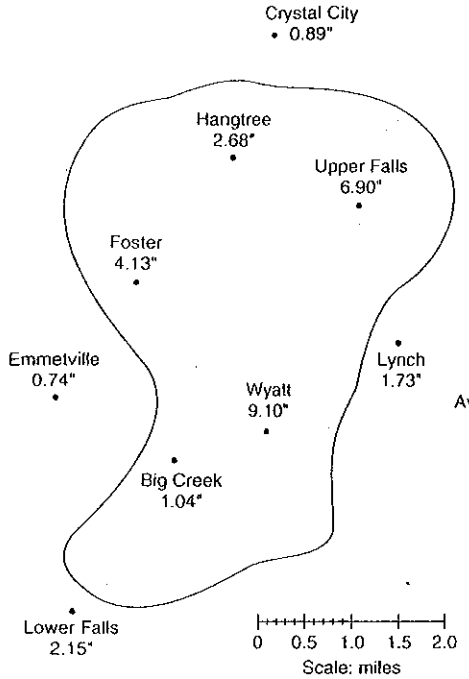
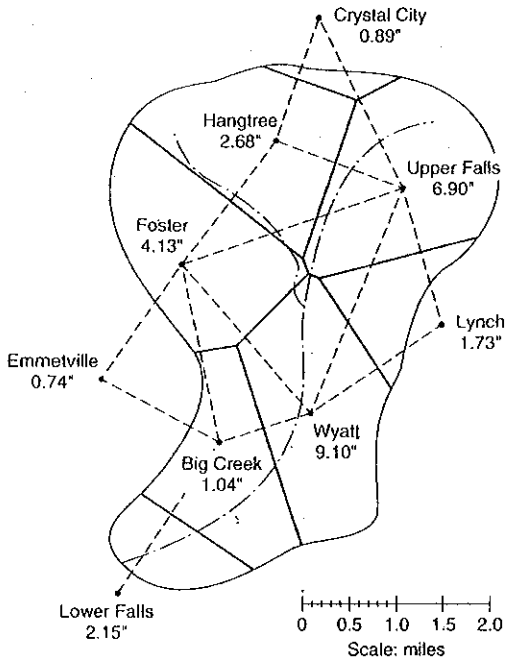


$$\text{Average rainfall} = \frac{0.89 + 2.68 + 6.90 + 4.13 + 1.73 + 0.74 + 1.04 + 9.10 + 2.15}{9}$$

$$= 3.26 \text{ in}$$

(*a*)

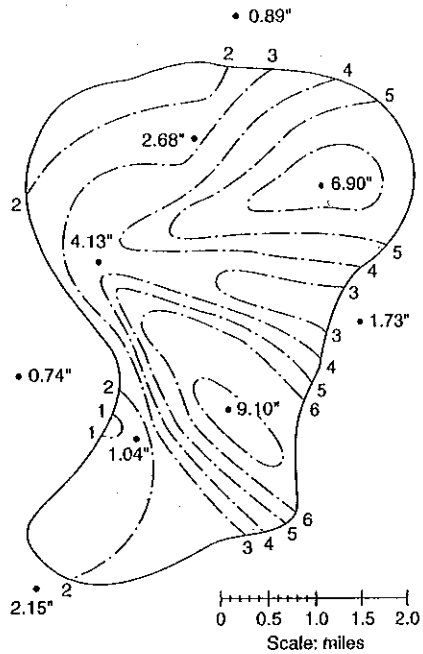


(1) Station	(2) Recorded Rainfall Depth P (in)	(3) Area A Represented by Station (mi^2)	(4) Rainfall Volume (mi^2-in)
Crystal City	0.89	0.21	0.187
Hangtree	2.68	2.82	7.558
Upper Falls	6.90	3.00	20.700
Foster	4.13	2.64	10.903
Lynch	1.73	1.00	1.730
Emmetville	0.74	0	0
Wyatt	9.10	2.94	26.754
Big Creek	1.04	2.07	2.153
Lower Falls	2.15	0.82	1.763
	Totals	15.50	71.748

$$\text{Average rainfall} = \frac{71.748}{15.50} = 4.63 \text{ in}$$

(*b*)

Figure 7.2.11 (*a*) Computation of areal average rainfall by the arithmetic-mean method for 24-hour storm. This is the simplest method of determining areal average rainfall. It involves averaging the rainfall depths recorded at a number of gauges. This method is satisfactory if the gauges are uniformly distributed over the area and the individual gauge measurements do not vary greatly about the mean (after Roberson et al. (1998)); (*b*) Computation of areal average rainfall by the Thiessen method for 24-hour storm. This method assumes that at any point in the watershed the rainfall is the same as that at the nearest gauge, so the depth recorded at a given gauge is applied out to a distance halfway to the next station in any direction. The relative weights for each gauge are determined from the corresponding areas of application in a *Thiessen polygon* network, the boundaries of the polygons being formed by the perpendicular bisectors of the lines joining adjacent gauges for J gauges, the area within the watershed assigned to each is A_j and P_j is the rainfall recorded at the jth gauge, the areal average precipitation for the watershed is where the watershed area (after Roberson et al. (1998)).



Rainfall Depth on Isohyet (in.)	Average Rainfall Depth (in.)	Area Between Isohyets (mi^2)	Rainfall Volume (mi^2-in.)
9.1			
	8.55	0.407	3.480
8.0			
	7.0	1.412	9.884
6.0			
	5.5	0.841 + 1.375 = 2.216	1.219
5.0			
	4.5	0.592 + 1.697 = 2.289	10.300
4.0			
	3.5	3.122	10.927
3.0			
	2.5	2.599 + 0.431 = 3.030	7.575
2.0			
	1.5	2.281	3.422
	1.0	0.05	0.050
1.0			
6.9			
	6.45	0.693	4.470
6.0			
	Totals	15.500	51.327

Average rainfall = $\frac{51.327}{15.50}$ = 3.31 in.

Figure 7.2.11 *(continued)* (*c*) Computation of areal average rainfall by the isohyetal method for 24-hour storm. This method constructs isohyets, using observed depths at rain gauges and interpolation between adjacent gauges. Where there is a dense network of rain gauges, isohyetal maps can be constructed using computer programs for automated contouring. Once the isohyetal map is constructed, the area A_j between each pair of isohyets, within the watershed, is measured and multiplied by the average, P_j of the rainfall depths of the two boundary isohyets to compute the areal average precipitation (after Roberson et al. (1998)).

SOURCE: Mays, L. W.
Water Resources Engineering
Wiley 2001