



# Stormwater Phase II Final Rule

## Construction Rainfall Erosivity Waiver

### Stormwater 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 stormwater runoff can contribute significantly to water quality problems, the Phase I Stormwater Rule imposed a requirement that all construction sites with a planned land disturbance of 5 acres or more obtain an NPDES permit and implement stormwater runoff control plans. Phase II extends the requirements of the stormwater program to sites of between 1 and 5 acres. The Rainfall erosivity 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 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 can be 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 Universal Soil Loss Equation (USLE) was developed by the U.S. Department of Agriculture (USDA) in the 1950s to help farmers conserve their valuable topsoil. The methodology for determining if a site qualifies for the erosivity waiver provided in this guide is based on the *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, dated January 1997. (Note that a more updated version of USLE, the Revised USLE, Version 2 (RUSLE2), is available and can be used as an alternative method for determining if a site qualifies for the erosivity waiver. Information about the RUSLE2 computer program is provided later in this fact sheet.)

Using a computer model supported by decades' worth of soil and rainfall data, USDA established estimates of annual erosivity values (R factors) 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 iseroindent 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.

<sup>1</sup> This revised fact sheet corrects errors identified in calculating the R factor from the 2001 version, and includes updated information about the USLE.

The Stormwater 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 R factor for the period of construction calculates to less than 5, 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 EPA or State NPDES regulations. 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, respectively. If the construction continues beyond this period, the operator will need to recalculate the Erosivity Index 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 less than 5 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, or whichever type of application is required, to obtain coverage under the applicable NPDES construction stormwater permit, and comply with its requirements. For information about EPA's Construction General Permit (CGP), see <http://www.epa.gov/npdes/stormwater/cgp>. State program information is available at [http://cfpub.epa.gov/npdes/contacts.cfm?program\\_id=6&type=STATE](http://cfpub.epa.gov/npdes/contacts.cfm?program_id=6&type=STATE).

## Examples

### 1. Construction started and completed in one calendar year.

*Find the R factor value of a construction site in Denver, Colorado. Assume the site will be disturbed from March 10 to May 10 of the same year.*

The EI distribution zone is 84 (Figure 1). Referring to Table 1, the project period will span from March 1 (from Table 1, the closest date prior to the actual March 10 start date) to May 15 (from Table 1, the closest date after the actual May 10 end date). The difference in values between these two dates is 9.7% ( $9.9 - 0.2 = 9.7$ ). Since the annual erosion index for this location is about 45 (interpolated from Figure 2), the R factor for the scheduled construction project is 9.7% of 45, or 4.4.

Because 4.4 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 factor 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 period will span from July 29 (from Table 1, the closest date prior to the actual August 1 start date) to April 15. The difference in values between July 29 and December 31 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% ( $35 + 8 = 43$ ). 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.

### 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.
2. Estimate the day you expect to achieve final stabilization, as defined by your permitting authority's regulations or NPDES construction stormwater permit, over all previous disturbed areas. This is your construction end date.
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 dates that correspond to the project start and end dates you identified in Steps 1 and 2. If your specific date is not on the table, either interpolate between dates to obtain your %EI value, or use the closest date prior to your proposed start date and the closest date after your proposed end date. 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%. NOTE: If your project lasts for one year or more, your EI value 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.

### Can I Use a Personal Computer to Calculate the R factor?

The computer program used by USDA to evaluate erosion potential is called the Revised Universal Soil Loss Equation, or RUSLE. The current version of RUSLE (RUSLE2) is a Windows-based model that uses extensive databases that are geographically-linked. RUSLE2 can be used to calculate the R factor for a proposed construction site; however, RUSLE2 can require a large investment of time to set up. RUSLE2 can be downloaded free of charge from the Internet at [http://fargo.nserl.purdue.edu/rusle2\\_dataweb/RUSLE2\\_Index.htm](http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm). Note that RUSLE2 is an upgrade of RUSLE, and contains more detailed data. Therefore, your calculated R factor may differ based on whether you calculate your R factor using the methods specified above, which utilizes data from *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, January 1997, or whether you calculate your R factor using the more updated RUSLE2. EPA notes that either method of calculation is acceptable for determining eligibility for the construction rainfall erosivity waiver.

### 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/pubs/ruslech2.pdf>.
- Information about RUSLE2, and a download of the program, is available at [http://fargo.nserl.purdue.edu/rusle2\\_dataweb/](http://fargo.nserl.purdue.edu/rusle2_dataweb/).
- Your local USDA Service Center may be able to provide assistance with calculating R factors and other conservation-related issues. To find the office nearest you, go to <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local>.

#### For Additional Information

##### Reference Documents

Stormwater Phase II Final Rule Fact Sheet Series

- Internet: [cfpub.epa.gov/npdes/stormwater/swfinal.cfm](http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm)

Stormwater Phase II Final Rule (64 FR 68722)

- Internet: [www.epa.gov/npdes/regulations/phase2.pdf](http://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](http://www.epa.gov/npdes/pubs/ruslech2.pdf)

Figure 1. Erosivity Index Zone Map

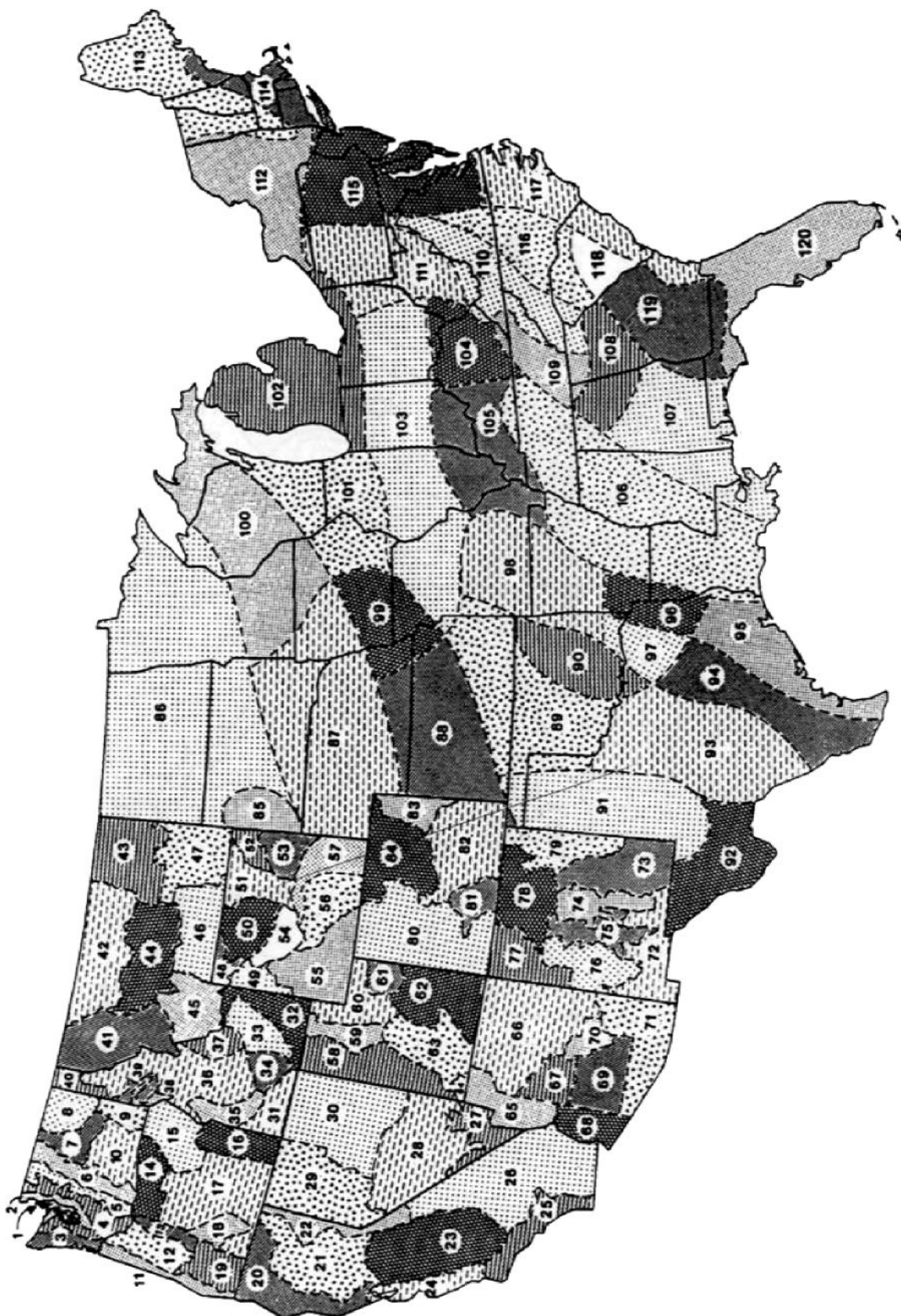
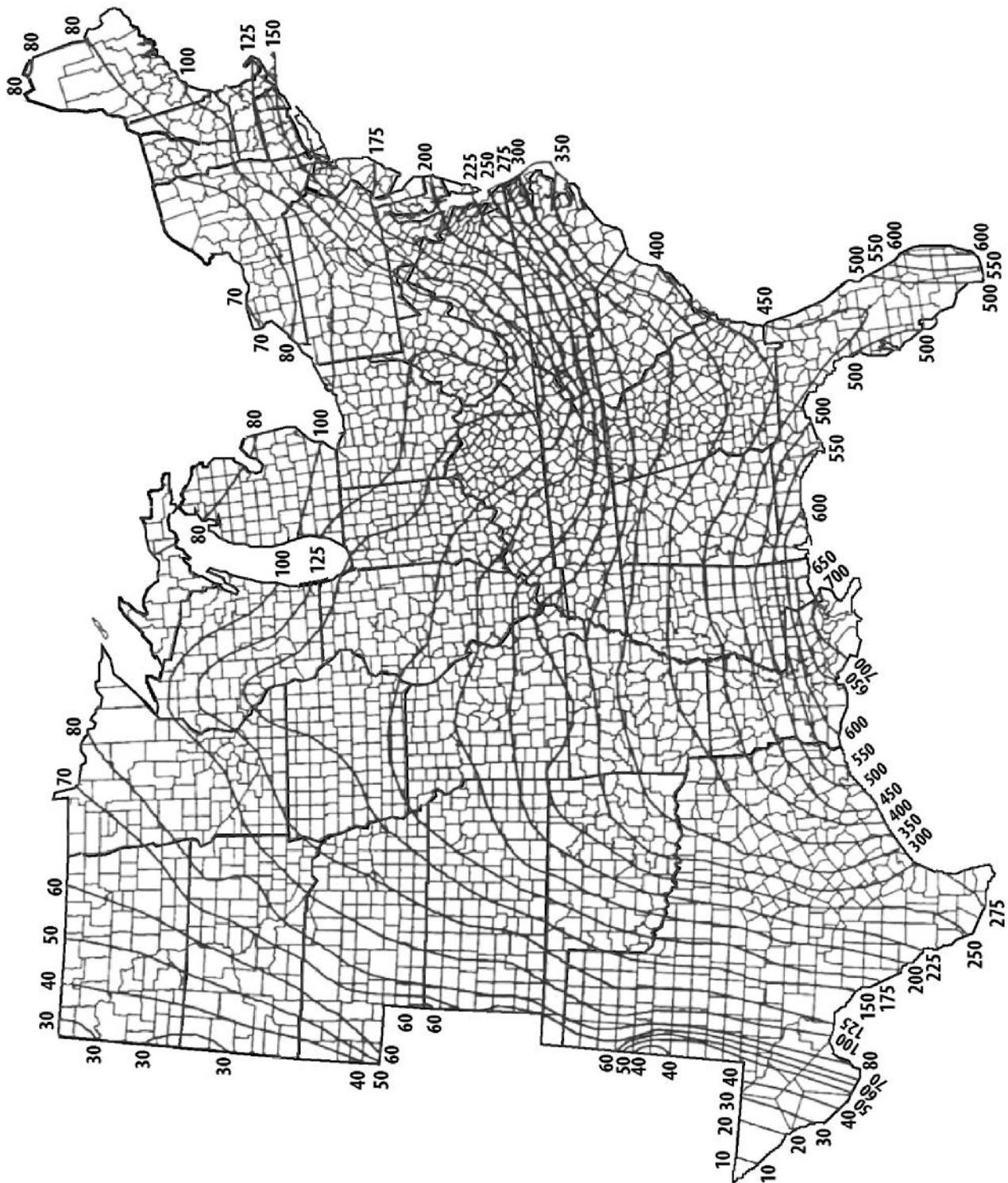


Figure 2. Isoerodent Map of the Eastern U.S.



Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)<sup>-1</sup>

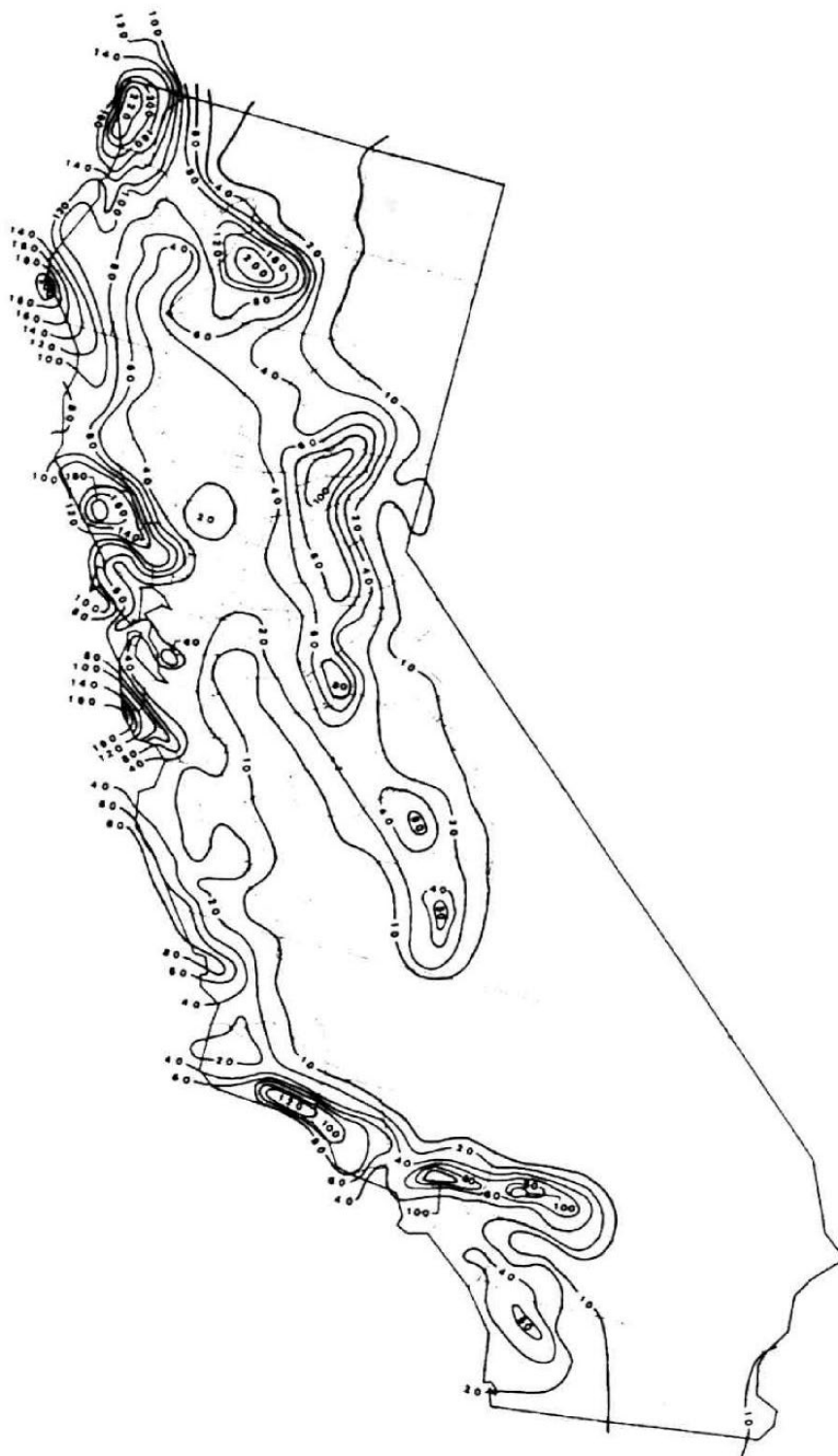


Figure 3. Isoerodent Map of the Western U.S.



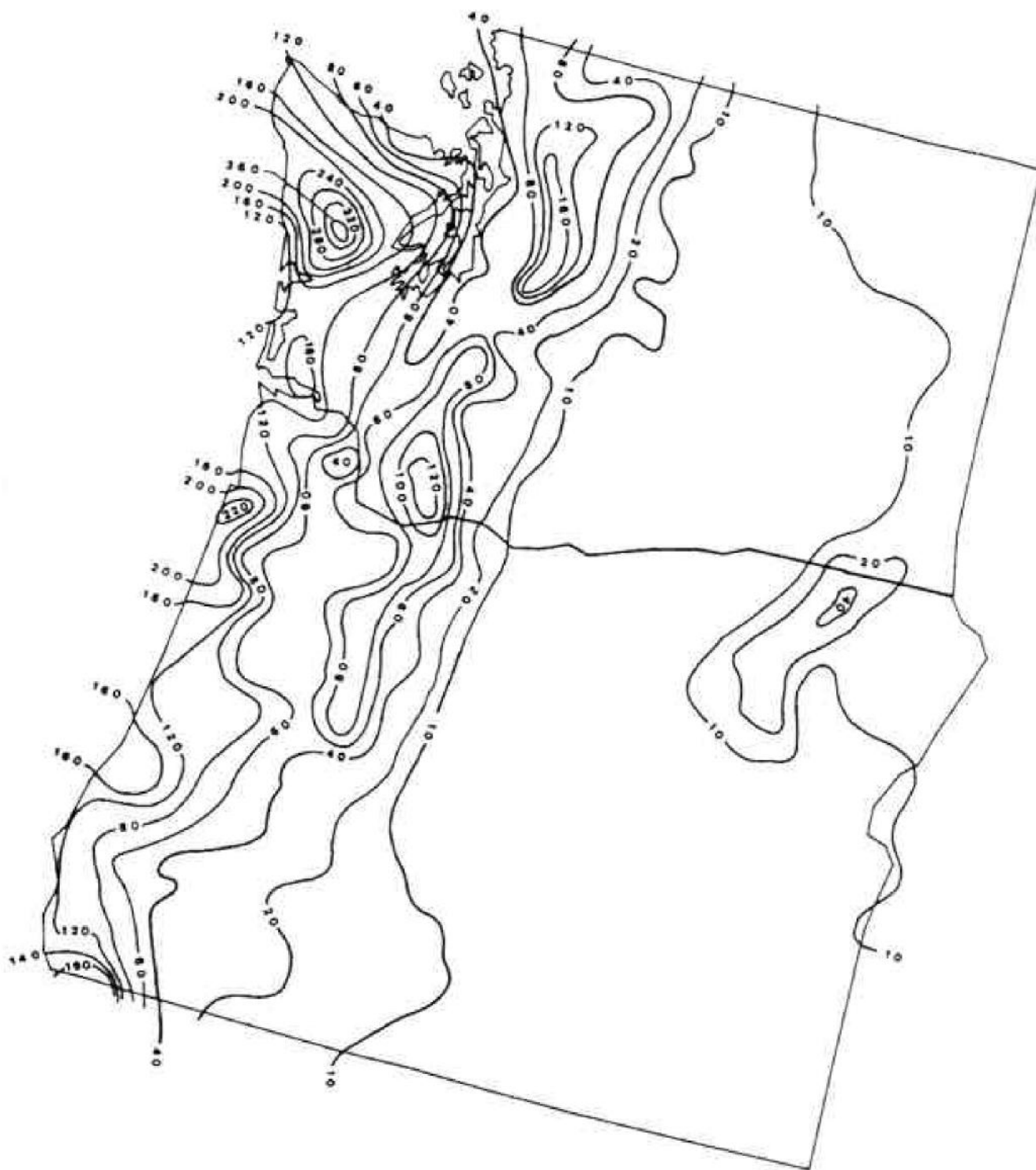
Note: Units for all maps on this page are hundreds  $\text{ft} \cdot \text{ton} \cdot \text{in} (\text{ac} \cdot \text{h} \cdot \text{yr})^{-1}$

Figure 4. Isoerodent Map of California



Note: Units for all maps on this page are hundreds of  $\text{ft} \cdot \text{ton} \cdot \text{in} \cdot (\text{ac} \cdot \text{h} \cdot \text{yr})^{-1}$

Figure 5. Isoerodent Map of Oregon and Washington



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



**Table 1. Erosivity Index (%EI Values extracted from USDA Manual 703)**

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.  
 EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec	
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31	
EI Zone																										
1	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100	
2	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	100	
3	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	100	
4	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	100	
5	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	100	
6	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	100	
7	0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.0	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	100	
8	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	100	
9	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	100	
10	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	100	
11	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	100	
12	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	100	
13	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	100	
14	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	100	
15	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	100	
16	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	100	
17	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	100	
18	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	100	
19	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	100	
20	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	100	
21	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	100	
22	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	100	
23	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	100	
24	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	100	
25	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	100	
26	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	100	
27	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	100	
28	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	100	
29	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	100	
30	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	100	
31	0	0.0	0.0	0.0	0.0	0.2	1.0	3.5	9.9	15.7	26.4	47.2	61.4	65.9	69.0	77.2	86.0	91.6	94.8	98.7	100.0	100.0	100.0	100.0	100	
32	0	0.1	0.1	0.1	0.1	0.6	2.2	4.3	9.0	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	100	
33	0	0.0	0.0	0.0	0.0	0.6	2.3	4.2	8.8	16.1	30.0	46.9	57.9	62.8	66.2	72.1	79.1	85.9	91.1	97.0	98.9	98.9	98.9	98.9	100	
34	0	0.0	0.0	0.0	0.0	1.8	7.3	10.7	15.5	22.0	29.9	35.9	42.0	48.5	56.9	67.0	76.9	85.8	91.2	95.7	97.8	99.6	100.0	100.0	100	
35	0	0.0	0.0	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	100	

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
El Zone																									
36	0	0.0	0.0	0.0	0.0	0.9	3.4	6.7	12.7	18.5	26.6	36.3	46.0	53.5	60.2	68.3	75.8	82.6	88.3	96.3	99.3	99.9	100.0	100.0	100
37	0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.9	9.1	19.1	26.7	36.3	47.9	61.4	75.1	84.5	92.3	96.0	99.1	100.0	100.0	100.0	100.0	100
38	0	0.0	0.0	1.1	4.3	7.2	11.0	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	100.0	100.0	100
39	0	0.0	0.0	0.0	0.0	1.6	6.5	11.0	17.8	24.7	33.1	42.8	50.3	54.9	59.7	68.9	78.1	83.6	87.5	93.0	96.5	99.2	100.0	100.0	100
40	0	0.0	0.0	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	100.0	100.0	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	100
42	0	0.0	0.0	0.0	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	99.0	99.7	100.0	100.0	100.0	100.0	100
43	0	0.0	0.0	0.0	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	99.0	99.8	100.0	100.0	100.0	100.0	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	64.0	72.3	83.3	90.0	95.1	97.3	98.5	98.9	98.9	98.9	99.2	100
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	54.0	64.5	78.7	88.4	96.0	98.7	99.4	99.7	99.7	99.8	99.9	100
46	0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.6	7.5	19.6	32.9	48.9	63.0	73.5	83.3	89.5	95.6	98.3	99.6	100.0	100.0	100.0	100.0	100
47	0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	5.8	17.0	33.0	52.5	66.4	75.7	85.5	91.3	96.5	98.8	100.0	100.0	100.0	100.0	100.0	100
48	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	8.1	15.4	27.8	40.7	52.6	61.1	69.3	82.6	92.0	98.0	100.0	100.0	100.0	100.0	100
49	0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.7	8.3	20.0	27.5	35.6	44.6	46.0	70.2	81.3	89.2	93.6	98.5	100.0	100.0	100.0	100.0	100
50	0	0.0	0.0	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	97.0	99.4	100.0	100.0	100.0	100.0	100
51	0	0.0	0.0	0.0	0.0	0.3	1.0	3.1	8.7	18.8	35.8	49.6	60.4	70.2	77.0	84.0	88.8	93.8	96.6	99.1	100.0	100.0	100.0	100.0	100
52	0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.5	6.8	17.5	29.8	46.1	60.5	72.7	86.0	92.8	96.8	98.4	99.7	100.0	100.0	100.0	100.0	100
53	0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.0	9.5	24.2	35.3	48.0	63.1	76.1	87.7	93.5	97.2	98.6	99.5	99.8	99.9	100.0	100.0	100
54	0	0.0	0.0	0.0	0.0	0.2	0.7	2.4	7.2	14.7	27.2	37.2	47.3	58.8	67.6	74.0	79.2	86.7	92.6	97.9	99.8	99.9	100.0	100.0	100
55	0	0.0	0.0	0.0	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	100.0	100.0	100.0	100.0	100
56	0	0.0	0.0	0.0	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	95.0	98.7	100.0	100.0	100.0	100.0	100
57	0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	3.5	9.2	21.5	31.0	43.5	60.4	75.1	86.1	91.6	96.2	98.1	99.4	99.9	99.9	100.0	100.0	100
58	0	0.0	0.0	0.0	0.0	0.2	0.9	2.9	8.0	13.2	21.0	29.1	38.0	45.9	54.5	65.4	74.8	82.1	87.5	95.4	98.8	99.7	100.0	100.0	100
59	0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	8.9	15.6	24.2	31.1	38.3	46.0	54.9	64.2	73.2	81.9	88.5	95.7	98.6	99.4	99.7	99.7	100
60	0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.5	4.0	9.5	13.3	20.5	33.6	52.8	66.5	76.7	88.1	94.2	98.6	100.0	100.0	100.0	100.0	100
61	0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.0	8.5	15.5	29.8	41.8	46.0	49.2	56.0	65.1	71.6	78.6	91.1	97.3	99.3	100.0	100.0	100
62	0	0.0	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	100.0	100.0	100
63	0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	3.7	7.8	13.3	15.8	19.9	29.0	46.8	64.7	78.3	88.8	93.9	98.5	100.0	100.0	100.0	100.0	100
64	0	0.0	0.0	0.7	2.8	7.4	12.4	14.4	15.6	17.3	19.4	21.0	24.4	32.3	48.0	61.4	72.1	81.9	87.0	90.1	92.4	98.1	100.0	100.0	100
65	0	3.6	7.0	9.6	11.4	13.0	14.4	16.3	17.7	18.4	19.3	20.5	23.6	32.0	50.0	66.2	77.2	85.4	88.8	90.4	91.3	92.7	94.8	97.0	100
66	0	0.0	0.0	0.0	0.0	0.1	0.5	1.1	2.2	3.6	6.0	7.6	11.1	19.8	38.9	59.7	74.4	83.2	88.1	94.6	97.7	99.4	100.0	100.0	100
67	0	0.0	0.0	0.0	0.0	0.1	0.4	0.9	1.6	1.9	2.4	5.0	12.1	24.8	48.3	73.6	86.5	92.0	94.3	96.6	97.9	99.5	100.0	100.0	100
68	0	2.3	4.5	7.8	10.4	12.0	13.3	16.3	17.7	18.1	18.2	18.3	18.4	19.9	24.5	35.0	54.4	69.4	78.6	85.7	89.2	91.9	93.9	97.0	100
69	0	2.0	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	75.0	81.8	87.8	90.8	93.2	94.9	97.5	100
70	0	0.5	0.7	1.0	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	100
71	0	0.7	1.2	1.6	2.1	2.8	3.3	3.6	4.0	4.5	5.6	6.5	9.1	18.5	40.6	59.7	74.0	86.3	91.7	94.7	96.0	96.7	97.3	98.8	100
72	0	0.0	0.0	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	100.0	100
73	0	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	67.0	77.2	87.7	93.3	97.5	99.1	99.6	99.8	100.0	100
74	0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	1.2	2.7	6.4	10.2	18.4	31.0	50.7	68.7	81.2	91.6	96.1	98.4	99.2	99.8	100.0	100.0	100
75	0	0.1	0.1	0.1	0.2	0.5	1.3	1.9	3.0	4.1	6.6	10.0	17.6	28.3	44.7	59.4	71.6	83.9	90.3	94.7	96.7	98.8	99.6	99.9	100

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
El Zone																									
76	0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.3	2.0	3.5	4.9	8.4	17.4	37.3	57.5	72.9	83.7	89.5	95.8	98.4	99.6	100.0	100.0	100
77	0	0.2	0.3	0.3	0.4	0.8	1.5	2.0	2.8	3.9	5.9	7.2	10.3	21.5	46.5	66.3	78.3	86.5	90.8	96.0	98.2	99.1	99.5	99.8	100
78	0	0.0	0.0	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	86.0	92.9	95.9	98.2	99.2	99.8	100.0	100.0	100
79	0	0.0	0.0	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	100.0	100.0	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	100
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	89.0	94.9	97.2	98.7	99.3	99.6	99.7	99.9	100
82	0	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	100
83	0	0.0	0.1	0.1	0.1	0.3	0.9	1.6	3.5	8.3	19.4	30.0	44.0	59.2	72.4	84.6	91.2	96.5	98.6	99.5	99.8	99.9	100.0	100.0	100
84	0	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	100
85	0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	3.0	6.0	11.0	23.0	36.0	49.0	63.0	77.0	90.0	95.0	98.0	99.0	100.0	100.0	100.0	100.0	100
86	0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	3.0	6.0	11.0	23.0	36.0	49.0	63.0	77.0	90.0	95.0	98.0	99.0	100.0	100.0	100.0	100.0	100
87	0	0.0	0.0	0.0	1.0	1.0	2.0	3.0	6.0	10.0	17.0	29.0	43.0	55.0	67.0	77.0	85.0	91.0	96.0	98.0	99.0	100.0	100.0	100.0	100
88	0	0.0	0.0	0.0	1.0	1.0	2.0	3.0	6.0	13.0	23.0	37.0	51.0	61.0	69.0	78.0	85.0	91.0	94.0	96.0	98.0	99.0	99.0	100.0	100
89	0	1.0	1.0	2.0	3.0	4.0	7.0	12.0	18.0	27.0	38.0	48.0	55.0	62.0	69.0	76.0	83.0	90.0	94.0	97.0	98.0	99.0	100.0	100.0	100
90	0	1.0	2.0	3.0	4.0	6.0	8.0	13.0	21.0	29.0	37.0	46.0	54.0	60.0	65.0	69.0	74.0	81.0	87.0	92.0	95.0	97.0	98.0	99.0	100
91	0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	6.0	16.0	29.0	39.0	46.0	53.0	60.0	67.0	74.0	81.0	88.0	95.0	99.0	99.0	100.0	100.0	100
92	0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	6.0	16.0	29.0	39.0	46.0	53.0	60.0	67.0	74.0	81.0	88.0	95.0	99.0	99.0	100.0	100.0	100
93	0	1.0	1.0	2.0	3.0	4.0	6.0	8.0	13.0	25.0	40.0	49.0	56.0	62.0	67.0	72.0	76.0	80.0	85.0	91.0	97.0	98.0	99.0	99.0	100
94	0	1.0	2.0	4.0	6.0	8.0	10.0	15.0	21.0	29.0	38.0	47.0	53.0	57.0	61.0	65.0	70.0	76.0	83.0	88.0	91.0	94.0	96.0	98.0	100
95	0	1.0	3.0	5.0	7.0	9.0	11.0	14.0	18.0	27.0	35.0	41.0	46.0	51.0	57.0	62.0	68.0	73.0	79.0	84.0	89.0	93.0	96.0	98.0	100
96	0	2.0	4.0	6.0	9.0	12.0	17.0	23.0	30.0	37.0	43.0	49.0	54.0	58.0	62.0	66.0	70.0	74.0	78.0	82.0	86.0	90.0	94.0	97.0	100
97	0	1.0	3.0	5.0	7.0	10.0	14.0	20.0	28.0	37.0	48.0	56.0	61.0	64.0	68.0	72.0	77.0	81.0	86.0	89.0	92.0	95.0	98.0	99.0	100
98	0	1.0	2.0	4.0	6.0	8.0	10.0	13.0	19.0	26.0	34.0	42.0	50.0	58.0	63.0	68.0	74.0	79.0	84.0	89.0	93.0	95.0	97.0	99.0	100
99	0	0.0	0.0	1.0	1.0	2.0	3.0	5.0	7.0	12.0	19.0	33.0	48.0	57.0	65.0	72.0	82.0	88.0	93.0	96.0	98.0	99.0	100.0	100.0	100
100	0	0.0	0.0	0.0	1.0	1.0	2.0	3.0	5.0	9.0	15.0	27.0	38.0	50.0	62.0	74.0	84.0	91.0	95.0	97.0	98.0	99.0	99.0	100.0	100
101	0	0.0	0.0	1.0	2.0	3.0	4.0	6.0	9.0	14.0	20.0	28.0	39.0	52.0	63.0	72.0	80.0	87.0	91.0	94.0	97.0	98.0	99.0	100.0	100
102	0	0.0	1.0	2.0	3.0	4.0	6.0	8.0	11.0	15.0	22.0	31.0	40.0	49.0	59.0	69.0	78.0	85.0	91.0	94.0	96.0	98.0	99.0	100.0	100
103	0	1.0	2.0	3.0	4.0	6.0	8.0	10.0	14.0	18.0	25.0	34.0	45.0	56.0	64.0	72.0	79.0	84.0	89.0	92.0	95.0	97.0	98.0	99.0	100
104	0	2.0	3.0	5.0	7.0	10.0	13.0	16.0	19.0	23.0	27.0	34.0	44.0	54.0	63.0	72.0	80.0	85.0	89.0	91.0	93.0	95.0	96.0	98.0	100
105	0	1.0	3.0	6.0	9.0	12.0	16.0	21.0	26.0	31.0	37.0	43.0	50.0	57.0	64.0	71.0	77.0	81.0	85.0	88.0	91.0	93.0	95.0	97.0	100
106	0	3.0	6.0	9.0	13.0	17.0	21.0	27.0	33.0	38.0	44.0	49.0	55.0	61.0	67.0	71.0	75.0	78.0	81.0	84.0	86.0	90.0	94.0	97.0	100
107	0	3.0	5.0	7.0	10.0	14.0	18.0	23.0	27.0	31.0	35.0	39.0	45.0	53.0	60.0	67.0	74.0	80.0	84.0	86.0	88.0	90.0	93.0	95.0	100
108	0	3.0	6.0	9.0	12.0	16.0	20.0	24.0	28.0	33.0	38.0	43.0	50.0	59.0	69.0	75.0	80.0	84.0	87.0	90.0	92.0	94.0	96.0	98.0	100
109	0	3.0	6.0	10.0	13.0	16.0	19.0	23.0	26.0	29.0	33.0	39.0	47.0	58.0	68.0	75.0	80.0	83.0	86.0	88.0	90.0	92.0	95.0	97.0	100
110	0	1.0	3.0	5.0	7.0	9.0	12.0	15.0	18.0	21.0	25.0	29.0	36.0	45.0	56.0	68.0	77.0	83.0	88.0	91.0	93.0	95.0	97.0	99.0	100
111	0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	11.0	15.0	20.0	28.0	41.0	54.0	65.0	74.0	82.0	87.0	92.0	94.0	96.0	97.0	98.0	99.0	100
112	0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	7.0	12.0	17.0	24.0	33.0	42.0	55.0	67.0	76.0	83.0	89.0	92.0	94.0	96.0	98.0	99.0	100
113	0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	13.0	17.0	22.0	31.0	42.0	52.0	60.0	68.0	75.0	80.0	85.0	89.0	92.0	96.0	98.0	100
114	0	1.0	2.0	4.0	6.0	8.0	11.0	13.0	15.0	18.0	21.0	26.0	32.0	38.0	46.0	55.0	64.0	71.0	77.0	81.0	85.0	89.0	93.0	97.0	100
115	0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	14.0	19.0	26.0	34.0	45.0	56.0	66.0	76.0	82.0	86.0	90.0	93.0	95.0	97.0	99.0	100

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
El Zone																									
116	0	1.0	3.0	5.0	7.0	9.0	12.0	15.0	18.0	21.0	25.0	29.0	36.0	45.0	56.0	68.0	77.0	83.0	88.0	91.0	93.0	95.0	97.0	99.0	100
117	0	1.0	2.0	3.0	4.0	5.0	7.0	9.0	11.0	14.0	17.0	22.0	31.0	42.0	54.0	65.0	74.0	83.0	89.0	92.0	95.0	97.0	98.0	99.0	100
118	0	1.0	2.0	3.0	5.0	7.0	10.0	14.0	18.0	22.0	27.0	32.0	37.0	46.0	58.0	69.0	80.0	89.0	93.0	94.0	95.0	96.0	97.0	97.0	100
119	0	2.0	4.0	6.0	8.0	12.0	16.0	20.0	25.0	30.0	35.0	41.0	47.0	56.0	67.0	75.0	81.0	85.0	87.0	89.0	91.0	93.0	95.0	97.0	100
120	0	1.0	2.0	4.0	6.0	7.0	9.0	12.0	15.0	18.0	23.0	31.0	40.0	48.0	57.0	63.0	72.0	78.0	88.0	92.0	96.0	97.0	98.0	99.0	100
121	0	8.0	16.0	25.0	33.0	41.0	46.0	50.0	53.0	54.0	55.0	56.0	56.5	57.0	57.8	58.0	58.8	60.0	61.0	63.0	66.5	72.0	80.0	90.0	100
122	0	7.0	14.0	20.0	25.5	33.5	38.0	43.0	46.0	50.0	52.5	54.5	56.0	58.0	59.0	60.0	61.5	63.0	65.0	68.0	72.0	79.0	86.0	93.0	100
123	0	4.0	8.0	12.0	17.0	23.0	29.0	34.0	38.0	44.0	49.0	53.0	56.0	59.0	62.0	65.0	69.0	72.0	75.0	79.0	83.0	88.0	93.0	96.0	100
124	0	4.0	9.0	15.0	23.0	29.0	34.0	40.0	44.0	48.0	50.0	51.0	52.0	53.0	55.0	57.0	60.0	62.0	64.0	67.0	72.0	80.0	88.0	95.0	100
125	0	7.0	12.0	17.0	24.0	30.0	39.0	45.0	50.0	53.0	55.0	56.0	57.0	58.0	59.0	61.0	62.0	63.0	64.0	66.0	70.0	77.0	84.0	92.0	100
126	0	9.0	16.0	23.0	30.0	37.0	43.0	47.0	50.0	52.0	54.0	55.0	56.0	57.0	58.0	59.0	60.0	62.0	64.0	67.0	71.0	77.0	86.0	93.0	100
127	0	8.0	15.0	22.0	28.0	33.0	38.0	42.0	46.0	50.0	52.0	53.0	53.0	53.0	53.0	54.0	55.0	57.0	59.0	63.0	68.0	75.0	83.0	92.0	100
128	0	8.0	15.0	22.0	29.0	34.0	40.0	45.0	48.0	51.0	54.0	57.0	59.0	62.0	63.0	64.0	65.0	66.0	67.0	69.0	72.0	76.0	83.0	91.0	100
129	0	9.0	16.0	22.0	27.0	32.0	37.0	41.0	45.0	48.0	51.0	53.0	55.0	56.0	57.0	58.0	59.0	61.0	64.0	68.0	73.0	79.0	89.0	90.0	100
130	0	10.0	20.0	28.0	35.0	41.0	46.0	49.0	51.0	53.0	55.0	56.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0	65.0	69.0	74.0	81.0	90.0	100
131	0	8.0	15.0	22.0	28.0	33.0	38.0	41.0	44.0	47.0	49.0	51.0	53.0	55.0	56.0	58.0	59.0	60.0	63.0	65.0	69.0	75.0	84.0	92.0	100
132	0	10.0	18.0	25.0	29.0	33.0	36.0	39.0	41.0	42.0	44.0	45.0	46.0	47.0	48.0	49.0	51.0	53.0	56.0	59.0	64.0	70.0	80.0	90.0	100
133	0	8.0	16.0	24.0	32.0	40.0	46.0	51.0	54.0	56.0	57.0	58.0	58.0	59.0	59.0	60.0	60.0	61.0	62.0	64.0	68.0	74.0	83.0	91.0	100
134	0	12.0	22.0	31.0	39.0	45.0	49.0	52.0	54.0	55.0	56.0	56.0	56.0	56.0	57.0	57.0	57.0	57.0	58.0	59.0	62.0	68.0	77.0	88.0	100
135	0	7.0	15.0	22.0	30.0	37.0	43.0	49.0	53.0	55.0	57.0	58.0	59.0	60.0	61.0	62.0	63.0	65.0	67.0	70.0	74.0	79.0	85.0	92.0	100
136	0	11.0	21.0	29.0	37.0	44.0	50.0	55.0	57.0	59.0	60.0	60.0	60.0	60.0	61.0	61.0	61.0	62.0	63.0	64.0	67.0	71.0	78.0	89.0	100
137	0	10.0	18.0	25.0	30.0	39.0	46.0	51.0	54.0	57.0	58.0	59.0	59.0	60.0	60.0	60.0	61.0	62.0	63.0	64.0	67.0	72.0	80.0	90.0	100
138	0	11.0	22.0	31.0	39.0	46.0	52.0	56.0	58.0	59.0	60.0	61.0	61.0	61.0	61.0	62.0	62.0	62.0	63.0	64.0	66.0	71.0	78.0	89.0	100
139	0	8.0	14.0	20.0	25.0	32.0	37.0	42.0	47.0	50.0	53.0	55.0	56.0	58.0	59.0	61.0	63.0	64.0	66.0	68.0	71.0	76.0	85.0	93.0	100
140	0	13.0	18.0	43.0	56.0	65.0	69.0	69.4	69.7	70.1	70.4	70.8	71.1	71.5	71.9	72.2	72.6	73.0	73.3	73.6	74.0	76.0	81.0	89.0	100