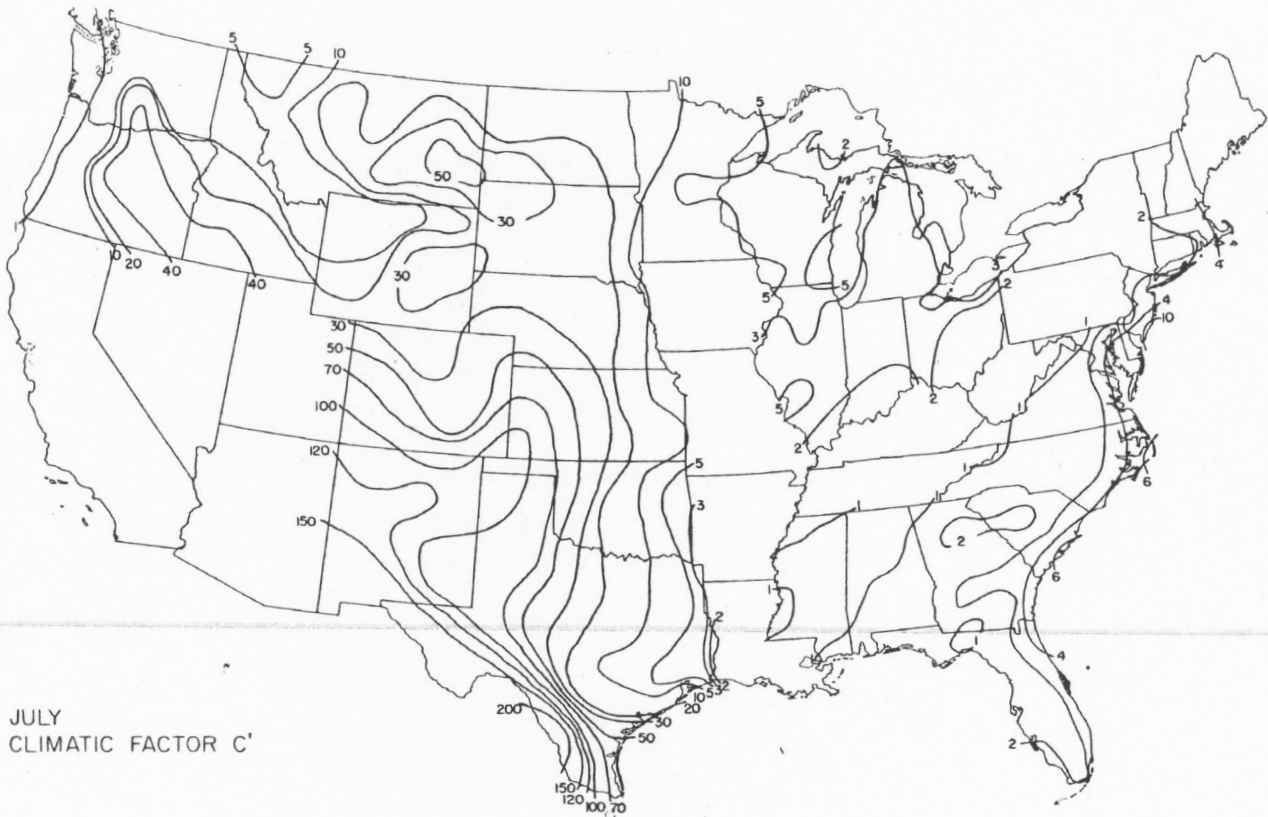
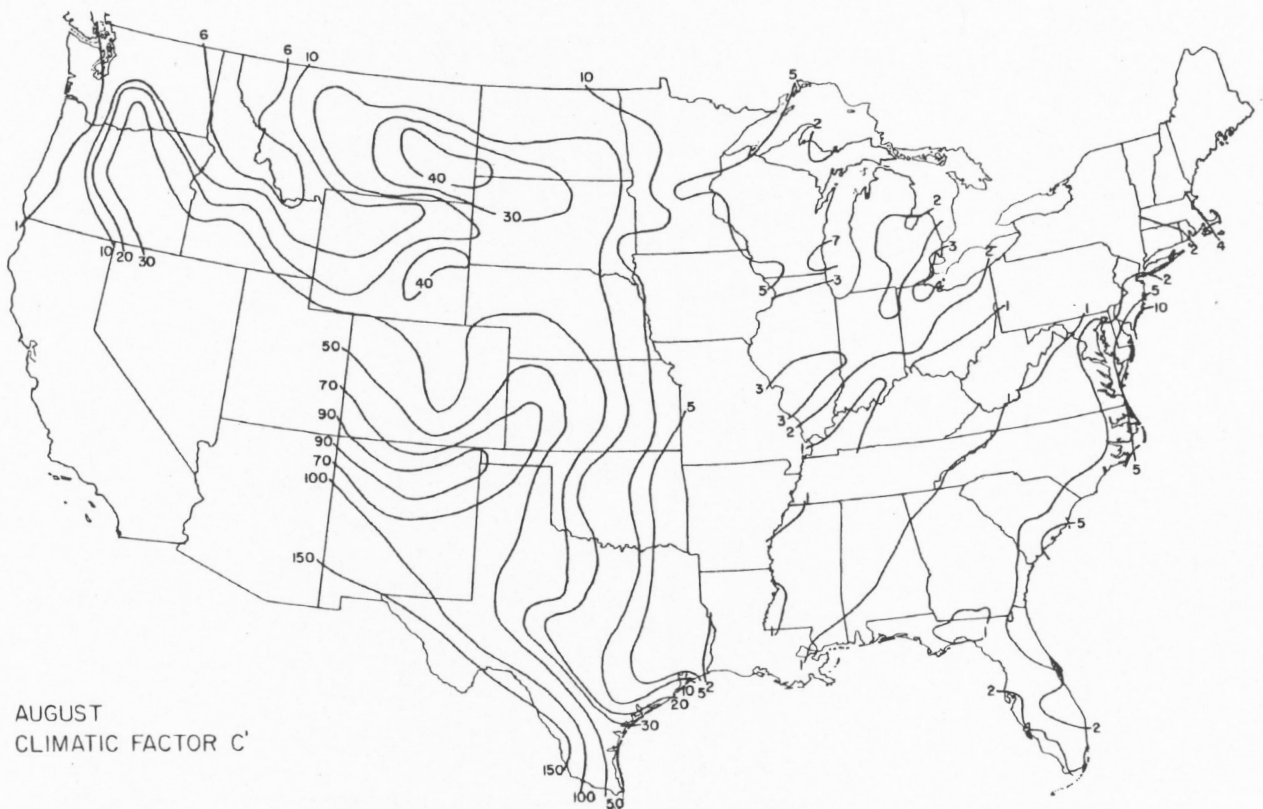


FIGURE 16.—Wind erosion climatic factor C' (percent) for June.



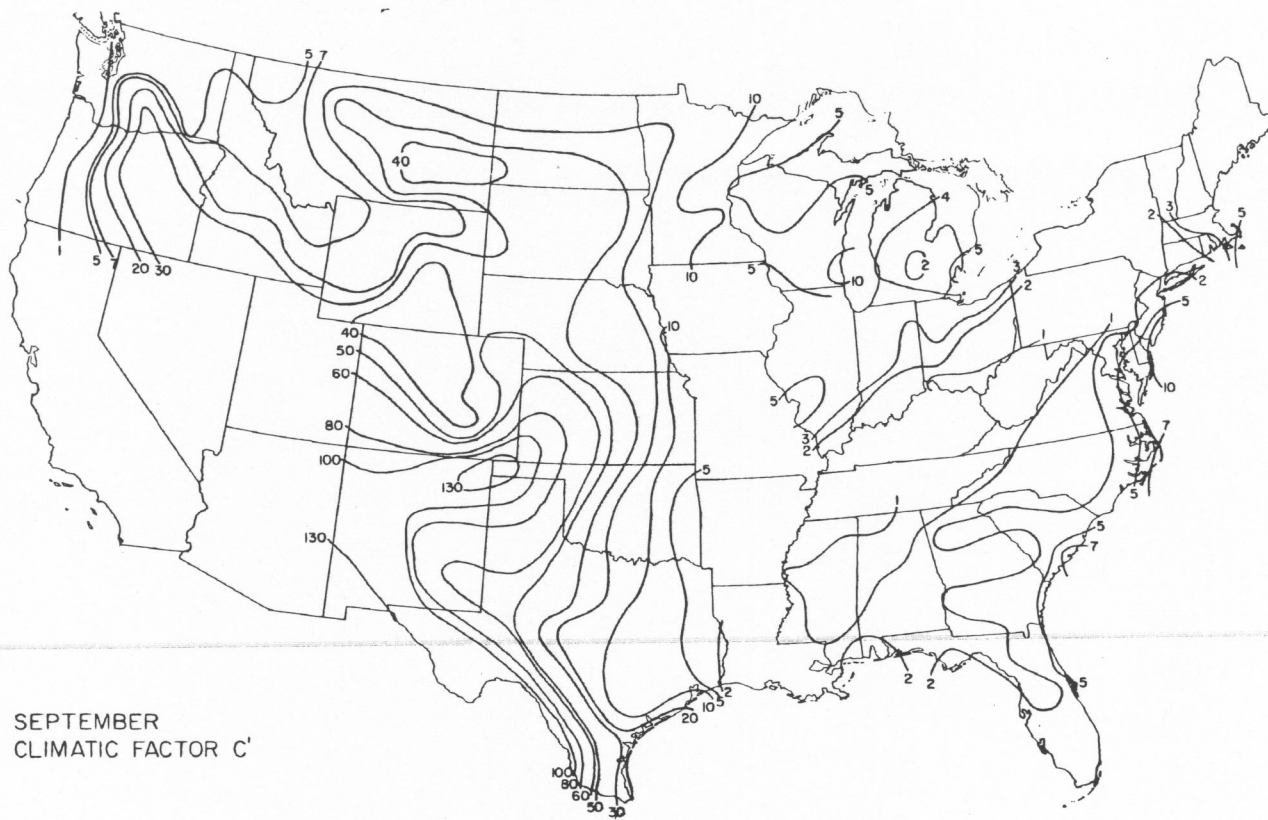
JULY
CLIMATIC FACTOR C'

FIGURE 17.—Wind erosion climatic factor C' (percent) for July.



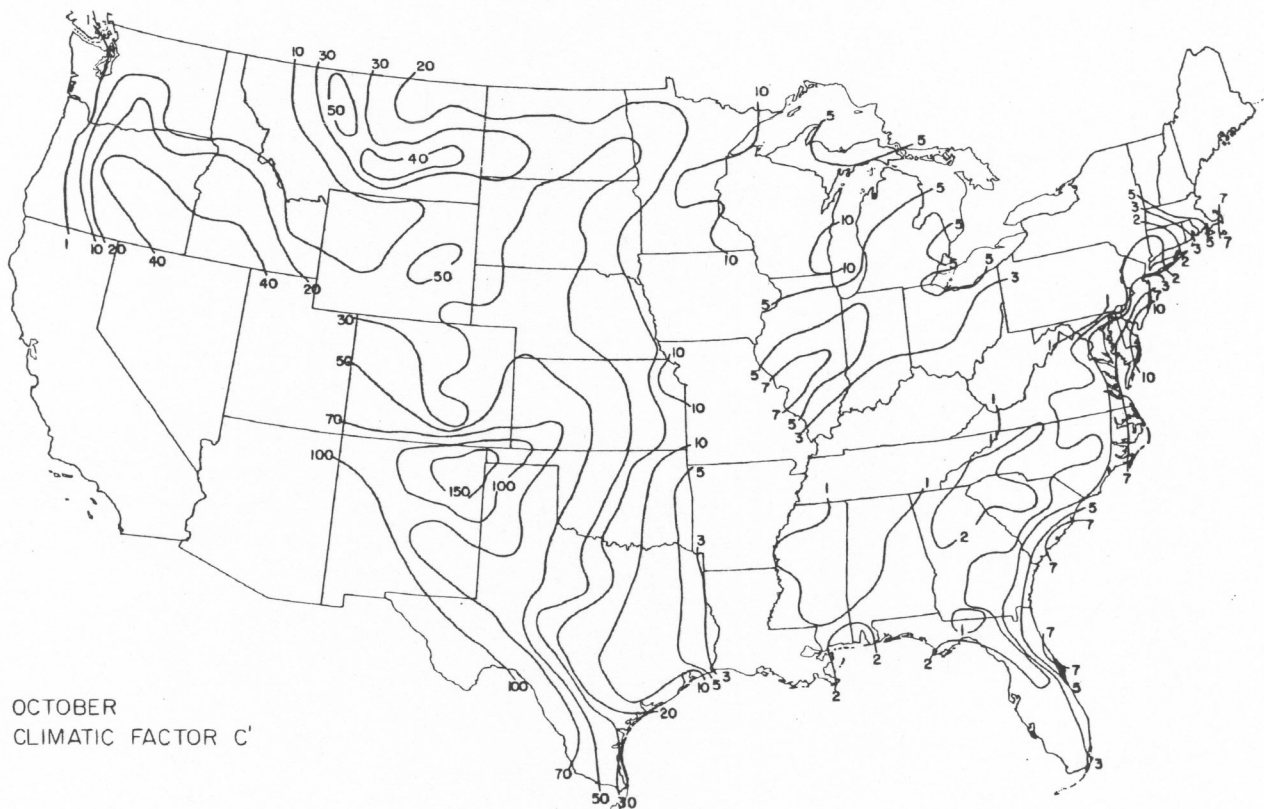
AUGUST
CLIMATIC FACTOR C'

FIGURE 18.—Wind erosion climatic factor C' (percent) for August.



SEPTEMBER
CLIMATIC FACTOR C'

FIGURE 19.—Wind erosion climatic factor C' (percent) for September.



OCTOBER
CLIMATIC FACTOR C'

FIGURE 20.—Wind erosion climatic factor C' (percent) for October.

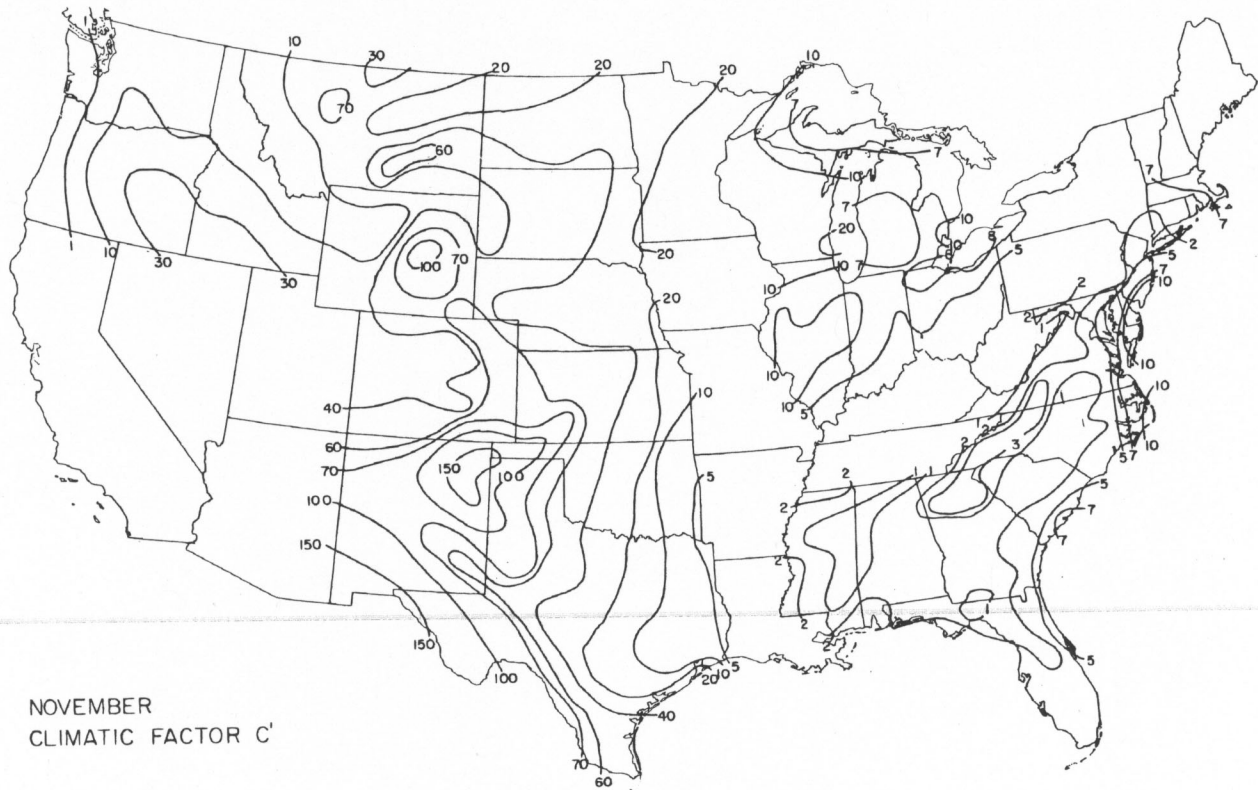


FIGURE 21.—Wind erosion climatic factor C' (percent) for November.

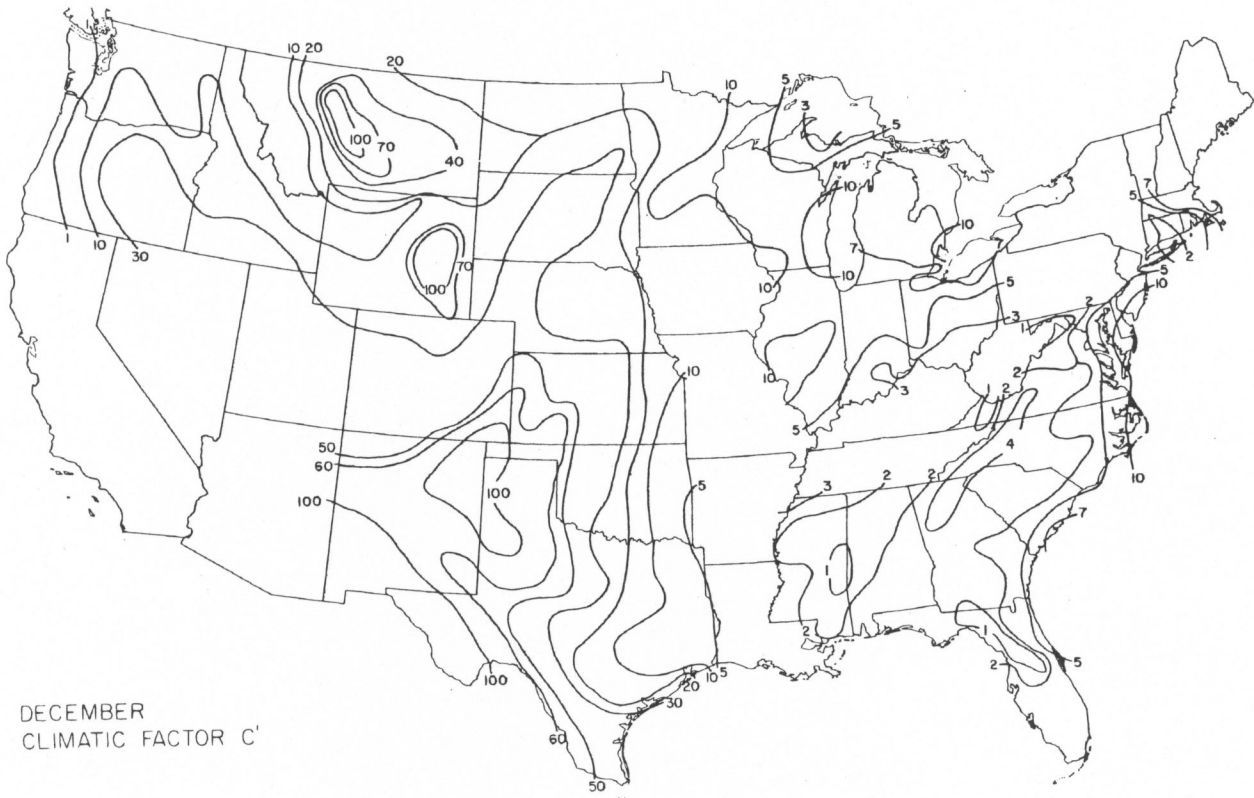


FIGURE 22.—Wind erosion climatic factor C' (percent) for December.

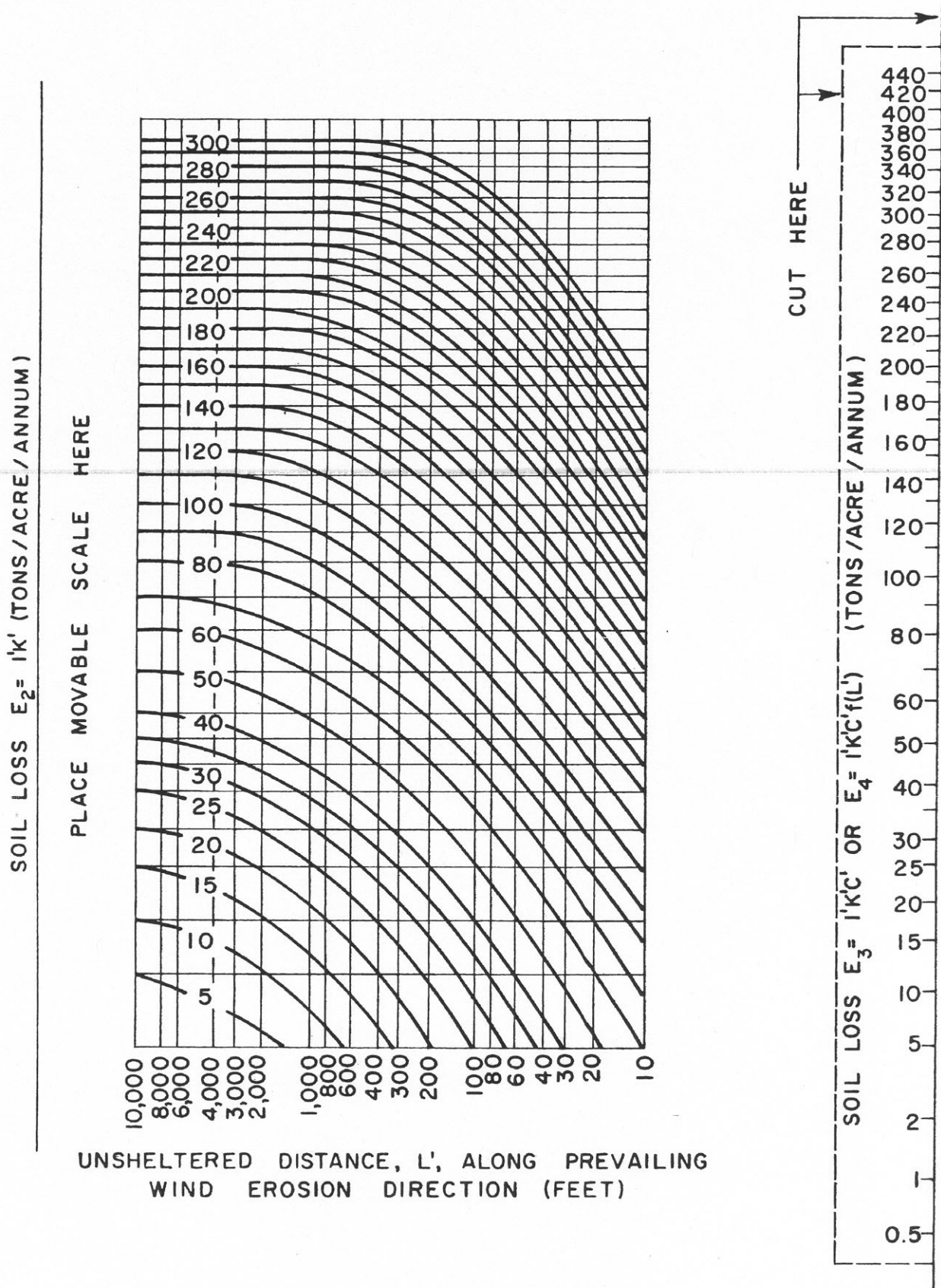


FIGURE 23.—Chart to determine soil loss $E_4 = I'K'C'f(L')$ from soil loss $E_2 = I'K'$ and $E_3 = I'K'C'$ and from unsheltered distance L' across field.

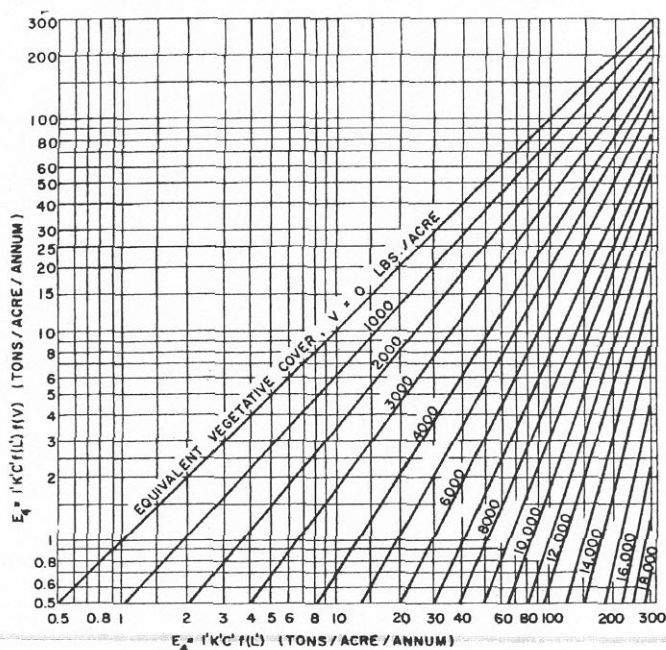


FIGURE 24.—Chart to determine soil loss $E_4 = I'K'C'f(L')f(V)$ from soil loss $E_1 = I'K'C'f(L')$ and from vegetative cover factor V . Chart can be used in reverse to determine V needed to reduce soil loss to any degree.

APPENDIX

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anchorage, Alaska (Jan. 1956 - Dec. 1960)												
Magnitude.....	66	108	75	48	115	73	63	42	66	56	45	36
Direction.....	68	68	90	90	90	90	90	90	90	90	90	90
Preponderance.....	2.0	3.4	2.7	2.7	3.4	3.1	2.7	3.2	3.1	3.2	3.1	3.1
Fairbanks, Alaska (Jan. 1956 - Dec. 1960)												
Magnitude.....	3	12	28	30	68	34	40	24	31	25	9	2
Direction.....	45	45	45	45	45	23	23	23	23	23	45	45
Preponderance.....	2.6	2.9	2.5	1.3	1.9	2.1	2.2	2.4	2.0	2.5	1.3	3.3
Ajo, Ariz. (Jan.-Sept. 1942; Nov. 1942 - Dec. 1946)												
Magnitude.....	54	73	91	83	80	95	69	44	62	37	24	28
Direction.....	90	90	113	45	45	67	45	90	68	90	90	90
Preponderance.....	1.9	2.1	1.2	1.2	1.4	1.8	1.3	1.2	1.6	1.5	1.7	1.4
Douglas, Ariz. (Nov. 1942 - Nov. 1945)												
Magnitude.....	84	140	230	294	177	215	80	37	69	86	74	53
Direction.....	69	67	45	23	22	45	113	135	180	180	180	90
Preponderance.....	1.3	1.6	1.5	1.4	1.5	1.6	1.4	1.4	1.5	1.8	1.0	1.0

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Kingman, Ariz. (Mar. 1943 - June 1945)												
Magnitude.....	150	244	337	256	280	329	225	181	162	98	83	66
Direction.....	45	67	67	45	45	45	45	45	45	45	45	90
Preponderance.....	2.9	1.7	2.6	2.8	2.7	3.6	2.4	2.9	1.9	1.5	2.0	1.6
Phoenix, Ariz. (May 1950 - Apr. 1955)												
Magnitude.....	45	101	74	93	89	62	131	97	76	34	29	38
Direction.....	180	157	158	180	113	135	90	135	112	90	90	113
Preponderance.....	1.5	1.4	1.6	1.7	1.4	1.5	1.5	1.7	1.7	1.6	1.0	1.4
Prescott, Ariz. (Jan. 1953 - Jan. 1963)												
Magnitude.....	69	128	194	236	242	204	103	75	88	85	76	57
Direction.....	68	68	45	67	67	45	45	67	67	68	68	68
Preponderance.....	1.7	1.4	1.7	2.0	2.7	2.3	1.9	1.6	2.0	2.1	2.2	1.5
Tucson, Ariz. (Sept. 1952 - Jan. 1963)												
Magnitude.....	93	82	101	121	132	91	96	63	70	107	106	87
Direction.....	157	158	158	180	22	158	157	157	157	157	157	157
Preponderance.....	2.6	1.7	1.6	1.4	1.7	1.2	1.5	1.6	2.1	2.3	3.4	2.6
Yuma, Ariz. (Sept. 1952 - Jan. 1963)												
Magnitude.....	62	90	89	111	108	107	139	114	43	45	62	59
Direction.....	90	90	113	157	135	113	113	113	112	113	90	90
Preponderance.....	2.6	2.1	1.5	1.5	1.7	2.2	3.0	2.5	1.9	1.4	2.4	2.7
Arcata, Calif. (Dec. 1949 - Nov. 1958)												
Magnitude.....	159	154	183	172	192	140	80	54	53	81	93	126
Direction.....	135	135	135	135	135	135	135	135	135	114	135	135
Preponderance.....	2.3	2.8	3.3	3.9	4.4	6.6	6.9	5.0	3.6	2.1	3.1	2.5
Bishop, Calif. (Jan. 1948 - Jan. 1957)												
Magnitude.....	170	234	409	299	305	256	170	176	175	242	222	161
Direction.....	90	90	90	90	90	90	112	90	90	90	90	90
Preponderance.....	4.1	4.0	3.2	2.6	2.0	2.4	2.1	2.3	2.5	3.6	5.7	3.9
Blythe, Calif. (Aug. 1942 - May 1944)												
Magnitude.....	110	108	172	132	226	216	136	166	59	103	127	90
Direction.....	90	90	90	45	90	45	90	90	90	67	90	113
Preponderance.....	2.3	2.4	2.2	2.3	1.4	2.1	1.9	3.9	1.8	1.9	4.2	1.9

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
China Lake, Calif. (Apr. 1945 - Dec. 1959)												
Magnitude.....	290	370	539	553	504	431	282	274	241	272	236	194
Direction.....	67	45	45	45	45	45	45	67	45	45	45	45
Preponderance.....	1.6	1.7	1.7	1.6	1.8	2.0	2.1	2.4	2.4	1.9	1.6	1.7
El Centro, Calif. (Feb. 1945 - Apr. 1946; Nov. 1946 - Feb. 1958)												
Magnitude.....	155	203	299	344	393	311	92	90	101	128	142	117
Direction.....	22	22	22	22	22	180	180	180	180	180	180	22
Preponderance.....	1.6	2.0	2.9	3.6	3.8	3.7	2.1	2.3	2.6	4.1	1.6	1.4
Fort Bragg, Calif. (June 1943 - May 1945)												
Magnitude.....	135	237	180	182	103	102	44	65	51	56	80	103
Direction.....	157	135	135	135	113	135	112	113	113	135	157	135
Preponderance.....	2.3	2.3	2.3	4.3	4.1	4.5	3.9	3.7	4.5	3.6	1.7	1.6
Fresno, Calif. (May 1950 - Apr. 1955)												
Magnitude.....	70	65	92	73	111	77	27	17	27	52	36	79
Direction.....	113	135	135	135	135	157	157	157	135	112	135	135
Preponderance.....	2.7	2.9	3.1	2.6	2.2	4.6	4.2	3.1	2.4	1.9	2.0	2.0
Marysville, Calif. (Aug. 1943 - Oct. 1944)												
Magnitude.....	141	187	188	121	131	195	101	61	47	54	36	150
Direction.....	113	135	135	135	135	135	135	113	135	135	135	112
Preponderance.....	3.3	4.3	3.0	3.2	6.4	4.6	3.6	3.2	4.9	4.6	9.3	1.9
Merced, Calif. (Jan. 1942 - Nov. 1946; Dec. 1947 - Dec. 1952)												
Magnitude.....	103	96	173	141	127	137	69	49	55	58	52	91
Direction.....	135	135	113	113	113	113	113	113	113	113	135	135
Preponderance.....	3.8	3.5	3.3	4.2	3.3	3.6	4.0	4.0	3.6	3.6	3.5	4.1
Palmdale, Calif. (Jan. 1934 - Dec. 1941; Nov. 1948 - Nov. 1952)												
Magnitude.....	210	267	326	349	407	368	285	216	176	179	148	158
Direction.....	23	45	23	45	45	45	45	45	45	45	22	45
Preponderance.....	1.8	2.1	1.6	2.0	2.4	4.2	5.7	5.0	4.3	2.4	1.9	1.7
Riverside, Calif. (Jan. 1933 - Dec. 1934; Feb., Apr. - June 1935; Feb. 1936 - July 1941; Sept. 1941 - May 1953)												
Magnitude.....	68	74	80	94	107	119	124	112	81	53	50	58
Direction.....	67	112	157	157	157	157	135	157	157	157	23	21
Preponderance.....	1.2	1.2	1.6	2.0	2.5	2.8	3.6	3.7	3.1	2.3	1.1	1.4

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Salinas, Calif. (Aug. 1941 - Dec. 1944)												
Magnitude.....	275	169	166	207	140	160	156	146	103	91	116	152
Direction.....	135	135	135	157	158	158	157	135	135	135	135	135
Preponderance.....	6.8	4.5	3.5	2.8	3.0	3.3	3.4	3.2	4.2	3.0	4.2	5.3
San Diego, Calif. (Jan. 1951 - Dec. 1960)												
Magnitude.....	72	81	105	96	66	37	19	20	24	34	81	57
Direction.....	90	90	90	68	22	67	157	22	157	67	90	113
Preponderance.....	1.5	1.5	1.4	1.3	1.1	1.2	1.3	1.1	1.5	1.4	1.4	1.3
San Miguel Island, Calif. (Feb. 1940 - June 1942)												
Magnitude.....	427	721	1,142	1,417	1,627	1,626	854	1,095	713	640	616	709
Direction.....	113	113	113	113	135	135	157	135	135	157	156	113
Preponderance.....	2.8	4.0	2.6	4.0	3.2	4.1	5.4	2.6	2.6	4.6	3.5	3.6
Santa Rosa, Calif. (Apr. 1943 - Dec. 1945)												
Magnitude.....	36	106	109	131	96	109	93	72	36	53	27	55
Direction.....	135	90	68	135	68	111	90	112	90	90	90	90
Preponderance.....	3.1	1.9	1.6	1.6	1.4	1.4	2.7	2.1	1.6	1.7	1.5	4.8
Stockton, Calif. (Feb. 1941 - June 1946)												
Magnitude.....	80	105	125	110	158	185	56	54	49	52	33	76
Direction.....	35	134	135	135	180	180	180	180	158	135	135	135
Preponderance.....	4.0	2.2	2.5	2.0	1.7	2.4	3.1	2.9	2.5	3.7	2.1	2.3
Thermal, Calif. (July 1943 - Feb. 1945)												
Magnitude.....	17	95	127	214	176	238	115	103	95	53	40	21
Direction.....	113	113	113	113	113	113	113	113	113	113	113	135
Preponderance.....	2.4	2.6	2.3	4.3	3.0	4.4	3.7	4.3	4.1	2.6	2.8	3.4
Victorville, Calif. (Jan. 1942 - Feb. 1946; May-Sept. 1948; Sept. 1950 - June 1957)												
Magnitude.....	224	311	392	413	342	283	159	147	134	145	192	218
Direction.....	77	180	19	180	180	45	90	90	90	22	22	22
Preponderance.....	1.1	1.2	1.3	1.4	1.3	1.1	2.0	1.8	1.4	1.2	1.3	1.4
Denver, Colo. (May 1950 - Apr. 1955)												
Magnitude.....	265	448	423	476	251	326	281	152	209	158	276	332
Direction.....	135	135	157	112	112	111	112	90	112	90	180	90
Preponderance.....	1.2	1.1	1.0	1.2	1.2	1.2	1.8	1.3	1.6	1.1	1.3	1.3

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
La Junta, Colo. (Nov. 1942 - June 1945)												
Magnitude.....	215	334	461	533	430	562	267	270	261	240	330	211
Direction.....	22	158	23	90	45	45	23	67	44	22	90	180
Preponderance.....	1.5	1.1	1.3	1.1	1.1	1.5	1.0	1.4	1.3	1.3	1.3	1.3
Pueblo, Colo. (Mar. 1950 - Feb. 1955)												
Magnitude.....	357	364	451	352	266	393	193	182	139	152	289	402
Direction.....	157	113	180	68	45	67	90	113	67	157	158	157
Preponderance.....	1.6	1.2	1.6	1.3	1.4	1.3	1.2	1.1	1.2	1.1	1.4	1.5
Bridgeport, Conn. (Jan.-Apr. 1953; Mar. 1960 - May 1963)												
Magnitude.....	348	340	387	406	234	145	136	151	274	302	327	506
Direction.....	157	135	157	157	180	45	180	23	45	22	113	157
Preponderance.....	1.2	1.3	1.2	1.5	1.2	1.6	1.3	1.7	1.5	1.3	1.6	1.4
Hartford, Conn. (Jan. 1950 - May 1963)												
Magnitude.....	190	179	221	273	128	96	59	68	80	102	155	137
Direction.....	135	135	135	112	90	90	90	90	90	90	135	135
Preponderance.....	1.8	1.8	1.5	2.0	1.5	1.6	1.4	1.5	1.8	1.4	1.3	1.6
Stratford, Conn. (Dec. 1942; Aug. 1943 - June 1944)												
Magnitude.....	268	339	231	200	138	151	-----	241	140	246	200	264
Direction.....	135	157	157	45	45	68	-----	66	45	23	158	180
Preponderance.....	1.3	2.3	1.4	1.4	1.6	1.6	-----	1.3	2.5	2.5	1.5	1.6
Windsor Locks, Conn. (Sept. 1941 - Oct. 1944)												
Magnitude.....	190	351	246	224	100	94	46	39	76	134	137	265
Direction.....	135	135	113	135	90	90	90	90	90	135	113	135
Preponderance.....	1.8	4.6	1.3	1.9	2.1	2.0	1.6	1.7	1.7	1.5	1.9	2.0
Wilmington, Del. (Jan. 1951 - Dec. 1960)												
Magnitude.....	192	227	257	182	105	94	59	63	82	110	135	136
Direction.....	135	157	135	135	112	135	112	90	90	22	135	157
Preponderance.....	1.7	2.0	1.8	1.3	1.1	1.2	1.4	1.3	1.4	1.1	1.7	1.4
Avon Park, Fla. (Dec. 1943 - Sept. 1945)												
Magnitude.....	145	142	153	225	134	71	34	68	222	323	104	140
Direction.....	112	68	90	45	23	180	113	22	22	45	90	90
Preponderance.....	1.5	1.6	1.2	1.6	2.0	1.2	1.2	1.7	1.8	2.1	1.5	2.4

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Cape Canaveral, Fla. (Aug. 1950 - Feb. and Apr. 1954; Apr. 1956 - July 1962)												
Magnitude.....	179	235	225	206	152	95	79	74	174	227	169	166
Direction.....	113	135	113	135	158	135	135	135	180	45	113	115
Preponderance.....	1.5	1.4	1.4	1.4	1.3	1.3	1.6	1.3	1.1	1.4	1.3	1.4
Daytona Beach, Fla. (Jan. 1953 - May 1963)												
Magnitude.....	163	216	188	216	150	109	74	75	153	165	132	127
Direction.....	68	45	45	22	22	22	180	23	23	45	90	90
Preponderance.....	1.2	1.2	1.1	1.3	1.6	1.7	1.6	1.7	1.7	2.0	1.4	1.3
Fort Myers, Fla. (Jan. 1943 - Nov. 1945)												
Magnitude.....	72	93	148	129	100	61	32	48	106	162	68	78
Direction.....	67	45	45	23	22	180	169	22	23	45	45	68
Preponderance.....	1.4	1.3	1.3	1.4	2.0	1.2	1.2	1.6	1.7	1.9	1.8	2.1
Homestead, Fla. (Feb. 1943 - Nov. 1944; May, June, Aug.-Nov. 1945; Jan. 1956 - Dec. 1960)												
Magnitude.....	143	185	259	264	196	130	61	76	171	98	134	137
Direction.....	158	158	180	180	180	180	158	180	180	22	23	158
Preponderance.....	1.2	1.4	1.3	2.0	2.4	2.5	2.5	2.5	1.7	2.2	1.6	1.3
Jacksonville, Fla. (Apr. 1949 - Feb. 1950; Oct. 1950 - Jan. 1963)												
Magnitude.....	45	83	68	69	31	23	14	14	31	42	37	40
Direction.....	45	23	180	180	180	22	180	45	45	45	45	45
Preponderance.....	1.3	1.5	1.5	1.6	1.8	1.7	1.5	1.5	1.9	1.9	1.2	1.3
Key West, Fla. (Aug. 1952 - June 1953; June 1960 - May 1963)												
Magnitude.....	210	231	257	293	193	170	97	99	173	205	220	247
Direction.....	90	135	135	157	158	157	135	158	180	45	45	67
Preponderance.....	1.1	1.3	1.6	1.3	2.1	1.8	1.7	2.2	1.2	1.9	1.5	1.5
Orlando, Fla. (Jan. 1953 - May 1954; July 1954 - May 1963)												
Magnitude.....	128	152	151	143	98	76	56	48	80	85	93	106
Direction.....	135	135	135	156	180	180	112	180	21	23	90	112
Preponderance.....	1.2	1.1	1.1	1.1	1.4	1.2	1.1	1.3	1.3	1.3	1.4	1.2
Pensacola, Fla. (Jan. 1952 - Dec. 1962)												
Magnitude.....	134	163	182	158	119	74	44	25	45	45	97	93
Direction.....	90	68	90	135	112	90	90	67	68	113	90	113
Preponderance.....	1.6	1.5	1.8	1.6	1.6	1.8	1.5	1.3	1.1	1.6	2.0	1.5

See footnote at end of table.

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued*

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Perry Field, Fla. (May 1944 - May 1945)												
Magnitude.....	41	91	62	85	26	12	16	10	15	93	22	22
Direction.....	90	67	45	68	45	45	45	45	45	135	112	90
Preponderance.....	1.8	3.8	1.6	3.0	3.2	4.0	2.5	2.2	2.2	1.3	2.3	1.3
Sarasota, Fla. (July 1942 - May 1944)												
Magnitude.....	104	124	178	125	109	31	19	25	37	85	109	106
Direction.....	90	90	68	68	21	45	113	67	45	68	68	90
Preponderance.....	1.6	1.6	1.6	1.3	1.4	1.3	1.3	1.3	2.3	1.7	1.6	1.6
Tallahassee, Fla. (Aug. 1952 - May 1963)												
Magnitude.....	65	75	87	79	36	23	17	15	24	27	40	42
Direction.....	112	90	90	90	90	90	90	23	45	90	112	112
Preponderance.....	1.8	1.5	1.7	1.7	1.4	1.2	1.5	1.2	1.5	1.2	1.9	2.1
Tampa, Fla. (May 1941 - June 1947; Aug. 1947 - Dec. 1951)												
Magnitude.....	150	210	220	185	135	127	58	79	170	197	162	156
Direction.....	90	112	68	22	180	180	158	22	45	45	67	68
Preponderance.....	1.3	1.2	1.0	1.1	1.3	1.3	1.2	1.3	1.4	2.0	1.7	1.6
Vero Beach, Fla. (Jan. 1949 - Dec. 1954)												
Magnitude.....	137	167	198	196	176	107	89	112	130	237	141	162
Direction.....	157	158	135	22	23	22	180	43	23	23	23	158
Preponderance.....	1.5	1.2	1.3	1.3	1.6	1.6	1.6	1.1	1.8	2.4	1.1	1.2
West Palm Beach, Fla. (Jan. 1953 - May 1963)												
Magnitude.....	211	221	211	249	165	97	80	83	162	235	218	205
Direction.....	157	157	135	157	180	158	157	158	22	23	22	180
Preponderance.....	1.3	1.5	1.6	1.6	1.6	1.5	2.3	1.8	1.8	2.1	1.4	1.3
Albany, Ga. (Oct. 1941 - June 1946; Feb. 1948 - Sept. 1953)												
Magnitude.....	104	124	136	93	64	42	26	25	45	35	56	63
Direction.....	92	90	112	135	48	23	45	45	45	45	157	154
Preponderance.....	1.3	1.2	1.3	1.2	1.1	1.4	1.4	1.2	1.6	1.5	1.3	1.1
Athens, Ga. (Oct. 1955 - May 1963)												
Magnitude.....	140	170	183	158	55	55	41	29	58	66	115	116
Direction.....	180	180	158	22	22	22	45	23	23	23	180	180
Preponderance.....	1.4	1.4	1.5	1.4	1.6	1.3	1.5	1.5	2.0	1.8	1.5	1.4

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bainbridge, Ga. (Oct. 1942 - Dec. 1944)												
Magnitude.....	90	114	146	128	61	52	51	53	73	63	58	101
Direction.....	45	110	112	45	23	113	45	45	23	45	135	180
Preponderance.....	1.1	1.0	1.4	1.2	1.1	1.1	1.5	1.3	1.9	1.3	1.5	1.2
Marietta, Ga. (Sept. 1946 - June 1947; Jan. 1948 - Feb. 1957)												
Magnitude.....	191	187	235	213	126	91	86	80	84	105	147	161
Direction.....	135	157	135	157	155	158	180	157	180	157	135	157
Preponderance.....	1.5	1.5	1.5	1.5	1.3	1.4	1.2	1.4	1.5	1.5	1.9	1.7
Savannah, Ga. (Mar. 1953 - Feb. 1963)												
Magnitude.....	86	118	139	129	65	58	38	43	76	63	60	74
Direction.....	158	180	180	158	180	180	67	157	22	45	180	180
Preponderance.....	1.5	1.6	1.3	1.2	1.2	1.2	1.2	1.1	1.2	1.9	1.3	1.4
Valdosta, Ga. (Apr. 1942 - May 1946)												
Magnitude.....	75	96	105	79	48	54	37	28	52	59	48	67
Direction.....	180	45	90	67	23	22	45	45	23	23	180	23
Preponderance.....	1.2	1.0	1.1	1.2	1.2	1.4	1.4	1.7	2.3	1.6	1.3	1.3
Waycross, Ga. (Dec. 1942 - July 1944)												
Magnitude.....	31	41	41	71	45	36	25	18	55	66	26	52
Direction.....	157	157	180	180	157	180	90	23	23	23	90	67
Preponderance.....	1.3	1.7	1.2	1.2	1.7	1.7	1.2	3.0	2.6	2.1	2.1	1.2
Boise, Idaho (Mar. 1950 - Feb. 1955)												
Magnitude.....	329	278	361	268	215	163	124	182	121	315	196	252
Direction.....	135	135	135	135	135	135	135	157	135	157	135	135
Preponderance.....	3.4	4.9	2.9	3.1	2.6	2.7	2.2	1.7	2.7	2.3	3.5	3.0
Mountain Home, Idaho (Jan. 1932 - Feb. 1933; July 1943 - Oct. 1945; May-Nov. 1949; Apr. 1951 - Nov. 1957)												
Magnitude.....	207	309	359	405	314	303	226	176	173	257	177	179
Direction.....	157	135	157	157	157	157	157	135	157	135	157	157
Preponderance.....	2.2	2.6	2.4	2.5	2.3	2.0	2.1	2.1	2.3	3.0	2.4	2.3
Pocatello, Idaho (May 1950 - Apr. 1955)												
Magnitude.....	541	532	584	510	425	382	331	183	312	351	470	454
Direction.....	90	67	23	23	23	45	45	45	23	23	45	67
Preponderance.....	2.0	1.5	2.2	2.6	1.8	1.6	1.3	1.3	2.1	1.5	1.3	1.6

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Belleville, Ill. (Jan.—Dec. 1938; Mar. 1939 — July 1953)												
Magnitude.....	291	315	353	308	168	115	57	44	77	107	239	212
Direction.....	135	135	157	135	135	180	22	112	88	112	135	135
Preponderance.....	1.9	1.9	1.6	1.3	1.4	1.0	1.1	1.0	1.1	1.3	1.4	1.6
Glenview, Ill. (Mar. 1945 — Nov. 1959)												
Magnitude.....	338	341	458	441	292	144	94	76	131	204	284	269
Direction.....	45	24	67	67	67	67	67	67	67	67	67	45
Preponderance.....	1.3	1.1	1.7	1.7	2.3	2.0	2.0	2.5	2.0	1.8	1.4	1.3
Lawrenceville, Ill. (Jan. 1943 — Jan. 1946)												
Magnitude.....	102	167	195	203	113	87	47	46	25	72	117	79
Direction.....	135	112	45	135	67	67	45	55	90	68	113	158
Preponderance.....	1.3	1.2	1.6	1.1	1.8	1.7	1.8	1.6	1.8	1.3	1.2	1.2
Park Ridge, Ill. (Oct. 1946 — Jan. 1957)												
Magnitude.....	393	434	502	519	376	246	158	137	245	292	464	371
Direction.....	180	158	180	22	45	45	67	45	45	67	180	22
Preponderance.....	1.2	1.3	1.4	1.2	1.4	1.2	1.3	1.5	1.2	1.4	1.2	1.2
Peoria, Ill. (Aug. 1949 — Mar. 1952; Sept. 1956 — May 1963)												
Magnitude.....	207	238	307	301	182	107	68	57	115	146	279	184
Direction.....	113	157	180	157	90	68	90	90	90	112	135	135
Preponderance.....	1.3	1.4	1.2	1.3	1.2	1.3	1.3	1.5	1.7	1.5	1.3	1.2
Rantoul, Ill. (July 1936 — Feb. 1961)												
Magnitude.....	317	362	377	415	288	193	97	86	137	170	312	262
Direction.....	67	135	22	67	68	46	45	68	68	90	90	112
Preponderance.....	1.1	1.1	1.1	1.2	1.4	1.3	1.5	1.6	1.5	1.4	1.2	1.2
Rockford, Ill. (Nov. 1958 — May 1963)												
Magnitude.....	147	166	215	248	191	113	77	87	121	147	210	167
Direction.....	23	180	22	22	45	23	22	67	67	23	26	158
Preponderance.....	1.2	1.4	1.6	1.3	1.2	1.9	1.3	1.6	1.4	1.1	1.1	1.2
Bunker Hill, Ind. (Feb.—Oct. 1945; Dec. 1955 — Apr. 1962)												
Magnitude.....	215	336	376	412	321	160	109	103	148	170	307	266
Direction.....	22	180	45	23	45	46	45	67	67	32	23	44
Preponderance.....	1.3	1.7	1.5	1.3	1.5	1.4	1.6	1.6	1.4	1.3	1.5	1.4

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Columbus, Ind. (May 1943 - June 1945; July 1949 - June 1957)												
Magnitude.....	228	231	288	243	159	100	66	60	76	120	220	181
Direction.....	90	68	22	90	68	67	45	67	90	90	135	90
Preponderance.....	1.3	1.1	1.0	1.1	1.5	1.4	1.2	1.4	1.6	1.6	1.1	1.1
Madison, Ind. (Nov. 1941 - Apr. 1944)												
Magnitude.....	198	245	324	263	180	63	51	60	79	135	185	200
Direction.....	21	180	158	22	112	68	22	68	112	112	23	180
Preponderance.....	1.5	1.4	1.4	1.1	1.1	1.2	1.4	1.3	1.5	1.2	1.2	1.6
South Bend, Ind. (Aug. 1952 - May 1963)												
Magnitude.....	226	262	331	292	223	128	90	77	132	150	259	241
Direction.....	45	180	180	135	112	112	112	90	90	90	45	45
Preponderance.....	1.2	1.2	1.3	1.1	1.1	1.3	1.2	1.3	1.3	1.2	1.4	1.2
Burlington, Iowa (Oct. 1949 - Sept. 1954)												
Magnitude.....	369	339	731	345	266	152	98	80	138	226	433	310
Direction.....	157	157	180	157	22	68	45	90	135	68	135	158
Preponderance.....	1.8	1.3	1.2	1.4	1.3	1.3	1.2	1.3	1.2	1.6	1.3	1.1
Des Moines, Iowa (Aug. 1950 - July 1955)												
Magnitude.....	458	545	732	693	533	388	287	164	251	303	598	543
Direction.....	135	135	135	135	112	67	135	112	135	113	135	135
Preponderance.....	1.5	1.1	1.4	1.6	1.3	1.1	1.3	1.2	1.1	1.5	1.7	1.3
Dodge City, Kans. (Jan. 1956 - Dec. 1960)												
Magnitude.....	423	517	741	755	620	539	350	411	499	497	572	505
Direction.....	90	90	90	90	90	90	90	90	90	90	90	90
Preponderance.....	2.1	2.0	2.4	1.7	2.2	2.4	2.1	2.5	2.8	2.5	2.2	2.3
Goodland, Kans. (Jan. 1956 - Jan. 1961)												
Magnitude.....	196	280	454	429	319	326	202	220	249	260	337	269
Direction.....	112	112	112	112	90	90	90	90	90	112	113	112
Preponderance.....	2.0	2.5	2.5	2.1	1.9	1.9	2.0	2.2	2.7	2.4	2.3	2.4
Olathe, Kans. (Jan. 1947 - Aug. 1953)												
Magnitude.....	230	262	355	303	216	177	91	85	132	151	241	217
Direction.....	90	90	90	90	90	68	68	68	90	90	90	90
Preponderance.....	1.7	1.6	1.6	1.3	1.6	1.8	2.2	1.9	2.0	2.0	1.6	1.5

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Salina, Kans. (Jan. 1943 - July 1956)												
Magnitude.....	313	383	479	479	340	368	231	228	351	313	337	258
Direction.....	90	90	90	90	90	90	90	90	90	90	112	90
Preponderance.....	2.0	1.9	1.8	1.6	1.8	2.0	2.1	2.0	2.7	2.1	1.8	1.7
Topeka, Kans. (Mar. 1950 - Feb. 1955)												
Magnitude.....	373	433	872	585	718	425	281	334	298	310	388	476
Direction.....	90	112	90	112	45	90	90	112	90	90	112	90
Preponderance.....	1.5	1.5	1.6	1.4	1.2	1.7	1.5	1.2	2.0	2.2	1.5	1.6
Wichita, Kans. (Aug. 1949 - July 1954)												
Magnitude.....	598	868	1,408	855	1,025	939	511	422	590	636	672	685
Direction.....	90	90	90	90	90	90	90	90	90	90	90	90
Preponderance.....	2.5	2.1	1.6	2.1	2.1	2.3	2.1	1.9	2.3	2.9	2.1	1.8
Bangor, Maine (Jan. 1942 - Mar. 1945; Mar. 1948 - Oct. 1949; Mar. 1951 - July 1956)												
Magnitude.....	331	376	328	288	195	144	121	144	183	175	242	271
Direction.....	113	113	113	112	112	90	112	113	112	112	112	135
Preponderance.....	1.9	1.7	1.7	1.5	1.6	1.6	1.5	1.4	1.6	1.6	1.7	1.9
Brunswick, Maine (Dec. 1951 - Oct. 1962)												
Magnitude.....	235	223	216	182	140	94	73	66	94	119	130	178
Direction.....	90	112	112	90	90	68	90	68	68	90	90	90
Preponderance.....	1.9	1.6	1.5	1.6	1.9	1.8	1.5	1.8	2.0	1.5	1.4	1.5
Caribou, Maine (Aug. 1952 - May 1963)												
Magnitude.....	379	377	447	323	260	189	150	136	189	226	260	325
Direction.....	157	158	157	157	135	135	157	157	158	157	158	158
Preponderance.....	1.8	1.6	1.9	1.7	1.5	1.2	1.3	1.4	1.3	1.6	1.6	1.6
Aberdeen, Md. (Oct. 1936 - July 1953)												
Magnitude.....	194	276	295	243	132	81	54	66	83	128	194	173
Direction.....	135	135	135	135	90	68	68	68	68	90	135	135
Preponderance.....	1.3	1.9	1.6	1.3	1.3	1.3	1.6	1.7	1.4	1.4	1.5	1.5
Annapolis, Md. (Mar. 1945 - Mar. 1960)												
Magnitude.....	172	237	263	206	125	77	57	50	73	82	145	143
Direction.....	135	135	135	112	90	90	90	90	90	90	135	135
Preponderance.....	1.8	1.9	1.7	1.5	1.5	1.8	2.0	2.0	2.0	1.2	1.4	1.7

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Frederick, Md. (July 1947 - Oct. 1953)												
Magnitude.....	161	193	345	173	70	35	22	21	36	67	151	110
Direction.....	157	135	135	135	135	135	157	135	135	135	157	157
Preponderance.....	2.6	2.9	4.0	2.1	1.9	1.9	2.3	1.3	1.8	1.8	2.6	2.8
Bedford, Mass. (Feb. 1943 - Aug. 1962)												
Magnitude.....	269	259	287	256	170	126	89	100	125	177	221	265
Direction.....	157	157	158	158	180	23	45	45	67	22	157	158
Preponderance.....	1.4	1.5	1.3	1.2	1.1	1.4	1.4	1.3	1.2	1.3	1.1	1.5
Chicopee Falls, Mass. (Apr. 1941 - Dec. 1952)												
Magnitude.....	265	366	320	314	221	164	109	97	134	206	259	278
Direction.....	113	135	112	112	90	90	90	90	90	90	90	135
Preponderance.....	1.5	2.0	1.6	1.6	1.6	1.9	2.1	2.1	1.9	1.7	1.5	1.6
Nantucket, Mass. (Aug. 1952 - Nov. 1954; Jan. 1955 - Sept. 1957; Apr. 1958 - Nov. 1960; July 1961 - May 1963)												
Magnitude.....	511	530	603	518	295	244	191	214	283	403	436	492
Direction.....	135	157	158	67	45	45	45	66	67	45	135	158
Preponderance.....	1.4	1.4	1.3	1.3	1.6	1.9	1.9	1.6	1.5	1.3	1.2	1.3
Worcester, Mass. (Nov. 1959 - May 1963)												
Magnitude.....	216	205	227	216	82	34	16	27	76	98	137	177
Direction.....	22	22	23	180	22	45	22	45	45	23	22	22
Preponderance.....	1.9	2.1	1.5	1.7	1.7	1.8	1.8	2.2	3.2	2.2	1.4	1.6
Battle Creek, Mich. (Oct. 1942 - Apr. 1945; Dec. 1948 - Dec. 1954)												
Magnitude.....	288	318	368	324	206	162	118	89	169	154	253	324
Direction.....	22	22	22	180	23	22	22	180	180	45	45	45
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, Mich. (Dec. 1948 - Sept. 1953)												
Magnitude.....	379	346	414	330	325	249	159	132	228	276	347	354
Direction.....	22	22	158	158	45	45	23	45	24	67	67	23
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
Flint, Mich. (Dec. 1956 - May 1963)												
Magnitude.....	155	167	212	313	128	67	45	36	63	96	187	145
Direction.....	45	180	22	22	23	22	22	45	45	45	45	45
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

See footnote at end of table.

TABLE 1—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette, Mich. (Jan.-Dec. 1948; Dec. 1949 - Nov. 1955)												
Magnitude.....	118	123	193	199	184	143	100	93	131	125	128	91
Direction.....	90	112	90	90	90	90	68	90	90	90	90	90
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
Mount Clemens, Mich. (Dec. 1936 - July 1953)												
Magnitude.....	364	368	364	315	182	143	104	100	156	206	341	320
Direction.....	45	45	45	67	90	69	68	90	90	68	67	45
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, Mich. (Jan.-May 1953; Jan. 1960 - May 1963)												
Magnitude.....	240	233	256	268	169	122	82	74	102	141	254	139
Direction.....	22	180	22	45	65	45	45	67	67	67	45	180
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, Mich. (July 1943 - Dec. 1945; Dec. 1950 - May 1958)												
Magnitude.....	187	224	261	265	186	140	107	109	137	199	181	211
Direction.....	112	135	180	31	43	180	22	45	22	46	44	135
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, Mich. (Jan. 1948 - Aug. 1954)												
Magnitude.....	324	263	328	272	255	180	164	117	183	225	279	304
Direction.....	180	180	180	180	180	22	22	22	22	22	158	180
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 Sainte Marie, Mich. (Aug. 1952 - May 1963)												
Magnitude.....	130	136	154	186	164	102	71	61	106	118	176	142
Direction.....	158	157	157	157	157	157	157	157	157	157	157	158
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
Traverse City, Mich. (Mar.-Oct. 1945; Jan. 1948 - Sept. 1953)												
Magnitude.....	410	343	433	331	262	205	144	127	254	310	431	376
Direction.....	67	68	68	68	67	45	67	67	68	68	90	45
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, Mich. (Jan. 1948 - Dec. 1957)												
Magnitude.....	308	292	434	342	234	169	132	110	161	188	340	302
Direction.....	22	180	180	180	180	180	180	180	180	22	22	22
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

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Duluth, Minn. (Aug. 1949 - July 1954)												
Magnitude.....	731	773	917	920	637	486	304	298	453	779	897	622
Direction.....	158	180	157	180	180	22	180	22	180	22	157	157
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
International Falls, Minn. (Jan. 1956 - Jan. 1961)												
Magnitude.....	122	155	120	246	212	127	88	92	153	200	234	158
Direction.....	158	180	157	158	158	157	158	135	135	157	157	158
Preponderance.....	1.4	1.5	1.3	1.4	1.3	1.4	1.5	1.3	1.3	2.3	1.5	1.9
Minneapolis, Minn. (Nov. 1949 - Oct. 1954)												
Magnitude.....	316	358	421	467	543	387	273	212	325	292	437	328
Direction.....	135	157	158	157	158	157	90	90	135	135	135	157
Preponderance.....	1.5	1.7	1.4	1.5	1.3	1.3	1.0	1.2	1.4	1.6	1.7	1.4
Rochester, Minn. (Jan. 1956 - Jan. 1960)												
Magnitude.....	189	191	199	337	245	172	106	133	179	220	292	237
Direction.....	113	135	135	135	113	112	113	90	90	113	135	113
Preponderance.....	2.0	1.9	1.7	1.8	1.6	1.8	1.7	2.1	2.0	2.1	1.6	1.6
Billings, Mont. (Oct. 1949 - Sept. 1954)												
Magnitude.....	503	552	499	584	480	451	326	338	351	332	528	514
Direction.....	23	22	135	90	135	90	90	112	112	112	134	159
Preponderance.....	1.4	1.2	1.3	1.3	1.3	1.1	1.4	1.4	1.5	1.2	1.0	1.2
Cut Bank, Mont. (Dec. 1942 - Nov. 1944)												
Magnitude.....	881	933	1,076	686	574	495	525	407	567	453	341	425
Direction.....	180	180	180	180	180	23	180	180	180	180	22	180
Preponderance.....	4.5	3.3	2.2	2.3	1.9	1.3	2.5	2.5	2.1	1.9	2.6	4.4
Glasgow, Mont. (Dec. 1942 - Nov. 1943; Jan. 1948 - Mar. 1957)												
Magnitude.....	198	176	314	370	373	337	193	216	235	201	202	192
Direction.....	157	156	157	157	157	158	158	157	157	157	157	157
Preponderance.....	2.9	3.0	2.8	2.1	2.2	2.2	2.3	2.3	2.6	3.9	3.6	3.6
Great Falls, Mont. (Aug. 1950 - July 1955)												
Magnitude.....	1,189	1,283	876	828	732	732	407	469	522	837	999	1,315
Direction.....	45	45	45	23	22	22	23	22	23	45	45	45
Preponderance.....	3.2	3.3	1.9	1.6	1.8	1.6	1.6	1.5	1.9	2.1	3.5	3.6

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Helena, Mont. (Nov. 1949 - Oct. 1954)												
Magnitude.....	208	248	184	243	265	217	187	123	173	153	205	269
Direction.....	90	180	158	157	158	158	157	157	157	180	22	157
Preponderance.....	1.4	1.8	1.6	1.5	1.6	1.8	1.4	1.4	1.7	1.2	1.3	1.2
Lewistown, Mont. (Aug. 1950 - July 1955)												
Magnitude.....	347	305	414	245	269	146	776	189	188	187	133	374
Direction.....	180	180	180	158	157	157	135	158	157	157	45	44
Preponderance.....	1.7	1.4	2.1	1.9	2.7	2.0	1.5	2.1	1.6	1.5	1.5	1.6
Miles City, Mont. (Jan. 1948 - July 1953)												
Magnitude.....	207	176	319	391	307	283	214	166	196	226	247	184
Direction.....	135	157	157	135	157	158	135	135	135	157	157	157
Preponderance.....	1.8	1.7	2.1	2.6	2.0	1.8	1.6	1.6	1.9	2.3	3.1	2.5
Missoula, Mont. (Aug. 1950 - July 1955)												
Magnitude.....	173	136	173	193	188	191	149	154	145	99	63	98
Direction.....	158	158	158	22	180	180	157	135	135	112	157	157
Preponderance.....	1.5	1.4	1.5	1.4	1.2	1.3	1.5	1.2	1.2	1.5	1.6	1.6
Grand Island, Nebr. (Jan. 1956 - Dec. 1960)												
Magnitude.....	262	281	435	471	377	341	211	221	264	312	418	323
Direction.....	112	112	112	90	90	90	90	90	90	112	112	112
Preponderance.....	2.2	2.1	1.6	1.6	1.7	2.0	1.6	1.9	2.2	2.4	1.9	2.1
Lincoln, Nebr. (Oct. 1942 - June 1955)												
Magnitude.....	259	331	439	427	325	228	140	151	148	177	293	233
Direction.....	112	113	112	112	113	112	112	112	112	112	113	112
Preponderance.....	2.4	1.5	1.5	1.6	1.6	1.6	1.8	1.5	1.8	1.7	2.1	2.1
North Platte, Nebr. (Jan. 1956 - Dec. 1960)												
Magnitude.....	136	160	364	412	320	206	124	162	193	236	325	239
Direction.....	112	112	112	112	112	112	112	112	90	112	112	112
Preponderance.....	2.3	2.6	2.1	2.6	2.2	2.4	2.0	2.6	2.4	3.1	3.0	3.4
Omaha, Nebr. (Nov. 1949 - Oct. 1954)												
Magnitude.....	405	452	848	623	802	360	230	202	236	283	416	391
Direction.....	113	113	113	135	90	112	101	112	112	112	113	112
Preponderance.....	2.9	1.7	1.7	1.9	1.7	1.6	1.7	1.3	2.0	1.9	2.1	2.1

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Scottsbluff, Nebr. (Jan. 1943—Sept. 1944)												
Magnitude.....	299	412	427	413	341	346	179	188	134	174	290	154
Direction.....	158	157	135	135	113	156	135	135	90	135	113	158
Preponderance.....	2.1	2.0	1.9	1.6	1.7	1.6	1.4	1.8	1.3	2.3	2.9	2.7
Fallon, Nev. (Apr. 1950—Dec. 1958)												
Magnitude.....	133	151	204	173	157	135	63	43	33	73	68	107
Direction.....	45	67	23	180	180	158	158	22	135	23	111	90
Preponderance.....	1.6	1.5	1.2	1.4	1.2	1.8	1.5	1.5	1.1	1.5	1.2	1.5
Las Vegas, Nev. (Jan.—Mar. 1952; Aug. 1952—Dec. 1962)												
Magnitude.....	124	242	330	350	395	327	244	208	179	171	108	120
Direction.....	90	90	67	45	67	45	45	67	45	67	68	90
Preponderance.....	1.8	1.4	1.7	1.9	2.2	2.6	2.0	2.0	2.6	1.9	1.8	1.8
Mercury, Nev. (Apr. 1951—June 1953)												
Magnitude.....	240	338	379	232	284	293	139	146	113	96	133	279
Direction.....	90	90	68	90	68	90	89	90	90	90	90	90
Preponderance.....	2.8	2.1	2.2	2.2	2.3	2.9	1.3	3.2	2.8	2.8	3.2	3.7
Reno, Nev. (Sept. 1952—Jan. 1963)												
Magnitude.....	151	165	188	191	157	130	96	94	68	84	81	110
Direction.....	90	90	112	113	157	157	157	158	135	112	90	90
Preponderance.....	2.2	2.1	1.3	1.6	1.6	2.4	2.4	2.7	1.2	1.5	2.1	2.2
Tonopah, Nev. (Apr. 1951—Feb. 1956)												
Magnitude.....	203	425	551	487	513	410	215	252	215	305	281	269
Direction.....	113	135	135	135	135	113	112	90	112	135	135	113
Preponderance.....	3.0	3.0	3.2	2.7	2.3	2.3	2.1	2.6	2.6	2.5	3.1	2.6
Concord, N.H. (Jan. 1953—May 1963)												
Magnitude.....	96	94	126	99	65	38	29	22	32	60	60	80
Direction.....	135	135	135	135	135	135	135	135	135	135	135	135
Preponderance.....	2.8	2.8	2.2	2.0	2.2	1.8	2.1	1.8	1.6	1.9	2.0	3.0
Manchester, N.H. (Oct. 1941—Oct. 1949; Mar. 1951—Oct. 1953)												
Magnitude.....	167	253	217	221	114	99	61	36	66	100	141	207
Direction.....	135	135	156	157	135	135	112	135	113	113	135	158
Preponderance.....	1.7	1.6	1.4	1.6	1.3	1.2	1.3	1.5	1.4	1.5	1.5	1.8

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Portsmouth, N.H. (Apr. 1956 - Mar. 1961)												
Magnitude.....	177	199	183	150	138	115	79	48	86	97	90	140
Direction.....	135	157	157	157	157	158	135	113	112	135	135	135
Preponderance.....	1.4	1.9	1.6	1.4	1.4	1.2	1.4	1.2	1.1	1.4	1.4	1.4
Atlantic City, N.J. (July 1958 - May 1963)												
Magnitude.....	365	360	384	333	179	133	96	70	150	217	281	321
Direction.....	158	158	158	158	157	146	90	68	135	180	157	157
Preponderance.....	2.2	2.0	1.9	1.6	1.3	1.2	1.2	1.3	1.2	1.1	1.7	1.6
Lakehurst, N.J. (Mar. 1945 - Sept. 1949; Nov. 1949 - Dec. 1959)												
Magnitude.....	275	327	355	262	178	107	72	56	71	96	198	206
Direction.....	180	180	180	22	22	23	45	45	45	23	22	180
Preponderance.....	1.8	2.0	1.9	1.5	1.7	1.8	2.1	1.7	1.7	1.8	1.6	1.8
Trenton, N.J. (Aug. 1942 - Mar. 1946; Aug. 1948 - Aug. 1956)												
Magnitude.....	218	215	255	221	117	80	48	63	87	136	179	198
Direction.....	158	157	158	158	158	21	45	45	68	23	157	158
Preponderance.....	1.2	1.6	1.4	1.2	1.2	1.2	1.4	1.1	1.4	1.2	1.5	1.4
Albuquerque, N. Mex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	396	354	591	554	601	450	438	387	271	270	190	271
Direction.....	158	157	157	157	158	135	135	157	157	135	158	157
Preponderance.....	1.8	1.6	1.5	1.4	1.3	1.5	1.4	1.9	1.4	1.3	1.4	1.5
Hobbs, N. Mex. (Jan. 1942 - Dec. 1946)												
Magnitude.....	183	328	453	381	309	310	766	107	121	115	208	145
Direction.....	22	180	23	180	23	90	90	68	67	68	45	23
Preponderance.....	1.8	1.5	2.1	1.3	1.2	1.3	1.6	1.8	2.7	1.8	1.7	1.3
Roswell, N. Mex. (July 1942 - Dec. 1952)												
Magnitude.....	133	160	301	235	238	226	94	84	92	99	96	105
Direction.....	68	80	67	68	90	90	90	112	90	90	68	90
Preponderance.....	1.6	1.5	1.3	1.7	1.6	2.0	2.2	2.0	2.6	2.2	1.4	1.5
Geneva, N. Y. (Apr. 1952 - Mar. 1953)												
Magnitude.....	141	280	167	169	188	157	198	96	70	207	224	154
Direction.....	135	157	113	90	113	112	68	90	90	90	90	90
Preponderance.....	2.0	1.9	1.8	2.4	2.4	1.8	2.8	2.1	2.3	2.1	1.8	1.4

See footnote at end of table.

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued*

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
New York, N.Y. (Apr. 1945 - Aug. 1957)												
Magnitude.....	431	481	523	399	305	198	153	136	182	241	434	437
Direction.....	158	158	158	158	158	113	112	90	112	180	180	158
Preponderance.....	1.6	1.9	1.7	1.5	1.1	1.4	1.4	1.2	1.1	1.1	1.5	1.7
Niagara, N.Y. (June 1951 - July 1960; Nov.-Dec. 1961; Jan. 1962 - July and Oct. 1962)												
Magnitude.....	347	320	276	230	171	143	130	126	174	212	246	344
Direction.....	23	23	44	45	45	45	45	45	45	45	45	23
Preponderance.....	1.7	1.5	1.6	2.0	1.6	1.8	2.1	2.2	1.7	1.7	1.8	2.0
Plattsburgh, N.Y. (Jan. 1956 - Dec. 1962)												
Magnitude.....	104	153	137	122	126	90	66	63	72	94	109	94
Direction.....	157	135	135	135	135	135	135	135	113	135	113	113
Preponderance.....	1.3	1.3	1.6	1.6	2.0	1.8	1.6	2.1	1.8	2.1	1.3	1.5
Rome, N.Y. (July 1942 - Mar. 1955)												
Magnitude.....	177	230	231	177	131	79	56	41	70	85	140	178
Direction.....	158	157	157	157	157	135	157	157	157	135	157	158
Preponderance.....	2.7	3.1	2.6	2.5	2.5	2.1	1.7	2.1	1.9	1.7	2.2	2.5
Schenectady, N.Y. (Sept. 1950 - Feb. 1953; June 1953 - Aug. 1955)												
Magnitude.....	203	193	254	238	195	117	117	128	146	115	179	131
Direction.....	157	157	157	157	157	158	158	157	157	157	158	157
Preponderance.....	5.6	2.8	2.4	1.6	2.6	2.2	2.5	1.9	1.5	2.1	2.0	2.7
Westhampton Beach, N.Y. (Aug. 1943 - Nov. 1945; June 1951 - Jan. 1959)												
Magnitude.....	274	268	315	275	224	179	148	172	217	236	280	247
Direction.....	135	157	158	22	45	45	45	45	45	23	89	158
Preponderance.....	1.2	1.5	1.2	1.2	1.2	1.4	1.8	1.6	1.6	1.3	1.1	1.2
Cherry Point, N.C. (Mar. 1945 - Mar. 1959)												
Magnitude.....	199	219	274	281	169	132	108	125	155	143	129	140
Direction.....	67	67	67	67	67	67	67	67	67	67	67	68
Preponderance.....	1.7	1.7	2.0	2.6	2.9	2.5	2.8	2.2	2.5	2.3	2.0	1.7
Hatteras, N.C. (Jan. 1953 - May 1963)												
Magnitude.....	350	387	365	363	238	217	190	270	284	264	276	318
Direction.....	90	68	68	68	67	67	67	67	67	67	90	68
Preponderance.....	1.2	1.5	1.4	1.8	2.8	2.6	2.9	1.6	1.7	1.9	1.6	1.3

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Jacksonville, N.C. (Jan. 1955 - Mar. 1959)												
Magnitude.....	109	121	142	153	63	61	54	77	89	79	64	57
Direction.....	113	135	45	63	67	90	67	45	64	67	89	90
Preponderance.....	1.3	1.3	1.2	1.6	1.9	1.5	2.1	2.0	1.7	2.4	1.2	1.3
Weeksville, N.C. (Mar.-Dec. 1945; May 1952 - Apr. 1954)												
Magnitude.....	115	99	138	128	68	51	36	57	77	46	64	94
Direction.....	68	68	45	67	45	67	45	45	45	68	112	67
Preponderance.....	1.9	2.0	1.5	2.7	1.7	1.6	3.1	2.4	3.8	2.0	3.1	1.6
Wilmington, N.C. (Aug. 1952 - July 1953; Sept. 1959 - May 1963)												
Magnitude.....	192	264	247	217	123	132	83	97	160	117	203	170
Direction.....	90	90	112	68	68	90	68	68	90	90	90	90
Preponderance.....	1.4	1.5	1.1	1.3	2.0	2.1	2.5	1.6	1.4	2.0	2.0	1.4
Winston-Salem, N.C. (Aug. 1952 - May 1963)												
Magnitude.....	173	204	227	232	112	83	71	69	98	123	145	134
Direction.....	45	23	45	45	45	45	45	45	45	45	45	45
Preponderance.....	1.2	1.2	1.2	1.4	2.3	2.2	2.2	2.3	2.8	2.2	1.5	1.3
Bismarck, N. Dak. (Aug. 1949 - July 1954)												
Magnitude.....	303	301	574	581	575	729	292	327	316	362	503	298
Direction.....	135	157	125	135	135	157	135	113	135	135	135	135
Preponderance.....	1.7	2.0	1.3	1.7	1.8	1.7	1.5	1.4	2.1	2.0	2.4	2.4
Fargo, N. Dak. (Oct. 1949 - Sept. 1954)												
Magnitude.....	614	565	713	1,002	790	838	414	400	491	649	769	503
Direction.....	113	113	113	135	113	135	113	112	135	135	113	113
Preponderance.....	2.5	2.0	1.9	1.7	1.5	1.2	1.7	1.6	1.6	1.9	2.4	2.2
Grand Forks, N. Dak. (Jan. 1949 - Dec. 1954; Mar. 1959 - Aug. 1960)												
Magnitude.....	571	439	548	749	580	526	295	282	462	593	679	420
Direction.....	112	113	112	113	113	180	113	112	135	113	113	113
Preponderance.....	3.2	2.5	2.1	2.0	1.5	1.2	1.4	1.7	1.3	1.8	2.5	2.5
Minot, N. Dak. (Dec. 1948 - June 1960)												
Magnitude.....	446	432	474	530	452	412	263	256	381	370	510	407
Direction.....	135	135	135	135	135	157	135	113	157	135	135	135
Preponderance.....	1.7	1.8	1.7	1.5	1.5	1.3	1.5	1.4	1.7	1.8	2.2	1.6

See footnote at end of table.

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued*

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Cincinnati, Ohio (Jan. 1951 - Dec. 1960)												
Magnitude.....	212	217	252	234	127	81	57	40	75	102	195	163
Direction.....	67	45	23	45	45	45	45	45	45	45	45	45
Preponderance.....	1.5	1.3	1.3	1.6	1.6	1.8	1.7	1.8	1.8	1.7	1.5	1.6
Cleveland, Ohio (Jan. 1951 - Dec. 1960)												
Magnitude.....	527	589	679	609	371	292	188	233	221	303	581	466
Direction.....	22	180	23	23	67	45	67	157	68	67	23	45
Preponderance.....	1.3	1.2	1.3	1.3	1.3	1.2	1.4	1.1	1.2	1.4	1.3	1.2
Columbus, Ohio (Jan. 1951 - Dec. 1960)												
Magnitude.....	169	187	227	178	108	66	46	41	56	73	156	132
Direction.....	135	180	23	45	67	68	68	90	90	90	45	67
Preponderance.....	1.1	1.1	1.2	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.2
Dayton, Ohio (Jan. 1951 - Dec. 1960)												
Magnitude.....	292	326	358	282	162	100	69	49	80	115	283	253
Direction.....	158	180	180	22	23	45	24	45	67	46	23	45
Preponderance.....	1.1	1.3	1.4	1.3	1.3	1.3	1.4	1.2	1.2	1.2	1.2	1.1
Toledo, Ohio (Mar. 1950 - Feb. 1955)												
Magnitude.....	457	448	774	468	359	252	229	103	194	235	479	623
Direction.....	23	23	22	23	23	45	66	45	22	45	50	45
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
Youngstown, Ohio (Jan. 1951 - Dec. 1960)												
Magnitude.....	254	271	297	215	138	97	67	55	87	126	269	252
Direction.....	22	180	22	22	22	23	45	68	45	45	23	23
Preponderance.....	1.4	1.5	1.6	1.4	1.2	1.1	1.3	1.3	1.3	1.3	2.0	1.7
Oklahoma City, Okla. (Jan. 1949 - Dec. 1953)												
Magnitude.....	1,028	1,043	1,338	1,273	1,099	927	538	606	543	691	809	940
Direction.....	90	90	90	90	90	90	90	90	90	90	90	90
Preponderance.....	2.6	2.4	1.7	2.4	2.1	2.1	2.1	2.0	2.1	3.1	2.6	2.5
Tulsa, Okla. (Jan. 1949 - Dec. 1953)												
Magnitude.....	396	379	537	504	331	271	198	217	162	236	293	329
Direction.....	90	90	90	90	90	90	90	90	90	90	90	90
Preponderance.....	2.6	2.8	1.8	2.2	2.2	2.7	2.0	1.9	2.8	2.7	2.7	2.1

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Astoria, Oreg. (Feb. 1953 - Jan. 1963)												
Magnitude.....	175	162	143	114	86	81	108	79	76	98	170	180
Direction.....	67	68	67	68	135	135	135	135	90	67	68	67
Preponderance.....	1.6	1.6	1.5	1.2	1.3	1.7	3.1	2.1	1.4	2.3	2.1	1.8
Klamath Falls, Oreg. (Jan. 1948 - Dec. 1954; Sept. 1959 - Aug. 1962)												
Magnitude.....	208	178	233	187	140	106	63	61	96	137	161	153
Direction.....	90	112	113	113	113	130	113	113	112	111	112	112
Preponderance.....	1.8	1.8	1.3	1.5	1.6	1.3	2.0	1.8	1.4	1.9	2.0	1.4
Medford, Oreg. (Aug. 1950 - July 1955)												
Magnitude.....	170	122	212	161	117	111	54	69	61	99	123	142
Direction.....	113	134	113	135	135	157	135	135	135	113	118	112
Preponderance.....	1.5	1.5	1.5	1.6	2.3	1.7	1.7	2.2	1.7	1.7	1.9	2.6
Pendleton, Oreg. (Sept. 1952 - Jan. 1963)												
Magnitude.....	128	242	286	301	276	266	192	162	200	119	190	180
Direction.....	22	180	180	180	180	180	180	180	180	180	180	180
Preponderance.....	1.2	2.0	3.1	4.1	4.8	4.2	3.2	3.9	3.7	3.1	2.7	1.7
Portland, Oreg. (Sept. 1951 - Dec. 1960)												
Magnitude.....	387	334	250	172	101	83	71	51	78	123	226	381
Direction.....	90	68	68	90	90	112	135	135	90	90	90	90
Preponderance.....	1.1	1.5	1.2	1.5	1.4	1.3	1.8	1.8	1.2	1.6	1.1	1.2
Redmond, Oreg. (Aug., Sept., Dec. 1942; Jan. 1943 - Apr. 1944)												
Magnitude.....	159	122	238	181	159	120	122	80	73	144	69	164
Direction.....	90	112	135	135	135	135	135	135	113	90	90	90
Preponderance.....	1.6	1.8	1.6	1.7	2.6	1.9	2.7	2.7	3.2	1.7	1.5	2.4
Salem, Oreg. (Jan. 1953 - Jan. 1963)												
Magnitude.....	136	134	129	80	42	30	37	35	47	64	116	131
Direction.....	90	90	90	90	90	68	90	90	90	90	90	90
Preponderance.....	6.6	5.4	3.8	2.1	1.6	1.4	1.7	1.8	2.6	4.5	5.6	5.5
Quonset Point, R.I. (Mar. 1945 - Feb. 1959)												
Magnitude.....	475	449	459	451	324	222	133	163	213	324	388	387
Direction.....	90	112	90	90	68	68	68	90	90	68	90	112
Preponderance.....	1.6	1.3	1.5	1.6	2.0	2.2	2.2	2.1	2.2	2.0	1.5	1.3

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beaufort, S.C. (Apr.—Nov. 1945; Nov. 1957 — Oct. 1961)												
Magnitude.....	52	109	55	105	49	35	23	10	66	37	47	56
Direction.....	23	180	158	90	180	67	68	45	45	45	68	45
Preponderance.....	1.2	1.7	1.6	1.3	1.4	1.5	1.9	1.3	1.6	2.3	1.2	1.3
Florence, S.C. (Jan. 1958; Feb. 1959 — May 1963)												
Magnitude.....	68	100	99	98	42	40	23	18	39	34	78	64
Direction.....	67	45	45	45	45	67	67	67	45	67	67	45
Preponderance.....	2.1	2.3	1.6	1.5	1.4	2.3	1.8	2.2	1.8	2.1	1.9	1.8
Greenville, S.C. (Jan. 1953 — Sept. 1962; Nov. 1962 — May 1963)												
Magnitude.....	122	128	147	147	78	61	43	48	79	88	80	89
Direction.....	45	45	45	45	45	45	45	45	45	45	45	45
Preponderance.....	2.0	2.4	2.0	1.9	2.4	2.1	2.0	2.3	3.3	2.7	2.3	2.3
Myrtle Beach, S.C. (Nov. 1942 — June 1947; Jan. 1949 — Dec. 1954)												
Magnitude.....	68	102	110	116	86	83	81	66	47	39	53	59
Direction.....	45	45	45	67	67	68	67	68	45	45	23	23
Preponderance.....	1.3	1.2	1.2	1.3	1.8	1.7	2.3	2.0	1.4	1.3	1.2	1.4
Sumter, S.C. (Jan. 1942 — May 1955)												
Magnitude.....	74	91	119	102	60	37	35	29	57	55	51	58
Direction.....	45	45	45	45	45	67	45	45	45	45	45	45
Preponderance.....	1.7	1.8	1.5	1.6	1.6	1.4	1.9	1.7	3.1	2.3	1.9	1.7
Huron, S. Dak. (Jan. 1956 — Dec. 1960)												
Magnitude.....	289	254	354	482	380	295	226	223	286	386	434	293
Direction.....	113	113	113	113	113	112	112	112	112	135	135	135
Preponderance.....	2.9	2.6	2.6	1.8	1.8	1.9	2.3	2.6	2.0	2.4	2.5	2.7
Rapid City, S. Dak. (Sept. 1949 — Aug. 1959)												
Magnitude.....	538	459	748	545	423	328	332	306	383	430	695	586
Direction.....	113	113	113	113	113	113	113	113	113	113	113	135
Preponderance.....	2.7	2.9	3.0	2.4	2.0	2.4	2.4	2.3	2.7	2.6	3.0	2.9
Sioux Falls, S. Dak. (Mar. 1950 — Feb. 1955)												
Magnitude.....	346	543	809	686	512	400	231	203	289	350	464	327
Direction.....	113	112	135	113	135	135	112	112	113	112	135	113
Preponderance.....	2.2	1.5	1.5	1.9	1.4	1.4	1.6	1.6	1.6	1.7	2.3	2.0

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Amarillo, Tex. (May 1950 - Apr. 1955)												
Magnitude.....	469	734	949	865	794	619	390	242	325	385	400	595
Direction.....	67	90	45	67	67	68	90	68	68	68	68	67
Preponderance.....	1.9	1.7	1.3	1.4	1.3	1.9	1.4	1.9	2.1	2.0	1.7	1.8
Austin, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	264	234	260	248	204	164	110	157	124	144	215	244
Direction.....	90	90	104	90	90	90	90	90	90	90	90	90
Preponderance.....	2.3	1.8	1.7	1.8	2.1	1.9	1.7	1.9	1.9	2.1	2.4	1.8
Brownsville, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	463	454	577	608	591	416	328	267	207	216	279	378
Direction.....	113	113	113	135	135	135	135	135	113	135	113	112
Preponderance.....	3.6	2.6	2.1	2.1	3.1	3.0	3.7	2.5	1.4	1.7	3.2	2.9
Corpus Christi, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	563	525	697	643	504	391	391	301	173	208	398	398
Direction.....	112	113	112	113	113	113	113	135	135	113	112	112
Preponderance.....	3.1	3.0	2.4	2.3	2.3	3.4	2.7	1.8	1.3	1.7	2.5	2.3
Dalhart, Tex. (Nov. 1942 - Dec. 1945)												
Magnitude.....	328	463	717	582	545	563	279	279	496	312	451	358
Direction.....	45	45	45	67	45	67	68	68	67	67	67	67
Preponderance.....	2.4	2.2	2.3	1.8	2.0	2.2	2.3	2.3	2.8	2.6	2.0	2.2
Dallas, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	320	258	441	474	343	337	181	168	109	160	262	252
Direction.....	90	112	112	90	90	90	90	90	90	90	90	92
Preponderance.....	2.9	2.2	1.9	2.3	2.2	2.6	2.1	1.9	1.9	2.5	1.8	2.1
Galveston, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	460	492	717	568	383	334	294	183	232	620	367	405
Direction.....	113	113	113	135	113	112	90	90	49	135	90	112
Preponderance.....	1.9	1.5	1.4	1.3	1.9	2.2	2.3	1.5	1.4	1.2	2.0	1.3
Houston, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	429	371	482	542	425	236	167	200	135	482	386	365
Direction.....	112	112	112	113	113	90	90	112	45	22	90	112
Preponderance.....	1.9	1.6	1.6	1.8	1.7	1.9	1.8	1.6	1.2	1.4	1.6	1.6

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Laredo, Tex. (Jan. 1943 - Feb. 1945; Sept. 1946 - Aug. 1955)												
Magnitude.....	175	222	320	409	437	496	433	357	240	228	196	169
Direction.....	115	135	135	135	135	135	135	135	135	135	113	113
Preponderance.....	1.9	1.8	1.7	2.4	2.9	3.5	3.8	3.2	1.7	2.2	1.8	2.0
Lubbock, Tex. (Aug. 1942 - Dec. 1945; Jan. 1950 - Dec. 1956)												
Magnitude.....	308	438	640	546	456	428	178	145	209	204	293	385
Direction.....	43	23	22	45	68	90	90	90	68	67	56	22
Preponderance.....	1.3	1.2	1.5	1.1	1.3	1.9	2.0	1.5	2.0	1.6	1.2	1.2
Midland, Tex. (Apr. 1940 - Oct. 1946)												
Magnitude.....	141	262	346	455	289	245	118	95	149	150	143	166
Direction.....	23	180	45	157	90	90	90	90	90	90	45	90
Preponderance.....	1.6	1.1	1.2	1.1	1.5	1.8	1.7	1.5	1.8	1.9	1.4	1.1
Port Arthur, Tex. (May 1950 - Apr. 1955)												
Magnitude.....	359	393	386	379	265	149	171	76	97	149	252	320
Direction.....	135	90	90	112	112	90	90	68	67	112	112	112
Preponderance.....	1.5	1.6	2.2	2.1	2.3	1.6	1.2	1.3	1.3	1.3	1.4	1.4
San Angelo, Tex. (Jan. 1955 - Dec. 1960)												
Magnitude.....	250	331	472	381	299	239	189	118	182	192	255	400
Direction.....	45	45	66	67	90	90	90	90	68	68	67	45
Preponderance.....	1.5	1.3	1.1	1.5	1.8	2.0	2.8	1.6	1.8	1.7	2.1	2.7
San Antonio, Tex. (Jan. 1949 - Dec. 1953)												
Magnitude.....	288	277	322	296	245	227	168	153	121	133	197	226
Direction.....	67	113	112	69	135	135	135	135	45	68	90	90
Preponderance.....	1.6	1.3	1.2	1.1	1.7	1.6	1.9	1.7	1.2	1.5	2.1	1.6
Waco, Tex. (Oct. 1942 - Sept. 1945; Jan. 1949 - Dec. 1955)												
Magnitude.....	260	230	311	277	232	243	168	135	124	147	228	227
Direction.....	90	90	90	90	90	90	68	68	68	68	90	90
Preponderance.....	2.5	2.4	2.5	2.4	2.5	3.0	2.4	2.3	2.0	2.4	2.5	2.6
Wichita Falls, Tex. (Apr. 1942 - Aug. 1955)												
Magnitude.....	346	378	560	460	340	354	218	180	207	234	383	339
Direction.....	89	90	112	90	112	90	90	90	90	90	112	90
Preponderance.....	1.9	1.6	1.5	1.8	1.9	2.3	1.5	1.4	1.8	2.1	1.6	1.6

See footnote at end of table.

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued*

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Dugway, Utah (June 1943 - Jan. 1946; Dec. 1949 - Nov. 1950; Jan. - May 1951; Dec. 1951 - June 1957)												
Magnitude.....	79	106	149	169	174	182	122	132	109	84	72	71
Direction.....	90	90	90	90	90	90	90	90	90	90	90	90
Preponderance.....	4.0	3.2	2.8	1.9	2.0	2.1	1.8	2.2	2.0	2.2	2.6	2.6
Ogden, Utah (Oct. 1941 - Feb. 1946; June 1946 - Dec. 1954)												
Magnitude.....	227	246	258	259	282	272	290	301	278	263	202	180
Direction.....	90	45	90	67	23	23	22	23	22	22	23	68
Preponderance.....	1.4	1.3	1.3	1.2	1.3	1.2	1.9	1.6	2.1	2.2	1.3	1.1
Salt Lake City, Utah (May 1950 - Apr. 1955)												
Magnitude.....	223	204	339	242	356	402	211	301	159	174	148	206
Direction.....	112	113	112	90	113	113	90	113	112	113	112	112
Preponderance.....	2.6	2.5	1.7	1.6	1.7	1.7	1.6	1.9	2.4	1.5	2.4	2.4
Wendover, Utah (Aug. 1942 - Feb. 1946; June 1946 - May 1947; July 1947 - Nov. 1949)												
Magnitude.....	105	100	168	146	114	135	100	107	74	87	106	62
Direction.....	112	135	135	135	135	113	112	113	135	135	135	135
Preponderance.....	1.4	1.9	1.9	2.1	1.6	1.5	1.4	1.3	1.6	1.9	1.8	1.9
Blackstone, Va. (Feb. 1949 - Dec. 1953)												
Magnitude.....	150	118	154	163	84	55	60	33	41	41	91	85
Direction.....	49	45	67	45	45	45	49	67	67	67	67	45
Preponderance.....	1.8	1.2	1.2	1.6	1.9	1.8	2.3	1.6	1.8	1.7	1.5	1.3
Chincoteague, Va. (Mar. 1945 - June 1957)												
Magnitude.....	320	382	415	374	244	181	144	142	215	246	247	244
Direction.....	135	157	158	88	45	42	67	67	45	45	135	149
Preponderance.....	1.4	1.3	1.3	1.1	1.2	1.1	1.5	1.3	1.7	1.4	1.3	1.3
Hampton, Va. (Oct.-Dec. 1936; Feb. 1937 - June 1953)												
Magnitude.....	369	462	453	374	265	198	166	178	267	298	311	336
Direction.....	90	90	68	90	68	67	67	68	68	90	90	90
Preponderance.....	1.5	1.3	1.4	1.5	1.5	1.7	1.9	1.7	2.1	2.1	1.6	1.5
Oceana, Va. (Mar. 1945 - Jan. 1946; Feb. 1947 - Aug. 1950; Dec. 1951 - Feb. 1958)												
Magnitude.....	373	335	417	350	211	131	103	115	211	230	255	268
Direction.....	90	97	45	67	45	45	45	23	45	68	112	90
Preponderance.....	1.7	1.1	1.1	1.4	1.2	1.5	2.2	1.4	1.5	1.4	1.5	1.3

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Quantico, Va. (Jan. 1945 - Mar. 1960)												
Magnitude.....	88	99	116	112	57	34	27	23	40	45	62	53
Direction.....	113	113	135	90	90	90	90	90	90	101	112	113
Preponderance.....	1.7	1.4	1.3	1.2	1.4	1.2	1.6	1.5	1.7	1.3	1.5	1.5
Everett, Wash. (Nov. 1938 - Nov. 1945; Jan. 1948 - June 1953)												
Magnitude.....	127	126	114	86	96	67	68	55	66	69	104	137
Direction.....	112	112	112	112	112	112	90	112	112	112	112	112
Preponderance.....	2.5	2.4	2.7	2.3	2.7	3.5	2.9	3.1	4.0	2.8	2.5	2.6
Kelso, Wash. (Jan. 1948 - Aug. 1953)												
Magnitude.....	207	168	130	92	82	50	51	41	65	90	185	212
Direction.....	112	112	112	112	112	112	112	112	90	112	112	112
Preponderance.....	7.7	6.3	3.8	2.3	1.8	1.6	1.9	1.8	3.3	4.5	9.2	9.2
Moses Lake, Wash. (June-Dec. 1943; Jan., May-Dec. 1944; Apr. 1949 - Oct. 1957)												
Magnitude.....	197	173	284	251	191	218	127	94	159	144	133	143
Direction.....	90	90	45	43	180	45	180	90	90	90	90	90
Preponderance.....	2.5	1.9	1.3	1.1	1.1	1.2	1.1	1.2	1.3	1.6	1.6	1.9
Olympia, Wash. (Jan. 1953 - Dec. 1962)												
Magnitude.....	123	114	120	101	47	43	36	38	45	79	107	136
Direction.....	68	67	67	45	23	45	45	45	45	68	67	67
Preponderance.....	3.1	2.9	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.6	2.8	3.1
Spokane, Wash. (Oct. 1949 - Sept. 1954)												
Magnitude.....	267	217	199	175	145	131	92	87	80	241	186	208
Direction.....	67	67	45	45	45	67	67	67	45	68	67	67
Preponderance.....	4.1	2.8	2.5	3.1	3.4	2.1	1.9	1.6	2.6	3.4	3.9	3.5
Tacoma, Wash. (Aug. 1940 - July 1953)												
Magnitude.....	83	84	94	78	69	46	37	36	37	42	65	69
Direction.....	67	67	67	45	45	45	45	45	67	67	68	68
Preponderance.....	2.4	2.6	2.1	2.0	1.9	1.8	1.4	1.4	2.2	2.3	2.2	2.4
Walla Walla, Wash. (Jan., Feb., Apr.-Dec. 1945)												
Magnitude.....	96	125	190	125	70	100	83	89	90	14	53	33
Direction.....	68	90	68	45	45	45	45	45	45	90	90	90
Preponderance.....	2.6	2.4	1.8	2.8	2.7	2.9	2.7	2.4	2.7	2.4	2.3	5.5

See footnote at end of table.

TABLE 1.—Relative magnitude, prevailing wind erosion direction,¹ and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months—Continued

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Whidbey Island, Wash. (Apr. 1945 - Mar. 1959)												
Magnitude.....	399	359	314	220	122	90	67	41	101	235	385	453
Direction.....	135	135	135	135	180	180	45	180	135	135	135	135
Preponderance.....	2.7	2.5	1.9	1.7	1.4	1.7	1.6	1.2	2.2	2.7	2.8	2.8
Yakima, Wash. (Jan. 1950 - Dec. 1962)												
Magnitude.....	76	88	142	158	101	74	56	38	60	67	65	52
Direction.....	67	47	49	157	157	135	113	135	157	90	90	67
Preponderance.....	2.3	1.0	1.1	1.2	1.7	1.8	1.7	2.0	1.5	1.1	1.1	1.4
Green Bay, Wis. (Aug. 1952 - July 1963)												
Magnitude.....	216	221	251	291	229	141	89	89	173	186	340	230
Direction.....	158	42	45	23	45	45	45	45	45	45	180	43
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
La Crosse, Wis. (Nov. 1949 - Oct. 1954)												
Magnitude.....	247	232	304	440	548	230	110	69	139	270	279	259
Direction.....	135	135	135	135	121	113	114	45	135	135	135	112
Preponderance.....	1.6	1.9	1.8	1.8	1.1	1.2	1.4	1.2	1.5	1.5	1.9	1.0
Madison, Wis. (Jan. 1951 - Dec. 1960)												
Magnitude.....	204	250	366	358	244	150	113	86	156	172	302	202
Direction.....	135	180	20	180	22	23	22	45	23	23	180	22
Preponderance.....	1.2	1.3	1.4	1.5	1.3	1.3	1.3	1.3	1.3	1.1	1.4	1.2
Milwaukee, Wis. (Jan. 1951 - Dec. 1960)												
Magnitude.....	490	666	811	644	544	360	250	247	340	467	784	578
Direction.....	45	45	67	45	45	67	68	45	67	90	45	23
Preponderance.....	1.2	1.2	1.3	1.1	1.2	1.2	1.7	1.3	1.2	1.2	1.4	1.1
Cheyenne, Wyo. (Sept. 1949 - Aug. 1954)												
Magnitude.....	1, 116	1, 227	1, 319	935	751	542	400	336	480	581	835	970
Direction.....	180	180	180	135	158	157	113	135	158	157	158	180
Preponderance.....	2.4	1.7	1.2	1.5	1.4	1.3	1.5	1.2	1.4	1.7	1.9	2.3
Sheridan, Wyo. (Jan. 1956 - Nov. 1960)												
Magnitude.....	143	190	245	281	207	156	110	146	143	201	322	250
Direction.....	135	135	135	135	135	135	135	135	135	154	135	158
Preponderance.....	3.4	2.5	3.0	3.1	2.7	3.1	2.4	2.5	3.0	3.2	3.4	2.3

¹ Direction given in degrees measured counterclockwise with east 0°, north 90°, west 180°, and south 270°.