for estimating flood magnitude	standard error (logs)	standard error (percent)	(percent)	record	
$Q_2 = 2.56A^{0.667}S^{0.211}SH^{0.208}$	0.1296	31	33	3	(24)
$Q_5 = 4.16A^{0.688}S^{0.289}SH^{0.252}$	.1217	29	31	4	(25)
$Q_{10} = 5.25A^{0.699}S^{0.334}SH^{0.270}$	.1281	30	33	4	(26)
$Q_{25} = 6.67A^{0.710}S^{0.385}SH^{0.286}$	.1432	34	37	4	(27)
$Q_{50} = 7.72A^{0.717}S^{0.418}SH^{0.295}$	.1575	38	41	4	(28)
$Q_{100} = 8.76A^{0.723}S^{0.448}SH^{0.302}$	.1726	41	45	4	(29)
$Q_{500} = 11.2A^{0.735}S^{0.510}SH^{0.316}$	.2100	51	56	4	(30)

where,

Q_x is the estimated discharge for the indicated recurrence interval x, in cubic meters per second,
A is contributing drainage area, in square kilometers,
S is channel slope, in meters per kilometer, and
SH is the basin shape factor (contributing drainage area divided by the square of the channel length).

Table 5. Matrix $\{X^T\Lambda^{-1}X\}^{-1}$ for equations 3 to 30

[These matrices can be used to compute the standard error of a prediction and prediction intervals as explained in the text. Numbers are given in scientific notation-- for example, 0.43958E-01 = $0.43958*10^{-1}$ = 0.043958]

Region A:

2-year recurrence interval

0.43958E-01 -0.84934E-02 -0.20778E-01

-0.84934E-02 0.19881E-02 0.38672E-02

-0.20778E-01 0.38672E-02 0.10470E-01

5-year recurrence interval

0.28758E-01 -0.55300E-02 -0.13505E-01

-0.55300E-02 0.12892E-02 0.25086E-02

-0.13505E-01 0.25086E-02 0.68686E-02

10-year recurrence interval

0.28131E-01 -0.53942E-02 -0.13171E-01

-0.53942E-02 0.12524E-02 0.24421E-02

-0.13171E-01 0.24421E-02 0.67215E-02

25-year recurrence interval

0.32287E-01 -0.61810E-02 -0.15107E-01

-0.61810E-02 0.14299E-02 0.27960E-02

-0.15107E-01 0.27960E-02 0.77168E-02

50-year recurrence interval

0.37561E-01 -0.71885E-02 -0.17591E-01

-0.71885E-02 0.16605E-02 0.32527E-02

-0.17591E-01 0.32527E-02 0.89802E-02

100-year recurrence interval

0.44122E-01 -0.84452E-02 -0.20693E-01

-0.84452E-02 0.19493E-02 0.38241E-02

-0.20693E-01 0.38241E-02 0.10554E-01

500-year recurrence interval

0.63179E-01 -0.12103E-01 -0.29736E-01

-0.12103E-01 0.27925E-02 0.54910E-02

-0.29736E-01 0.54910E-02 0.15129E-01

Region B:

2-year recurrence interval

0.71741E-01 -0.10264E-02 -0.27396E-01 -0.55925E-02

-0.10264E-02 0.66625E-03 0.53591E-03 0.22025E-02

-0.27396E-01 0.53591E-03 0.11417E-01 0.52948E-02

-0.55925E-02 0.22025E-02 0.52948E-02 0.16780E-01

5-year recurrence interval

0.68235E-01 -0.80566E-03 -0.26047E-01 -0.47717E-02

-0.80566E-03 0.62328E-03 0.42576E-03 0.20176E-02

-0.26047E-01 0.42576E-03 0.10838E-01 0.47109E-02

-0.47717E-02 0.20176E-02 0.47109E-02 0.15313E-01

10-year recurrence interval

0.71592E-01 -0.69766E-03 -0.27276E-01 -0.44413E-02

-0.69766E-03 0.63613E-03 0.37304E-03 0.20232E-02

-0.27276E-01 0.37304E-03 0.11313E-01 0.45948E-02

-0.44413E-02 0.20232E-02 0.45948E-02 0.15311E-01

25-year recurrence interval

0.79089E-01 -0.59322E-03 -0.30067E-01 -0.42279E-02

-0.59322E-03 0.68129E-03 0.32433E-03 0.21243E-02

-0.30067E-01 0.32433E-03 0.12423E-01 0.46561E-02

-0.42279E-02 0.21243E-02 0.46561E-02 0.16005E-01

50-year recurrence interval

0.86212E-01 -0.53420E-03 -0.32741E-01 -0.41977E-02

-0.53420E-03 0.73047E-03 0.29900E-03 0.22517E-02

-0.32741E-01 0.29900E-03 0.13500E-01 0.48209E-02

-0.41977E-02 0.22517E-02 0.48209E-02 0.16906E-01

100-year recurrence interval

0.94265E-01 -0.48791E-03 -0.35780E-01 -0.42600E-02

-0.48791E-03 0.78990E-03 0.28143E-03 0.24146E-02

-0.35780E-01 0.28143E-03 0.14733E-01 0.50675E-02

-0.42600E-02 0.24146E-02 0.50675E-02 0.18066E-01

Table 5. Matrix $(X^T\Lambda^{-1}X)^{-1}$ for equations 3 to 30 --Continued

[These matrices can be used to compute the standard error of a prediction and prediction intervals as explained in the text. Numbers are given in scientific notation-- for example, 0.43958E-01 = $0.43958*10^{-1}$ = 0.043958]

Region C:

2-year recurrence interval

0.21520E-02	-0.55105E-03
-0.55105E-03	0.37088E-03

5-year recurrence interval

0.20390E-02	-0.49713E-03
-0.49713E-03	0.31981E-03

10-year recurrence interval

0.21528E-02	-0.50282E-03
-0.50282E-03	0.31368E-03

25-year recurrence interval

0.23786E-02	-0.52920E-03
-0.52920E-03	0.31993E-03

50-year recurrence interval

0.25786E-02	-0.55765E-03
-0.55765E-03	0.33140E-03

100-year recurrence interval

0.27968E-02	-0.59216E-03
-0.59216E-03	0.34758E-03

500-year recurrence interval

0.33659E-02	-0.69466E-03
-0.69466E-03	0.40158E-03

Region D:

2-year recurrence interval

0.93999E-02	-0.26700E-03	-0.48218E-02	0.68313E-02
-0.26700E-03	0.83050E-03	0.46865E-03	0.13276E-02
-0.48218E-02	0.46865E-03	0.47968E-02	-0.29897E-02
0.68313E-02	0.13276E-02	-0.29897E-02	0.84803E-02

5-year recurrence interval

0.85561E-02	-0.24462E-03	-0.43541E-02	0.61836E-02
-0.24462E-03	0.75456E-03	0.42541E-03	0.12024E-02
-0.43541E-02	0.42541E-03	0.44801E-02	-0.27184E-02
0.61836E-02	0.12024E-02	-0.27184E-02	0.76528E-02

10-year recurrence interval

0.96985E-02	-0.27568E-03	-0.49568E-02	0.69997E-02
-0.27568E-03	0.85455E-03	0.48133E-03	0.13624E-02
-0.49568E-02	0.48133E-03	0.51587E-02	-0.31018E-02
0.69997E-02	0.13624E-02	-0.31018E-02	0.86492E-02

25-year recurrence interval

0.12282E-01	-0.34491E-03	-0.63471E-02	0.88849E-02
-0.34491E-03	0.10878E-02	0.61047E-03	0.17393E-02
-0.63471E-02	0.61047E-03	0.66297E-02	-0.39767E-02
0.88849E-02	0.17393E-02	-0.39767E-02	0.10994E-01

50-year recurrence interval

0.14772E-01	-0.41120E-03	-0.77027E-02	0.10720E-01
-0.41120E-03	0.13169E-02	0.73657E-03	0.21108E-02
-0.77027E-02	0.73657E-03	0.80380E-02	-0.48274E-02
0.10720E-01	0.21108E-02	-0.48274E-02	0.13297E-01

100-year recurrence interval

0.17621E-01	-0.48670E-03	-0.92666E-02	0.12832E-01
-0.48670E-03	0.15822E-02	0.88219E-03	0.25423E-02
-0.92666E-02	0.88219E-03	0.96486E-02	-0.58075E-02

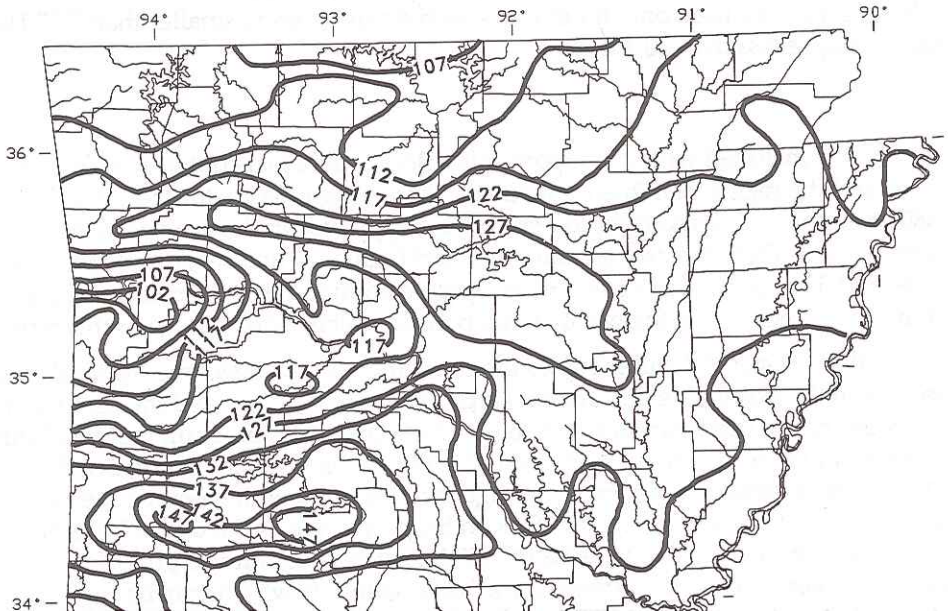
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Table 6. Root mean square error comparison results

Region	Recurrence interval	Region of Influence method (percent)	Regional regression equations method (percent)
A	Q_2	35.7	42.4
	Q_5	27.4	32.9
	Q_{10}	26.7	32.1
	Q_{25}	28.2	34.6
	Q_{50}	31.0	37.8
	Q_{100}	34.5	41.7
	Q_{500}	45.5	51.7
B	Q_2	32.2	41.3
	Q_5	26.6	39.6
	Q_{10}	27.0	40.1
	Q_{25}	29.6	41.6
	Q_{50}	26.7	43.4
	Q_{100}	34.8	45.6
	Q_{500}	42.2	51.9
C	Q_2	39.7	41.9
	Q_5	33.6	38.3
	Q_{10}	32.2	38.0
	Q_{25}	32.1	39.0
	Q_{50}	33.4	40.3
	Q_{100}	34.7	42.4
	Q_{500}	37.6	48.1
D	Q_2	41.2	29.8
	Q_5	37.4	27.9
	Q_{10}	37.4	29.7

where,

UQ_x is the peak discharge, in cubic feet per second, urban discharge for the urban watershed for the recurrence interval, x.

A is the contributing drainage area, in square miles.

S is the main channel slope, in feet per mile, measured between points which are 10 and 85 percent of the main channel length upstream from the study site. For sites where S is greater than 70 feet per mile, use 70 in the equations.

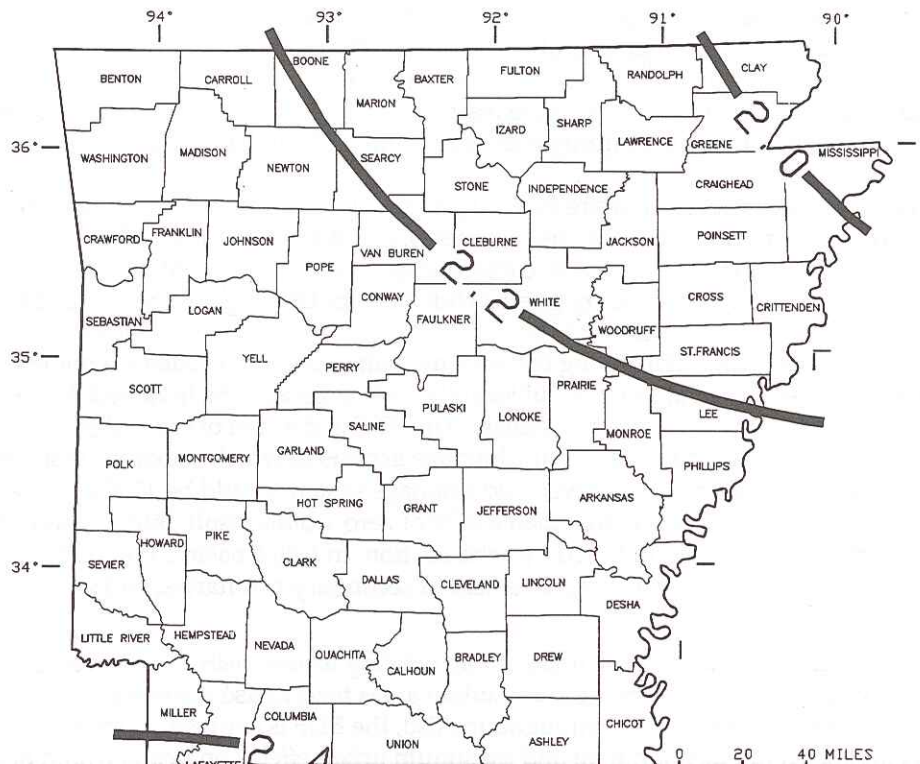
RI2 is rainfall intensity, in inches, for the 2-hour 2-year occurrence. The rainfall intensity for the 2-hour, 2-year occurrence is shown on figure 6 (Weather Bureau, 1961).

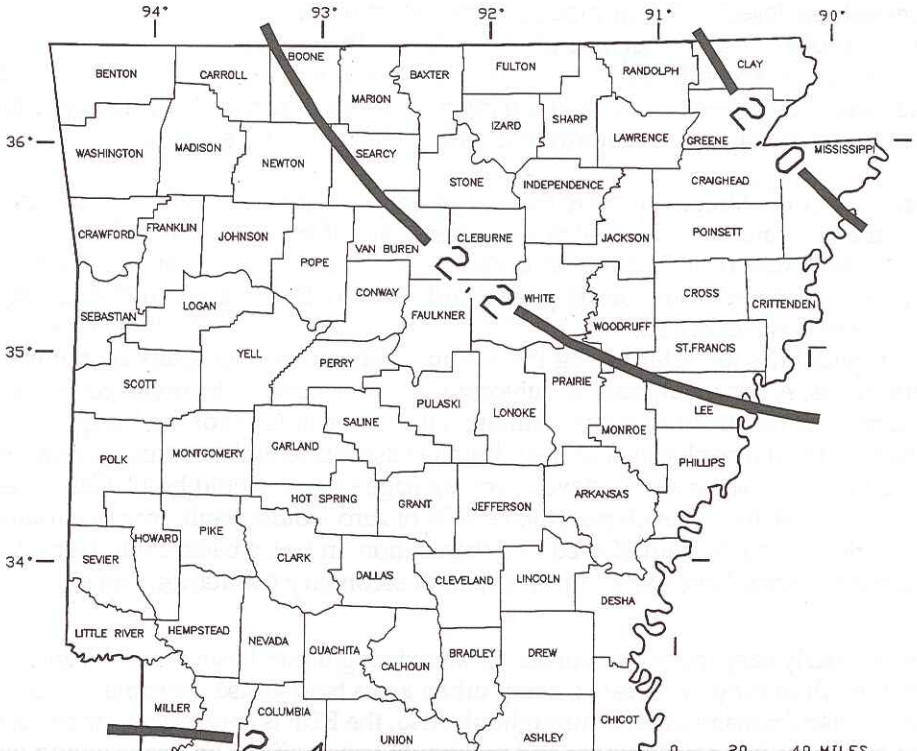
ST is basin storage, the percentage of the drainage basin occupied by lakes, reservoirs, swamps, and wetlands. In-channel storage of a temporary nature, resulting from detention ponds or roadway embankments, is not included in the computation of ST.

BDF is the basin development factor.

IA is the percentage of the drainage basin occupied by impervious surfaces, such as houses, buildings, streets, and parking lots.

RQ_x is the peak discharge, in cubic feet per second, for an equivalent rural drainage basin in the same hydrologic area as the urban basin, and for recurrence interval x.

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POPE
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CLEBURNE
JACKSON
POINSETT
CONWAY
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CROSS
CRITTENDEN
SEBASTIAN
LOGAN
FAULKNER
WOODRUFF
ST.FRANCIS
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SCOTT
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GRANT
JEFFERSON
ARKANSAS
HOWARD
PIKE
SEVIER
CLARK
DALLAS
CLEVELAND
LINCOLN
DESHA
LITTLE RIVER
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NEVADA
OUACHITA
CALHOUN
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