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Storm Water Phase II Final Rule

Construction Rainfall Erosivity Waiver

Storm Water Phase II Final Rule Fact Sheet Series

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The 1972 amendments to the Federal Water Pollution Control Act, later referred to as the Clean Water Act (CWA), prohibit the discharge of any pollutant to navigable waters of the United States unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Because construction site storm water runoff can contribute significantly to water quality problems, the Phase I Storm Water Rule imposed a requirement that all construction sites with a planned land disturbance of 5 acres or more obtain an NPDES permit and implement storm water runoff control plans. Phase II extends the requirements of the storm water program to sites of between 1 and 5 acres. The Rainfall erosivity waiver, along with the water quality waiver, allows permitting authorities to waive those sites that do not have adverse water quality impacts.

What is Erosivity?

Erosivity is the term used to describe the potential for soil to wash off disturbed, devegetated earth into waterways during storms. The potential for erosion is in part determined by the soil type and geology of the site. For instance, dense, clay-like soils on a glacial plain will erode less readily when it rains than will sandy soils on the side of a hill. Another important factor is the amount and force of precipitation expected during the time the earth will be exposed. While it is impossible to predict the weather several months in advance of construction, for many areas of the country, there are definite optimal periods, such as a dry season when rain tends to fall less frequently and with less force. When feasible, this is the time to disturb the earth, so that the site is stabilized by the time the seasonal wet weather returns. There are many other important factors to consider in determining erosivity, such as freeze/thaw cycles and snow pack.

How Is Site Erosivity Determined?

The method for determining if a site qualifies for the erosivity waiver is based on the Universal Soil Loss Equation (USLE) developed by the U.S. Department of Agriculture (USDA) in the 1950s to help farmers conserve their valuable topsoil. The USLE has been updated to the Revised USLE (RUSLE). Using a computer model supported by decades worth of soil and rainfall data, USDA established estimates of annual erosivity values (R) for sites throughout the country. These R factors are used as surrogate measures of the impact that rainfall had on erosion from a particular site. They have been mapped using isoerodent contours, as shown in Figures 2 through 5.

USDA developed the Erosivity Index Table (EI Table, provided here in Table 1), to show how the annual erosivity factor is distributed throughout the year in two-week increments. Table 1 is based on 120 rainfall distribution zones for the continental U.S. Detailed instructions for calculating a project R Factor are provided later in this fact sheet.

The Storm Water Phase II rule allows permitting authorities to waive NPDES requirements for small construction sites if the value of the rainfall erosivity factor is less than 5 during the period of construction activity (see § 122.26(b)(15)(i)(A)). Note that the permitting authority has the option to not allow waivers for small construction activity. If the permitting authority in a State chooses to use the rainfall erosivity waiver, it will not become effective until permits are required from small construction activity.

If the R Factor for the period of construction calculates to 5 or lower, and the permitting authority allows the use of the waiver, the site owner may apply for a waiver under the low rainfall erosivity provision of the applicable NPDES Construction General Permit. When applying, owners are encouraged to consider other site-specific factors, such as proximity to water resources and the sensitivity of receiving waters to sedimentation impacts. The small construction operator must certify to the permitting authority that the construction activity will take place during a period when the rainfall erosivity factor is less than 5.

The start and end dates used for the construction activity will be the initial date of disturbance and the anticipated date when the site will have achieved final stabilization as defined by the permit. If the construction continues beyond this period, the operator will need to recalculate the EI for the site based on this new ending date (but keeping the old start date) and either resubmit the certification form or apply for NPDES permit coverage.

What Other Factors Can Affect Waiver Availability and Eligibility?

EPA has established the R Factor of 5 or lower as the criteria for determining waiver eligibility. However, since the intent is to waive only those construction activities that will not adversely impact water quality, State and Tribal permitting authorities have considerable discretion in determining where, when, and how to offer it. They can establish an R Factor threshold lower than 5, or they can suspend the waiver within an area where watersheds are known to be heavily impacted by, or sensitive to, sedimentation. They can also suspend the waiver during certain periods of the year. They may opt not to offer the waiver at all. NOTE: This waiver is not available to sites that will disturb more than 5 acres of land (large construction).

What if My Site Is Not Eligible?

If your site is not eligible for a waiver, you must submit a Notice of Intent under the NPDES General Permit, and comply with its requirements. These requirements are described in more detail in Storm Water Phase II Fact Sheet 3.0.

How Do I Compute the R Factor for My Project?

1. Estimate the construction start date. This is the day you expect to begin disturbing soils, including grubbing, stockpiling, excavating, and grading activities. Pick the 15-day period for your start date (e.g., June 1-15.)
2. Estimate the day you expect to have a permanent vegetative cover of at least 70%, or as defined by your permitting authority, over all previous disturbed areas. Round to the nearest 15-day period.
3. Refer to Figure 1 to find your Erosivity Index (EI) Zone based on your geographic location.
4. Refer to Table 1, the Erosivity Index (EI) Table. Find the number of your EI Zone in the left column. Locate the EI values for the 15-day periods that correspond to the project start and end periods you identified in Steps 1 and 2. Subtract the start value from the end value to find the % EI for your site. The maximum annual EI value for a project is 100%.
5. Refer to the appropriate Isoerodent Map (Figures 2 through 5). Interpolate the annual isoerodent value for your area. This is the annual R Factor for your site.
6. Multiply the percent value obtained in Step 4 by the annual isoerodent value obtained in Step 5. This is the R Factor for your scheduled project.

Examples

1. Construction started and completed in one calendar year.

Find the R value of a construction site in Denver, Colorado. Assume the site will be disturbed from March 1 to May 15.

The EI distribution zone is 84 (Figure 1). Referring to Table 1, the project period will span from March 1 to May 15. The difference in values between these two periods is 4.7 % (4.9-0.2 =4.7). Since the annual erosion index for this location is about 45 (interpolated from Figure 2), the R Factor for the scheduled construction project is 4.7% of 45, or 2.1.

Because 2.1 is less than 5, the operator of this site would be able to seek a waiver under the low rainfall erosivity provision.

2. Construction spanning two calendar years.

Find the R value for a construction site in Pittsburgh, Pennsylvania. Assume the site will be disturbed from August 1 to April 15.

The EI distribution zone is 111 (Figure 1). Referring to Table 1, the project will span from August 1 to April 15. The difference in values between August 1 and December 30 is 35% (100- 65.0 = 35.0). The difference between January 1 and April 15 is 8%. The total percentage EI for this project is 43% (35 + 8). Since the annual erosion index for this location is 112 (interpolated from Figure 2), the R Factor for the scheduled construction is 43% of 112, or 48.

Since 48 is greater than 5, the operator of this site would not be able to seek a waiver under the low rainfall erosivity provision.

Can I Use A Personal Computer to Calculate the R Factor?

The computer program used by USDA to develop the current R Factor maps and table is called the Revised Universal Soil Loss Equation, or RUSLE. The current version of RUSLE (v. 1.60) will calculate the R factor for the entire year for a limited number of cities in the U.S., but does not allow the R factor to be easily adjusted based on a shorter period of construction. If you are interested in using RUSLE; Version 1.06 for Mined Lands, Construction Sites, and Reclaimed Lands, is downloadable free of charge from the Internet at http://www.sedlab.olemiss.edu/rusle.

Where Can I Get Help?

- A copy of "Chapter 2, Rainfall-Runoff Erosivity Factor (R)" from the *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, January 1997, is available on EPA's web site at http://www.epa.gov/npdes/stormwater.

- Your local soil conservation district office can provide assistance with R Factors and other conservation-related issues. To find the office nearest you, look in the government section of the phone book under soil conservation district, conservation district, natural resource conservation district, etc.

For Additional Information

Reference Documents

- Storm Water Phase II Final Rule Fact Sheet Series
  - Internet: cfpub.epa.gov/npdes/stormwater/swfinal.cfm

- Storm Water Phase II Final Rule(64 *FR* 68722)
  - Internet: www.epa.gov/npdes/regulations/phase2.pdf
  - Contact the U.S. EPA Water Resource Center
    - Phone: (202) 564-9545

- *Agricultural Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, Chapter 2, pp. 21-64, January 1997.
  - Internet: www.epa.gov/npdes/pubs/ruslech2.pdf

Figure 1. Erosivity Index Zone Map

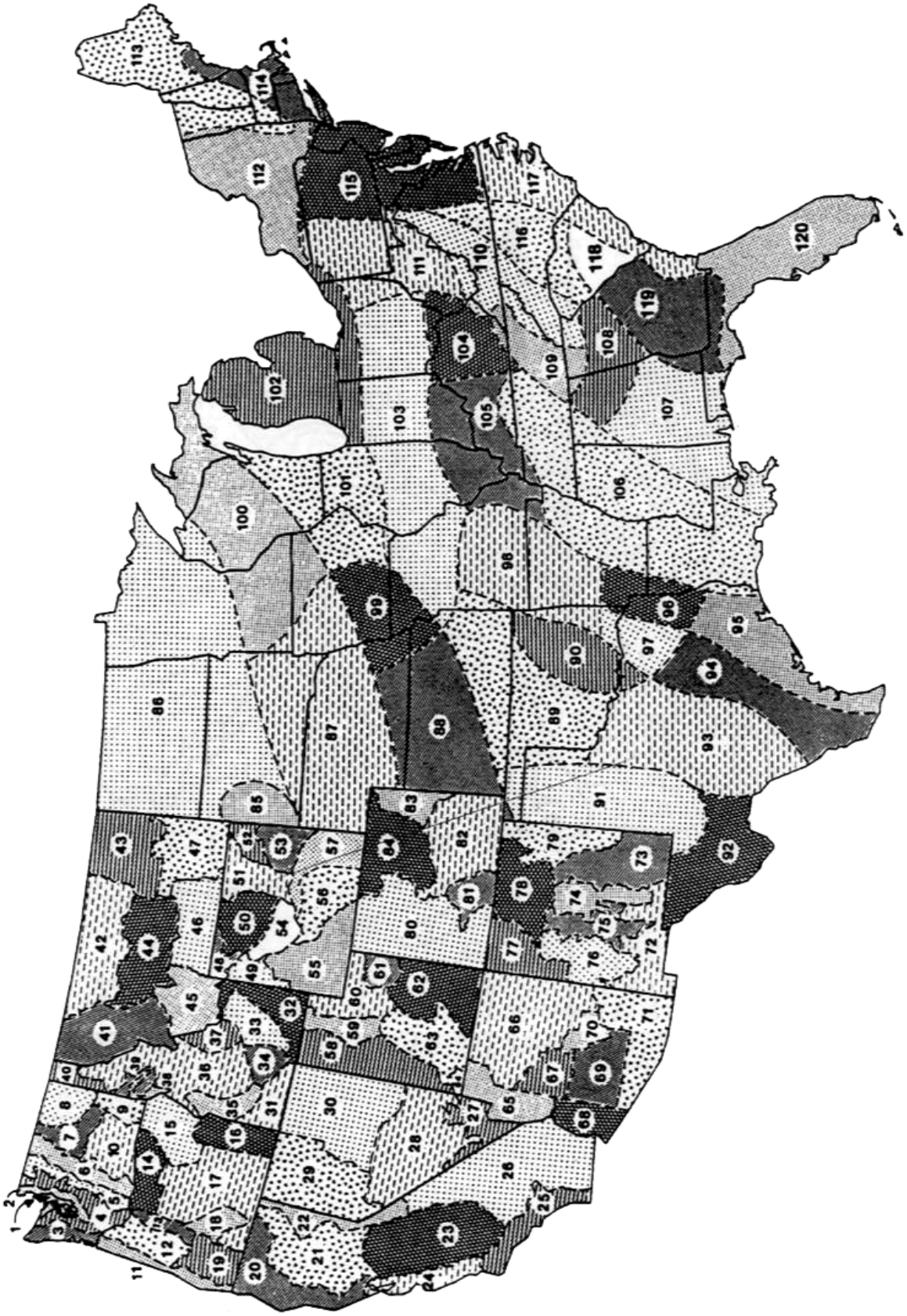
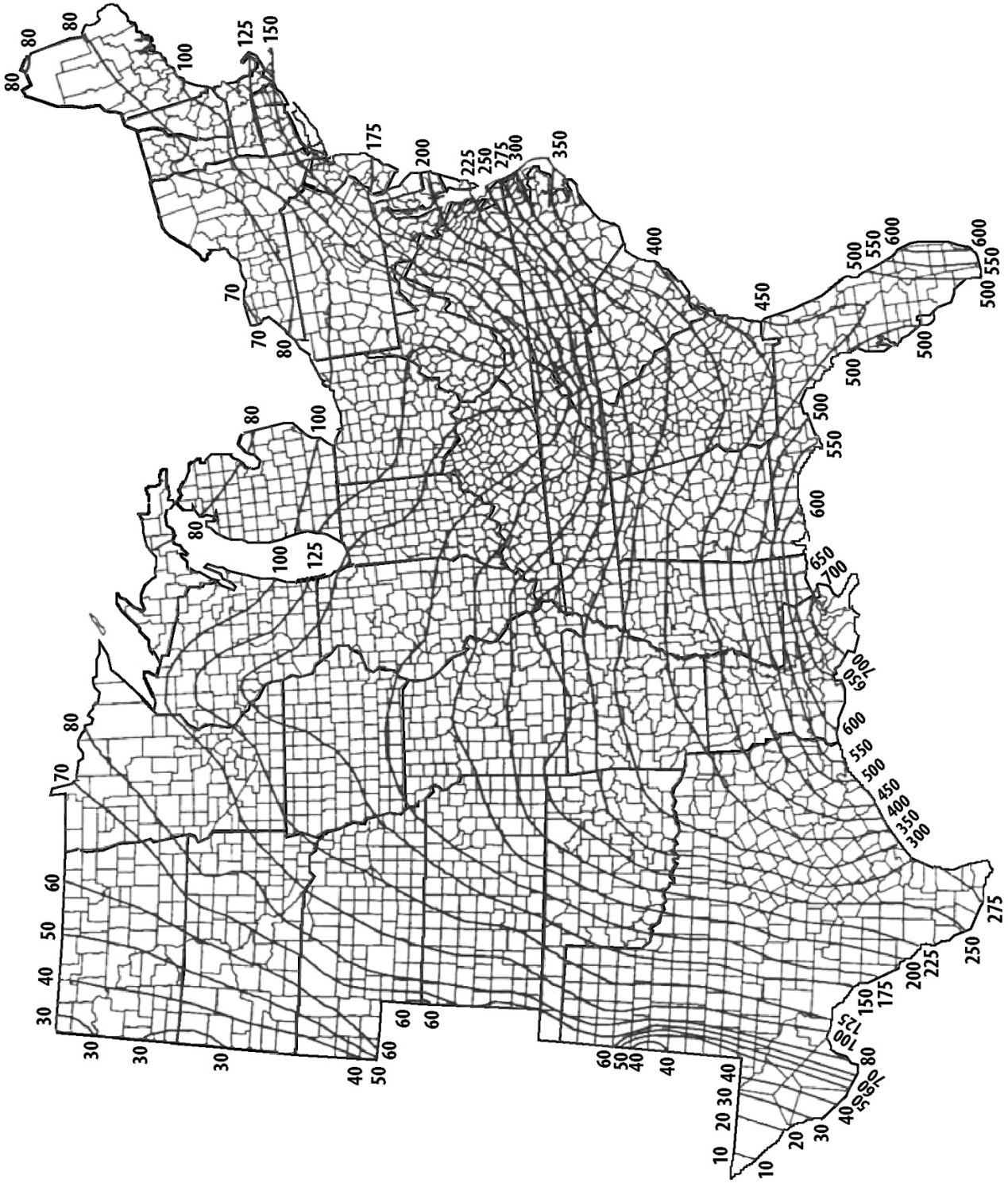
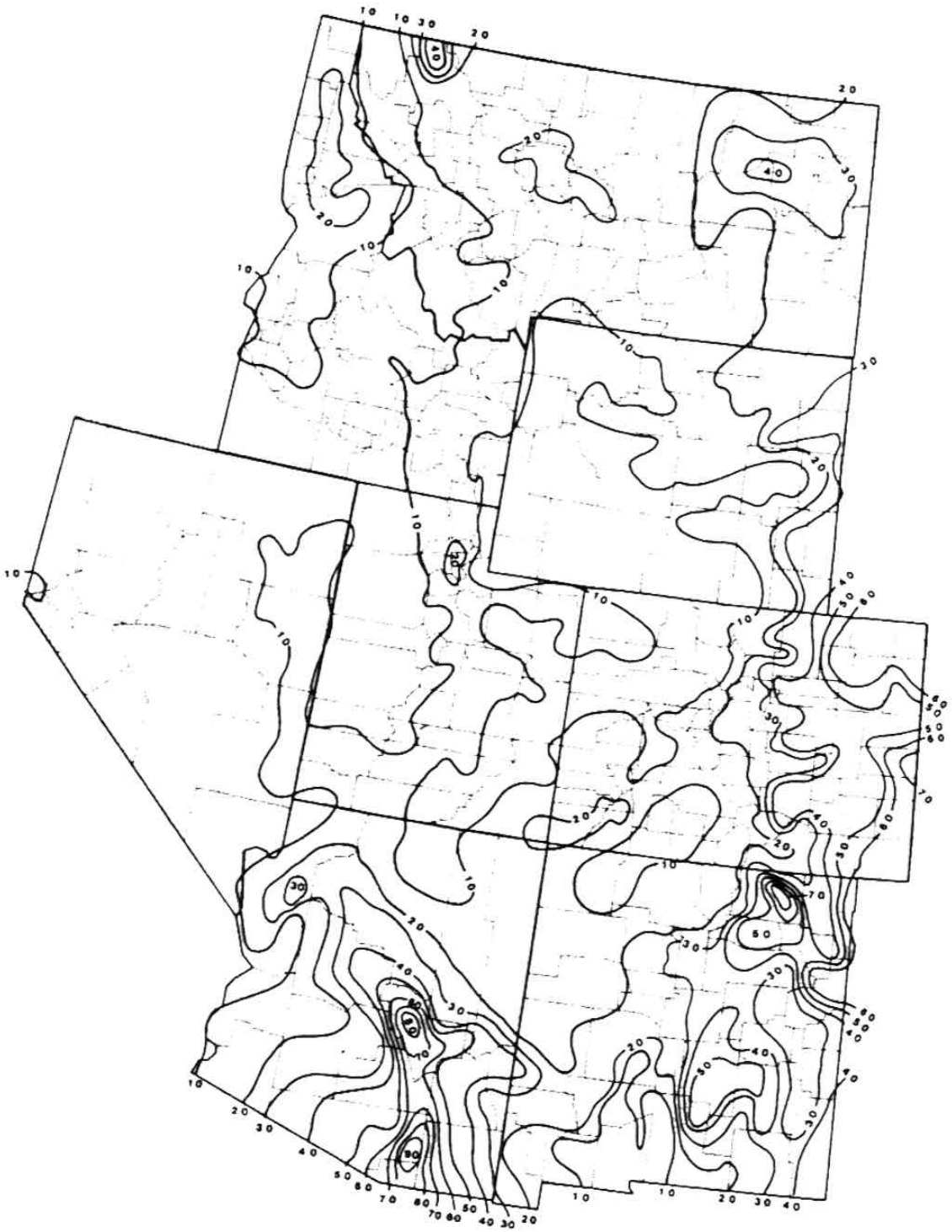


Figure 2. Isoerodent Map of the Eastern U.S.



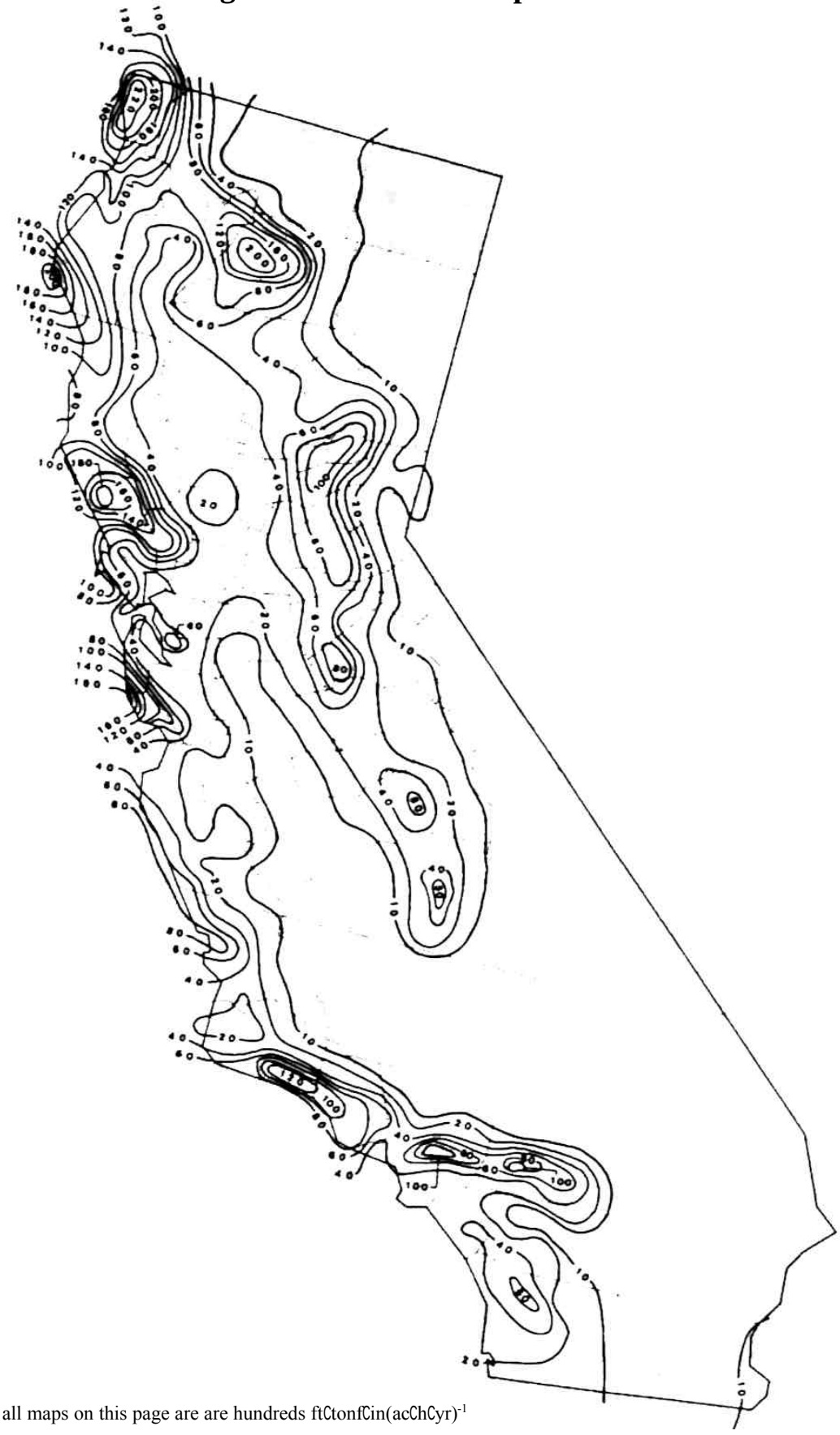
Note: Units for all maps on this page are are hundreds ftCtonfCin(acChCyr)$^{-1}$

Figure 3. Isoerodent Map of the Western U.S.



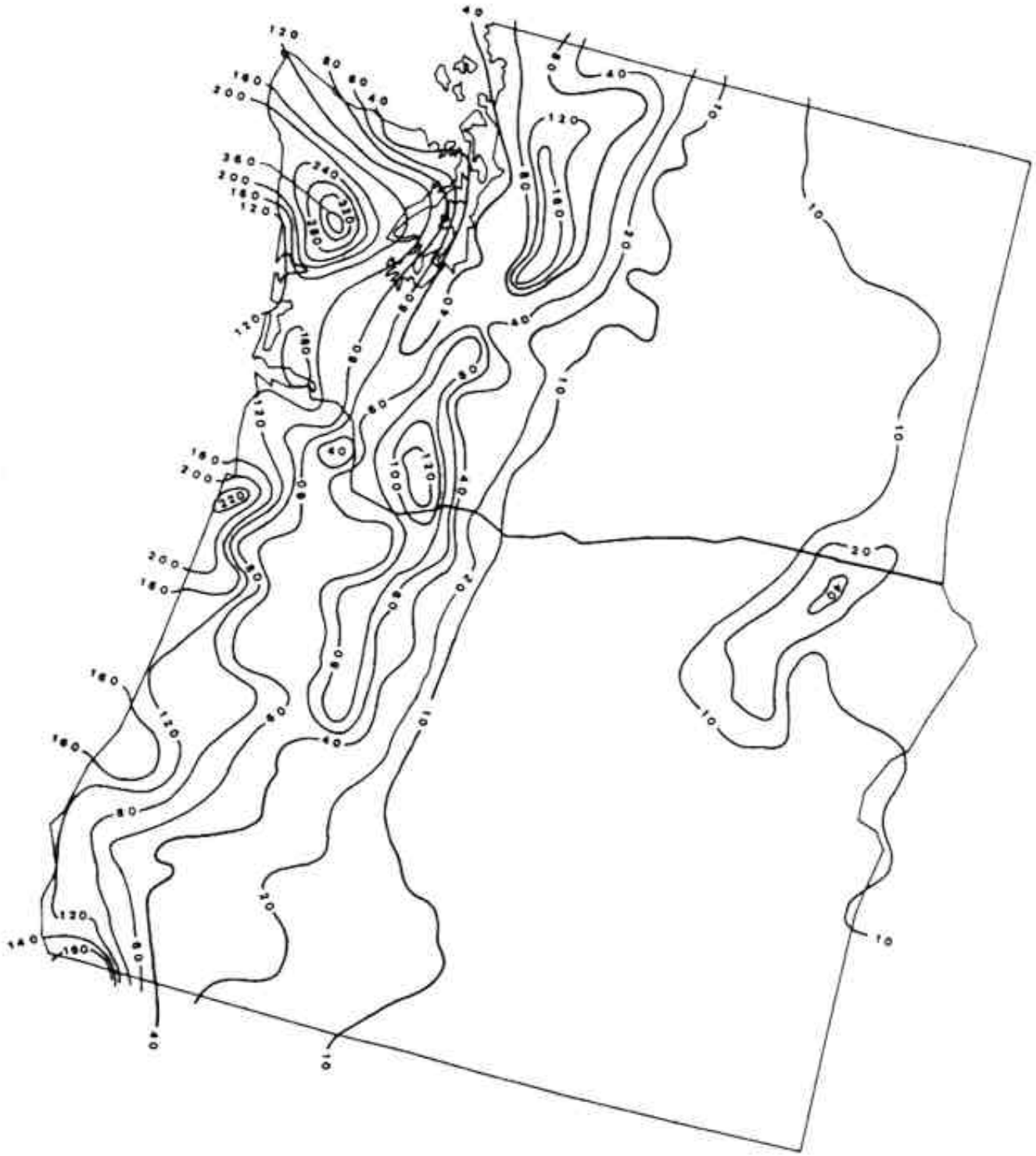
Note: Units for all maps on this page are are hundreds ftCtonfCin(acChCyr)$^{-1}$

Figure 4. Isoerodent Map of California



Note: Units for all maps on this page are are hundreds ft·tonf·in(ac·h·yr)$^{-1}$

Figure 5. Isoerodent Map of Oregon and Washington



Note: Units for all maps on this page are are hundreds ftCtonfCin(acChCyr)$^{-1}$

Table 1. Erosivity Index Table

EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
1	0.0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2
2	0.0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2
3	0.0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3
4	0.0	3.9	7.9	12.6	17.4	21.6	25.2	28.7	31.9	35.1	38.2	42.0	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0
5	0.0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9
6	0.0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9
7	0.0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.1	35.4	43.9	48.8	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7
8	0.0	0.0	0.0	0.0	0.0	0.9	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.8	89.4	93.4	96.3	99.1	100.0	100.0
9	0.0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.6	97.4	100.0	100.0
10	0.0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0
11	0.0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8
12	0.0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7
13	0.0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.6	65.3	67.6	71.6	76.1	83.1	93.3	98.2	99.6
14	0.0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3
15	0.0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.8	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8
16	0.0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6
17	0.0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8
18	0.0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0
19	0.0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7
20	0.0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	58.5	60.1	63.2	69.6	76.7	85.4	92.4
21	0.0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7
22	0.0	1.2	1.6	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	99.9
23	0.0	7.9	15.0	20.9	25.7	31.1	35.7	40.2	43.2	46.2	47.7	48.8	49.4	49.9	50.7	51.8	54.1	57.7	62.8	65.9	70.1	77.3	86.8	93.5
24	0.0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.1	59.2	59.2	59.3	59.5	60.0	61.4	63.0	66.5	71.8	81.3	89.6
25	0.0	9.8	20.8	30.2	37.6	45.8	50.6	54.4	56.0	56.8	57.1	57.1	57.2	57.6	58.5	59.8	62.2	65.3	67.5	68.2	69.4	74.8	86.6	93.0
26	0.0	2.0	5.4	9.8	15.6	21.5	24.7	26.6	27.4	28.0	28.7	29.8	32.5	36.6	44.9	55.4	65.7	72.6	77.8	84.4	89.5	93.9	96.5	98.4
27	0.0	0.0	0.0	1.0	4.0	5.9	8.0	11.1	13.0	14.0	14.6	15.3	17.0	23.2	39.1	60.0	76.3	86.1	89.7	90.4	90.9	93.1	96.6	99.1
28	0.0	0.0	0.0	0.0	0.2	0.5	1.5	3.3	7.2	11.9	17.7	21.4	27.0	37.1	51.4	62.3	70.6	78.8	84.6	90.6	94.4	97.9	99.3	100.0
29	0.0	0.6	0.7	0.7	0.7	1.5	3.9	6.0	10.5	17.9	28.8	36.6	43.8	51.5	59.3	68.0	74.8	80.3	84.3	88.8	92.7	98.0	99.8	99.9
30	0.0	0.0	0.0	0.0	0.0	0.2	0.8	2.8	7.9	14.2	24.7	35.6	45.4	52.2	58.7	68.5	77.6	84.5	88.9	93.7	96.2	97.6	98.3	99.6

Table 1. Erosivity Index Table (cont.)

	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
31	0	0	0	0	0	0.2	1	3.5	9.9	15.7	26.4	47.2	61.4	65.9	69	77.2	86	91.6	94.8	98.7	100	100	100	100
32	0	0.1	0.1	0.1	0.1	0.6	2.2	4.3	9	14.2	23.3	34.6	46.3	54.2	61.7	72.9	82.5	89.6	93.7	98.2	99.7	99.9	99.9	99.9
33	0	0	0	0	0	0.6	2.3	4.2	8.8	16.1	30	46.9	57.9	62.8	66.2	72.1	79.1	85.9	91.1	97	98.9	98.9	98.9	98.9
34	0	0	0	0	0	1.8	7.3	10.7	15.5	22	29.9	35.9	42	48.5	56.9	67	76.9	85.8	91.2	95.7	97.8	99.6	100	100
35	0	0	0	0	0	2.5	10.2	15.9	22.2	27.9	34.7	43.9	51.9	56.9	61.3	67.3	73.9	80.1	85.1	89.6	93.2	98.2	99.8	99.8
36	0	0	0	0	0	0.9	3.4	6.7	12.7	18.5	26.6	36.3	46	53.5	60.2	68.3	75.8	82.6	88.3	96.3	99.3	99.9	100	100
37	0	0	0	0	0	0	0	1	3.9	9.1	19.1	26.7	36.3	47.9	61.4	75.1	84.5	92.3	96	99.1	100	100	100	100
38	0	0	0	1.1	4.3	7.2	11	13.9	17.9	22.3	30.3	43.1	55.1	61.3	65.7	72.1	77.9	82.6	86.3	90.3	93.8	98.4	100	100
39	0	0	0	0	0	1.6	6.5	11	17.8	24.7	33.1	42.8	50.3	54.9	59.7	68.9	78.1	83.6	87.5	93	96.5	99.2	100	100
40	0	0	0	0	0	1.5	6.2	10.1	16.3	23.3	32.5	42.2	50.1	55.6	60.5	67.5	74.3	79.4	84.1	91.1	95.8	99.1	100	100
41	0	0.1	0.2	0.2	0.2	0.2	0.2	0.4	1.1	6.8	22.9	40.1	54.9	63.8	70.7	81.5	89.8	96.3	98.7	99.2	99.3	99.4	99.4	99.7
42	0	0	0	0	0	0	0	0.2	0.9	5.2	17.3	33.8	53.2	66.5	75.9	87.6	93.7	97.5	99	99.7	100	100	100	100
43	0	0	0	0	0	0	0	0.1	0.4	2.7	9.5	21.9	42.7	58.6	71.1	84.6	91.9	97.1	99	99.8	100	100	100	100
44	0	1.7	2.3	2.4	2.4	2.4	2.4	2.7	3.5	7.6	18.5	34.3	52.5	64	72.3	83.3	90	95.1	97.3	98.5	98.9	98.9	98.9	99.2
45	0	0.2	0.2	0.3	0.3	0.4	0.6	0.8	1.4	3.7	10.2	22.6	41.8	54	64.5	78.7	88.4	96	98.7	99.4	99.7	99.7	99.8	99.9
46	0	0	0	0	0	0	0	0.6	2.6	7.5	19.6	32.9	48.9	63	73.5	83.3	89.5	95.6	98.3	99.6	100	100	100	100
47	0	0	0	0	0	0	0	0.4	1.6	5.8	17	33	52.5	66.4	75.7	85.5	91.3	96.5	98.8	100	100	100	100	100
48	0	0	0	0	0	0	0	0	0	2	8.1	15.4	27.8	40.7	52.6	61.1	69.3	82.6	92	98	100	100	100	100
49	0	0	0	0	0	0	0	0.7	2.7	8.3	20	27.5	35.6	44.6	56	70.2	81.3	89.2	93.6	98.5	100	100	100	100
50	0	0	0	0	0	0.1	0.4	2.4	8.2	13.7	23.8	38.8	55.1	66.1	73.6	81.8	87.7	93.8	97	99.4	100	100	100	100
51	0	0	0	0	0	0.3	1	3.1	8.7	18.8	35.8	49.6	60.4	70.2	77	84	88.8	93.8	96.6	99.1	100	100	100	100
52	0	0	0	0	0	0	0	0.6	2.5	6.8	17.5	29.8	46.1	60.5	72.7	86	92.8	96.8	98.4	99.7	100	100	100	100
53	0	0	0	0	0	0	0	0.8	3	9.5	24.2	35.3	48	63.1	76.1	87.7	93.5	97.2	98.6	99.5	99.8	99.9	100	100
54	0	0	0	0	0	0.2	0.7	2.4	7.2	14.7	27.2	37.2	47.3	58.8	67.6	74	79.2	86.7	92.6	97.9	99.8	99.9	100	100
55	0	0	0	0	0	0	0	1.3	5.4	13.3	25.5	31.6	38.8	52.5	66.8	75.5	81.2	87.9	92.8	98.3	100	100	100	100
56	0	0	0	0	0	0	0	1.3	5.1	11.4	22.3	29.5	38.5	51.1	65.2	77.8	85.6	91.7	95	98.7	100	100	100	100
57	0	0	0	0	0	0	0.1	1	3.5	9.2	21.5	31	43.5	60.4	75.1	86.1	91.6	96.2	98.1	99.4	99.9	99.9	100	100
58	0	0	0	0	0	0.2	0.9	2.9	8	13.2	21	29.1	38	45.9	54.5	65.4	74.8	82.1	87.5	95.4	98.8	99.7	100	100
59	0	0	0	0	0	0	0	2.2	8.9	15.6	24.2	31.1	38.3	46	54.9	64.2	73.2	81.9	88.5	95.7	98.6	99.4	99.7	99.7
60	0	0	0	0	0	0	0	0.4	1.5	4	9.5	13.3	20.5	33.6	52.8	66.5	76.7	88.1	94.2	98.6	100	100	100	100

Table 1. Erosivity Index Table (cont.)

	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
61	0	0	0	0	0	0	0	1.3	5	8.5	15.5	29.8	41.8	46	49.2	56	65.1	71.6	78.6	91.1	97.3	99.3	100	100
62	0	0	0	0.1	0.3	0.8	2.1	3.6	6.5	9.7	13.7	16.5	20.8	27.3	40.1	56.9	72.6	83.4	89.4	95.5	98.1	99.6	100	100
63	0	0	0	0	0	0	0	0.9	3.7	7.8	13.3	15.8	19.9	29	46.8	64.7	78.3	88.8	93.9	98.5	100	100	100	100
64	0	0	0	0.7	2.8	7.4	12.4	14.4	15.6	17.3	19.4	21	24.4	32.3	48	61.4	72.1	81.9	87	90.1	92.4	98.1	100	100
65	0	3.6	7	9.6	11.4	13	14.4	16.3	17.7	18.4	19.3	20.5	23.6	32	50	66.2	77.2	85.4	88.8	90.4	91.3	92.7	94.8	97
66	0	0	0	0	0	0.1	0.5	1.1	2.2	3.6	6	7.6	11.1	19.8	38.9	59.7	74.4	83.2	88.1	94.6	97.7	99.4	100	100
67	0	0	0	0	0	0.1	0.4	0.9	1.6	1.9	2.4	5	12.1	24.8	48.3	73.6	86.5	92	94.3	96.6	97.9	99.5	100	100
68	0	2.3	4.5	7.8	10.4	12	13.3	16.3	17.7	18.1	18.2	18.3	18.4	19.9	24.5	35	54.4	69.4	78.6	85.7	89.2	91.9	93.9	97
69	0	2	3.7	5.7	7.8	10.5	12.4	13.7	14.3	14.7	15.1	15.7	17.1	22.7	36.7	50.4	63.6	75	81.8	87.8	90.8	93.2	94.9	97.5
70	0	0.5	0.7	1	1.3	1.7	2.2	2.8	3.4	3.9	4.7	5.4	7.4	15.7	36.5	55.8	70.3	80.9	86.4	90.9	93.4	96.4	98.1	99.4
71	0	0.7	1.2	1.6	2.1	2.8	3.3	3.6	4	4.5	5.6	6.5	9.1	18.5	40.6	59.7	74	86.3	91.7	94.7	96	96.7	97.3	98.8
72	0	0	0	0	0	0	0.1	0.2	0.7	0.8	1.3	3.5	9.9	24.7	51.4	71.5	83.6	93.8	97.7	99.2	99.8	99.9	99.9	100
73	0	0	0.1	0.1	0.2	0.2	0.3	0.6	1.3	4.1	11.5	18.1	28.3	40.2	54.1	67	77.2	87.7	93.3	97.5	99.1	99.6	99.8	100
74	0	0	0	0	0	0.1	0.2	0.5	1.2	2.7	6.4	10.2	18.4	31	50.7	68.7	81.2	91.6	96.1	98.4	99.2	99.8	100	100
75	0	0.1	0.1	0.1	0.2	0.5	1.3	1.9	3	4.1	6.6	10	17.6	28.3	44.7	59.4	71.6	83.9	90.3	94.7	96.7	98.8	99.6	99.9
76	0	0	0	0	0	0.1	0.2	0.6	1.3	2	3.5	4.9	8.4	17.4	37.3	57.5	72.9	83.7	89.5	95.8	98.4	99.6	100	100
77	0	0.2	0.3	0.3	0.4	0.8	1.5	2	2.8	3.9	5.9	7.2	10.3	21.5	46.5	66.3	78.3	86.5	90.8	96	98.2	99.1	99.5	99.8
78	0	0	0	0	0	0	0.2	0.5	1.6	3.8	8.9	13.2	21.8	35.8	56.6	75.4	86	92.9	95.9	98.2	99.2	99.8	100	100
79	0	0	0	0	0	0.2	0.7	1.3	2.7	5.8	12.7	18.8	28.8	41.6	58.4	75.7	86.5	94.2	97.3	98.9	99.5	99.9	100	100
80	0	0.6	1.2	1.6	2.1	2.5	3.3	4.5	6.9	10.1	15.5	19.7	26.6	36.4	51.7	67.5	79.4	88.8	93.2	96.1	97.3	98.2	98.7	99.3
81	0	0.1	0.1	0.2	0.4	0.5	0.8	0.9	1.5	3.9	9.9	12.8	18.2	30.7	54.1	77.1	89	94.9	97.2	98.7	99.3	99.6	99.7	99.9
82	0	0	0.1	0.1	0.2	0.2	0.5	1.2	3.1	6.7	14.4	20.1	29.8	44.5	64.2	83.1	92.2	96.4	98.1	99.3	99.7	99.8	99.8	99.9
83	0	0	0.1	0.1	0.1	0.3	0.9	1.6	3.5	8.3	19.4	30	44	59.2	72.4	84.6	91.2	96.5	98.6	99.5	99.8	99.9	100	100
84	0	0	0.1	0.1	0.2	0.3	0.6	1.7	4.9	9.9	19.5	27.2	38.3	52.8	68.8	83.9	91.6	96.4	98.2	99.2	99.6	99.8	99.8	99.9
85	0	0	0	0	0	0	1	2	3	6	11	23	36	49	63	77	90	95	98	99	100	100	100	100
86	0	0	0	0	0	0	1	2	3	6	11	23	36	49	63	77	90	95	98	99	100	100	100	100
87	0	0	0	0	1	1	2	3	6	10	17	29	43	55	67	77	85	91	96	98	99	100	100	100
88	0	0	0	0	1	1	2	3	6	13	23	37	51	61	69	78	85	91	94	96	98	99	99	100
89	0	0	1	1	2	3	4	7	12	18	27	38	48	55	62	69	76	83	90	94	97	98	99	100
90	0	1	2	3	4	6	8	13	21	29	37	46	54	60	65	69	74	81	87	92	95	97	98	99

Table 1. Erosivity Index Table (cont.)

	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
91	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100
92	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100
93	0	1	1	2	3	4	6	8	13	25	40	49	56	62	67	72	76	80	85	91	97	98	99	99
94	0	1	2	4	6	8	10	15	21	29	38	47	53	57	61	65	70	76	83	88	91	94	96	98
95	0	1	3	5	7	9	11	14	18	27	35	41	46	51	57	62	68	73	79	84	89	93	96	98
96	0	2	4	6	9	12	17	23	30	37	43	49	54	58	62	66	70	74	78	82	86	90	94	97
97	0	1	3	5	7	10	14	20	28	37	48	56	61	64	68	72	77	81	86	89	92	95	98	99
98	0	1	2	4	6	8	10	13	19	26	34	42	50	58	63	68	74	79	84	89	93	95	97	99
99	0	0	0	1	1	2	3	5	7	12	19	33	48	57	65	72	82	88	93	96	98	99	100	100
100	0	0	0	0	1	1	2	3	5	9	15	27	38	50	62	74	84	91	95	97	98	99	99	100
101	0	0	0	1	2	3	4	6	9	14	20	28	39	52	63	72	80	87	91	94	97	98	99	100
102	0	0	1	2	3	4	6	8	11	15	22	31	40	49	59	69	78	85	91	94	96	98	99	100
103	0	1	2	3	4	6	8	10	14	18	25	34	45	56	64	72	79	84	89	92	95	97	98	99
104	0	2	3	5	7	10	13	16	19	23	27	34	44	54	63	72	80	85	89	91	93	95	96	98
105	0	1	3	6	9	12	16	21	26	31	37	43	50	57	64	71	77	81	85	88	91	93	95	97
106	0	3	6	9	13	17	21	27	33	38	44	49	55	61	67	71	75	78	81	84	86	90	94	97
107	0	3	5	7	10	14	18	23	27	31	35	39	45	53	60	67	74	80	84	86	88	90	93	95
108	0	3	6	9	12	16	20	24	28	33	38	43	50	59	69	75	80	84	87	90	92	94	96	98
109	0	3	6	10	13	16	19	23	26	29	33	39	47	58	68	75	80	83	86	88	90	92	95	97
110	0	1	3	5	7	9	12	15	18	21	25	29	36	45	56	68	77	83	88	91	93	95	97	99
111	0	1	2	3	4	5	6	8	11	15	20	28	41	54	65	74	82	87	92	94	96	97	98	99
112	0	0	0	1	2	3	4	5	7	12	17	24	33	42	55	67	76	83	89	92	94	96	98	99
113	0	1	2	3	4	5	6	8	10	12	17	22	31	42	52	60	68	75	80	85	89	92	96	98
114	0	1	2	4	6	8	11	13	11	13	21	26	32	38	46	55	64	71	77	81	85	89	93	97
115	0	1	2	3	4	5	6	8	10	14	19	26	34	45	56	66	76	82	86	90	93	95	97	99
116	0	1	3	5	7	9	12	15	18	21	25	29	36	45	56	68	77	83	88	91	93	95	97	99
117	0	1	2	3	4	5	7	9	11	14	17	22	31	42	54	65	74	83	89	92	95	97	98	99
118	0	2	4	6	8	12	16	20	25	30	35	41	47	56	67	75	81	85	87	89	91	93	95	97
119	0	1	2	4	6	7	9	12	15	18	23	31	40	48	57	63	72	78	88	92	96	97	98	99
120	0	8	16	25	33	41	46	50	53	54	55	56	56.5	57	57.75	58	58.75	60	61	63	66.5	72	80	90

Table 1. Erosivity Index Table (cont.)

0	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
121	0	7	14	20	25.5	33.5	38	43	46	50	52.5	54.5	56	58	59	60	61.5	63	65	68	72	79	86	93
122	0	4	8	12	17	23	29	34	38	44	49	53	56	59	62	65	69	72	75	79	83	88	93	96
123	0	4	9	15	23	29	34	40	44	48	50	51	52	53	55	57	60	62	64	67	72	80	88	95
124	0	7	12	17	24	30	39	45	50	53	55	56	57	58	59	61	62	63	64	66	70	77	84	92
125	0	9	16	23	30	37	43	47	50	52	54	55	56	57	58	59	60	62	64	67	71	77	86	93
126	0	8	15	22	28	33	38	42	46	50	52	53	53	53	53	54	55	57	59	63	68	75	83	92
127	0	8	15	22	29	34	40	45	48	51	54	57	59	62	63	64	65	66	67	69	72	76	83	91
128	0	9	16	22	27	32	37	41	45	48	51	53	55	56	57	57	58	59	61	64	68	73	79	89
129	0	10	20	28	35	41	46	49	51	53	55	56	56	57	58	59	60	61	62	65	69	74	81	90
130	0	8	15	22	28	33	38	41	44	47	49	51	53	55	56	58	59	60	63	65	69	75	84	92
131	0	10	18	25	29	33	36	39	41	42	44	45	46	47	48	49	51	53	56	59	64	70	80	90
132	0	8	16	24	32	40	46	51	54	56	57	58	58	59	59	60	60	61	62	64	68	74	83	91
133	0	12	22	31	39	45	49	52	54	55	56	56	56	56	57	57	57	57	58	59	62	68	77	88
134	0	7	15	22	30	37	43	49	53	55	57	58	59	60	61	62	63	65	67	70	74	79	85	92
135	0	11	21	29	37	44	50	55	57	59	60	60	60	60	61	61	61	62	63	64	67	71	78	89
136	0	10	18	25	30	39	46	51	54	57	58	59	59	60	60	60	61	62	63	64	67	72	80	90
137	0	11	22	31	39	46	52	56	58	59	60	61	61	61	61	62	62	62	63	64	66	71	78	89
138	0	8	14	20	25	32	37	42	47	50	53	55	56	58	59	61	63	64	66	68	71	76	85	93
139	0	10.6	21.2	28.6	36	41.4	46.8	49.3	51.8	52.5	53.2	53.5	53.7	53.9	54	54.3	54.7	55.7	56.8	61.6	65.3	73.9	82.5	91.2
140	0	0.2	0.3	0.3	0.3	0.3	0.3	0.8	1.3	5.3	9.3	30.1	50.8	56.8	62.9	67.5	72.2	75.8	79.4	85.6	91.7	95.9	100	100
141	0	10.7	21.4	28.7	36	41.7	47.3	50.3	53.2	54.5	55.7	56.2	56.7	56.9	57	57.4	57.8	59	60.2	64.1	67.9	76.1	84.2	92.1
142	0	2.7	5.5	5.7	5.9	7.1	8.4	10	11.7	15.3	19	22.6	26.1	29	31.9	36.6	41.2	46	50.7	62.3	73.9	83.5	93.1	96.6
143	0	8.7	17.5	25.2	33	39.9	46.7	50.8	54.8	56.2	57.6	58	58.4	58.9	59.4	60.8	62.3	64.1	65.9	68.8	71.7	78.6	85.5	92.7
144	0	4.3	8.6	9.3	10.1	11.1	12	15.3	18.6	22.7	26.7	28.7	30.7	31.3	32	34	36	44.4	52.9	60.1	67.3	78.2	89.2	94.6
145	0	11.7	23.3	33.5	43.7	50.7	57.6	60.3	63	63.5	64.1	64.2	64.2	64.5	64.8	66.1	67.3	68.6	69.8	70.7	71.6	79.2	86.7	93.4
146	0	4.8	9.6	13.1	16.5	22.6	28.7	30.8	32.8	33.3	33.8	34	34.2	36.4	38.6	43	47.5	56	64.5	66.2	67.9	77.9	88	94
147	0	0	4.7	9.4	10.8	12.2	13.2	14.3	14.9	15.5	24.2	32.8	45.5	58.2	67.9	77.6	86.3	95.1	95.6	96.1	98	100	100	100
148	0	5.5	11	19.2	27.5	36.6	45.7	47.8	50	50.9	51.7	52.1	52.5	54.2	55.9	60.1	64.4	70.5	76.7	81.2	85.7	90.4	101	97.6
149	0	2.4	4.9	7.4	9.9	11.7	13.6	14.6	15.6	16.2	16.8	17.2	17.7	24.7	31.7	46.9	62.1	67	72	80.7	89.3	92.3	95.3	97.7