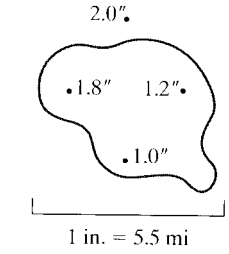
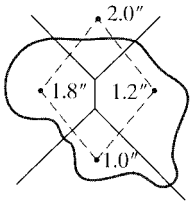
Lesson 6: Areal Precipitation

Application of Methods *[Bedient et al., 2012]*



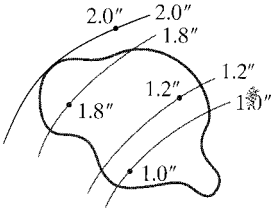
$$\frac{1.8 + 1.2 + 1.0}{3} = 1.33 \text{ in.}$$

(a) Arithmetic mean



P_i (in.)	A_i (mi^2)	A_i/A_r	$(P_i)(A_i/A_r)$ (in.)
2.0	1.5	0.064	0.13
1.8	7.2	0.305	0.55
1.2	5.1	0.216	0.26
1.0	9.8	0.415	0.42
Σ =	23.6	1.000	1.35 in.

(b) Thiessen polygon method



Isohyet (in.)	A (mi^2)	P_{av} (in.)	V (in.– mi^2)
2.0	5.1	1.9	9.69
1.8	9.8	1.5	14.7
1.2	3.1	1.1	3.41
1.0	5.6	0.5*	2.8
	23.6		30.6

Average rainfall = 30.6/23.6 = 1.30 in.

* Estimated

(c) Isohyetal method

Figure 1–16
The different rainfall averaging methods can produce different results for the same watershed.

Thiessen Polygon Method

The steps for creating the polygons and computing areal average precipitation are:

1. Plot stations on a map (drawn to scale)
2. Connect adjoining stations (dashed)
3. Construct perpendicular bisectors (solid)
4. Measure area within the basin for each gage
5. Multiply gage precipitation by weighting factor ($w_i = A_i/A$)
6. Sum weighted precipitation for all polygons

Isohyetal Method

The steps for creating the polygons and computing areal average precipitation are:

The steps for creating an isohyetal map and computing areal average precipitation are:

1. Plot stations on a map (drawn to scale)
2. Draw contours of equal precipitation (isohyets)
3. Measure area in basin between each contour (A_j)
4. Multiply area (A_j) by the average of the contour (isohyet) values (P_j)
5. Sum volumes for each contour interval and divide by total area (A)

Storm Analysis for the 28-29 May 1962 Ralston Creek Flood