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Illinois State Water Survey

WATER RESOURCES BUILDING MAIL: BOX 232. URBANA. ILLINOIS 61801 AREA CODE 217
605 E. SPRINGFIELD, CHAMPAIGN PHONE 333-2210

WILLIAM C. ACKERMANN, CHIEF

Subject: Technical Letter 13
Rainfall Frequencies

December 1970

This letter is a re-issue of Illinois rainfall frequency-relations that were presented in Technical Letter 1 (February 1959) and Technical Letter 4 (March 1960), which are now out of print. These data remain valid and have been combined here for convenience.

Tables 1, 2, and 3 provide point frequencies of 5 to 60 minutes, 1 to 18 hours, and 1 to 10 days, respectively, for each of the four sections of the state (see figure 1) having similar storm rainfall characteristics. Values presented in the tables were developed from station records of maximum yearly rainfall, and represent maximum-period rather than clock-hour or calendar-day amounts. Amounts apply to a point location, and within 5 percent limits, to areas up to 10 square miles.

Use of the tables is illustrated by this example for table 1: Assume that one wishes to obtain an estimate of the maximum 30-minute rainfall amount that will be equaled or exceeded in an average 10-year period, or 5 times in 50 years, for any location in the Northwest Section. To obtain the desired rainfall value, enter table 1 at a recurrence interval of 10 years under the Northwest Section and move horizontally to the column for 30-minute storm periods. This procedure yields a value of 1.50 inches. Other combinations of recurrence interval and storm period within any section can be obtained in the same manner.

These frequency values are based on mathematical relations discussed in Water Survey Bulletin 46 by F. A. Huff and J. C. Neill and on data presented in U. S. Weather Bureau Technical Papers 24 and 25. If additional materials are desired, please let us know.

Very truly yours,



William C. Ackermann

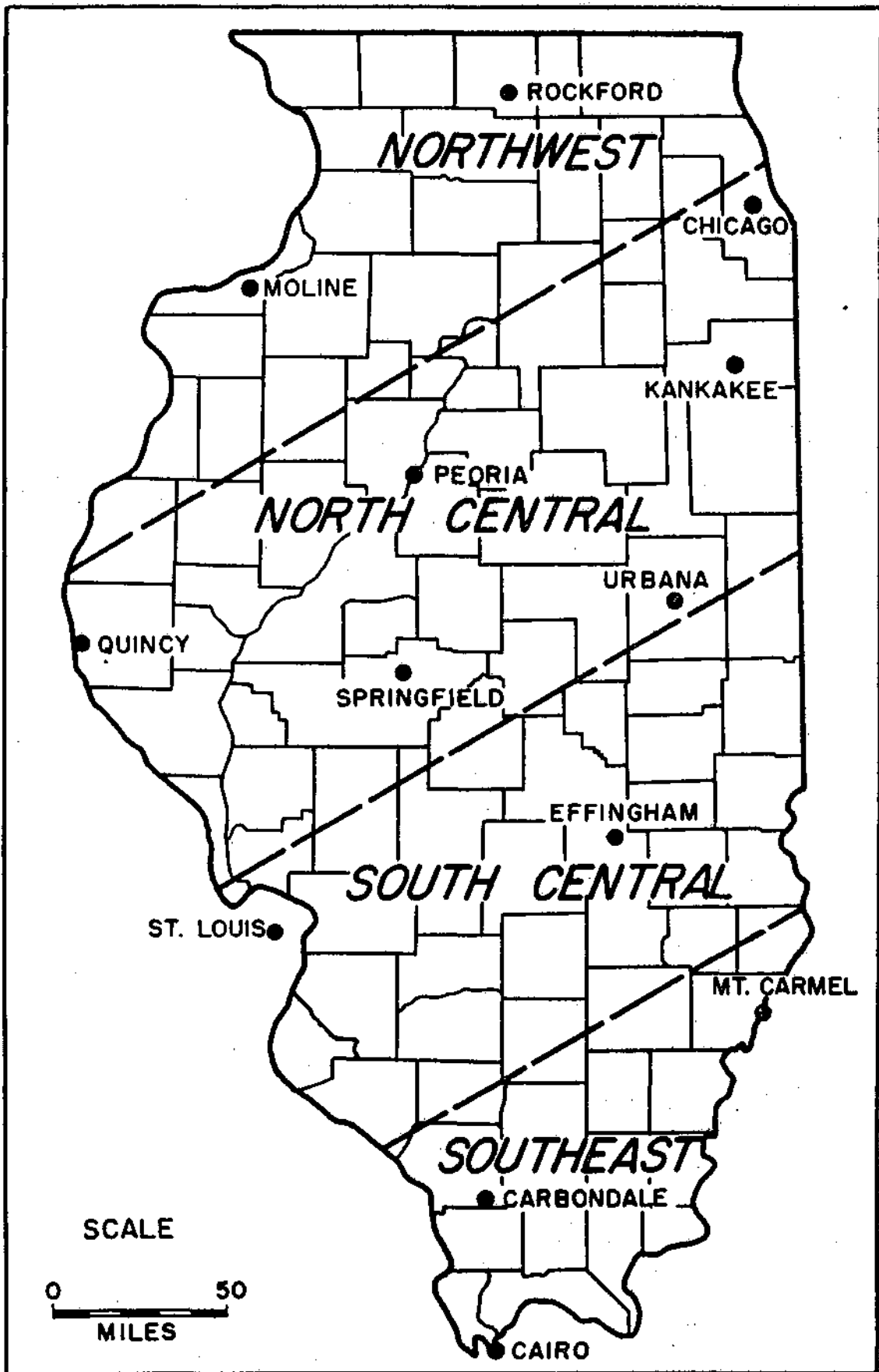


Fig. 1.- Sections of state according to rainfall frequencies

TABLE 1
AVERAGE RAINFALL FREQUENCY FOR STORM PERIODS
OF 5 TO 60 MINUTES

<u>Average Recurrence Interval (years)</u>	<u>Northwest Section</u>							
	<u>Depth (inches) for Given Storm Period (minutes)</u>							
	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>
2	0.35	0.55	0.70	0.80	0.95	1.10	1.20	1.25
5	0.40	0.70	0.90	1.05	1.25	1.40	1.55	1.65
10	0.50	0.90	1.10	1.25	1.50	1.70	1.90	2.00
25	0.65	1.15	1.40	1.60	1.95	2.25	2.45	2.60
50	0.75	1.35	1.65	1.90	2.35	2.65	2.95	3.15
100	0.90	1.50	1.90	2.20	2.65	3.00	3.30	3.55
	<u>North Central Section</u>							
2	0.35	0.55	0.70	0.80	0.95	1.10	1.20	1.25
5	0.40	0.65	0.85	1.00	1.25	1.35	1.45	1.55
10	0.50	0.80	1.00	1.20	1.45	1.60	1.75	1.95
25	0.60	1.00	1.25	1.45	1.75	1.95	2.15	2.35
50	0.70	1.15	1.45	1.65	2.00	2.30	2.50	2.65
100	0.80	1.30	1.65	1.90	2.35	2.65	2.90	3.10
	<u>South Central Section</u>							
2	0.35	0.55	0.70	0.80	0.95	1.10	1.20	1.25
5	0.40	0.70	0.90	1.05	1.25	1.40	1.55	1.65
10	0.50	0.85	1.05	1.25	1.50	1.65	1.80	1.95
25	0.65	1.10	1.35	1.60	1.95	2.20	2.40	2.55
50	0.80	1.30	1.65	1.90	2.35	2.65	2.90	3.10
100	0.95	1.55	1.90	2.20	2.70	3.10	3.40	3.60
	<u>Southeast Section</u>							
2	0.35	0.60	0.75	0.90	1.05	1.15	1.25	1.35
5	0.45	0.75	0.95	1.15	1.35	1.55	1.65	1.80
10	0.55	0.90	1.15	1.35	1.60	1.85	2.00	2.15
25	0.70	1.15	1.45	1.70	2.05	2.35	2.50	2.65
50	0.85	1.40	1.75	2.05	2.50	2.85	3.10	3.25
100	1.05	1.70	2.10	2.45	3.00	3.40	3.70	3.95

TABLE 2

AVERAGE RAINFALL FREQUENCY FOR STORM PERIODS
OF 1 TO 18 HOURS

Average Recurrence Interval (years)	<u>Northwest Section</u>					
	Depth (inches) for Given Storm Periods (hours)					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>12</u>	<u>18</u>
2	1.2	1.4	1.5	1.8	2.2	2.4
5	1.7	2.0	2.2	2.6	3.1	3.4
10	2.0	2.4	2.7	3.2	3.7	4.1
25	2.6	3.1	3.4	4.1	4.8	5.4
50	3.2	3.8	4.2	4.9	5.8	6.7
100	3.6	4.5	4.8	5.8	6.9	7.8

	<u>North Central Section</u>					
	Depth (inches) for Given Storm Periods (hours)					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>12</u>	<u>18</u>
2	1.2	1.4	1.5	1.8	2.1	2.4
5	1.5	1.8	2.0	2.4	2.8	3.1
10	1.9	2.2	2.5	2.9	3.5	3.8
25	2.3	2.7	3.1	3.6	4.3	4.7
50	2.6	3.2	3.5	4.3	5.1	5.5
100	3.1	3.7	4.2	5.0	5.9	6.7

	<u>South Central Section</u>					
	Depth (inches) for Given Storm Periods (hours)					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>12</u>	<u>18</u>
2	1.2	1.5	1.7	2.0	2.3	2.5
5	1.6	1.9	2.2	2.6	3.1	3.4
10	1.9	2.3	2.6	3.1	3.7	4.1
25	2.5	2.9	3.3	4.0	4.8	5.3
50	3.1	3.7	4.1	4.9	5.8	6.4
100	3.6	4.4	4.9	5.9	7.0	7.8

	<u>Southeast Section</u>					
	Depth (inches) for Given Storm Periods (hours)					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>12</u>	<u>18</u>
2	1.4	1.7	1.9	2.2	2.8	3.0
5	1.8	2.1	2.4	2.9	3.5	3.8
10	2.2	2.6	2.9	3.5	4.2	4.6
25	2.7	3.3	3.6	4.4	5.2	5.8
50	3.3	3.9	4.3	5.2	5.9	6.7
100	4.0	4.7	5.2	6.3	7.4	8.2

TABLE 3

AVERAGE RAINFALL FREQUENCY FOR STORM PERIODS
OF 1 TO 10 DAYS

Average Recurrence Interval (years)	<u>Northwest Section</u>				
	Depth (inches) for Given Storm Periods (days)				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>	<u>10</u>
2	2.6	2.9	3.1	3.5	4.2
5	3.6	3.9	4.2	4.8	5.8
10	4.4	4.8	5.3	6.0	7.1
25	5.7	6.2	6.9	7.8	9.3
50	7.2	7.5	8.4	9.4	11.4
100	8.4	9.2	10.0	11.2	13.2

	<u>North Central Section</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>	<u>10</u>
	2	2.6	2.8	3.0	3.4
5	3.4	3.7	4.0	4.5	5.5
10	4.0	4.4	4.8	5.6	6.7
25	5.1	5.6	6.2	7.0	8.5
50	6.1	6.6	7.3	8.2	9.9
100	7.2	7.9	8.7	9.9	11.8

	<u>South Central Section</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>	<u>10</u>
	2	2.7	3.0	3.3	3.8
5	3.7	4.0	4.4	5.2	6.3
10	4.5	4.9	5.5	6.3	7.7
25	5.8	6.3	7.0	8.0	9.8
50	7.0	7.5	8.4	9.5	11.7
100	8.4	9.1	10.0	11.5	13.9

	<u>Southeast Section</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>	<u>10</u>
	2	3.2	3.4	3.7	4.2
5	4.2	4.5	4.9	5.7	6.8
10	4.9	5.4	6.0	6.8	8.1
25	6.3	6.8	7.6	8.5	10.3
50	7.3	7.9	8.6	9.7	11.7
100	8.8	9.5	10.4	11.9	14.3