

Precipitation - Runoff Relationship

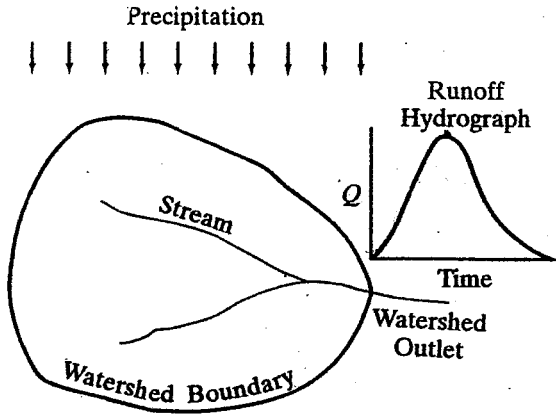


Figure 8.1 The runoff at a location results from precipitation falling on the watershed above that location.

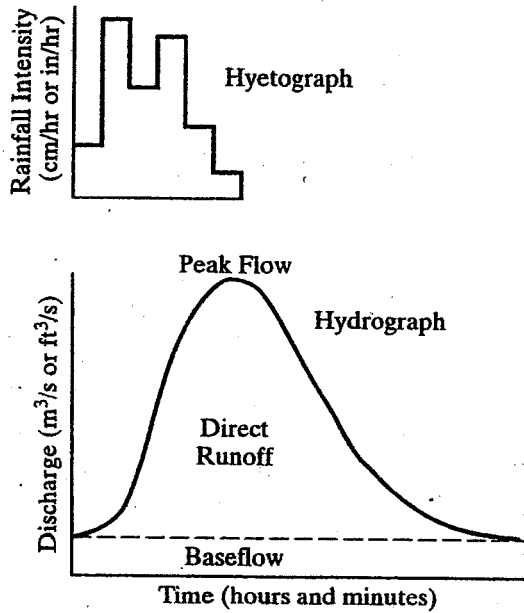


Figure 8.2 The direct runoff portion of the streamflow hydrograph results from the rainfall hyetograph.

SOURCE: Wurbs & James, 2002

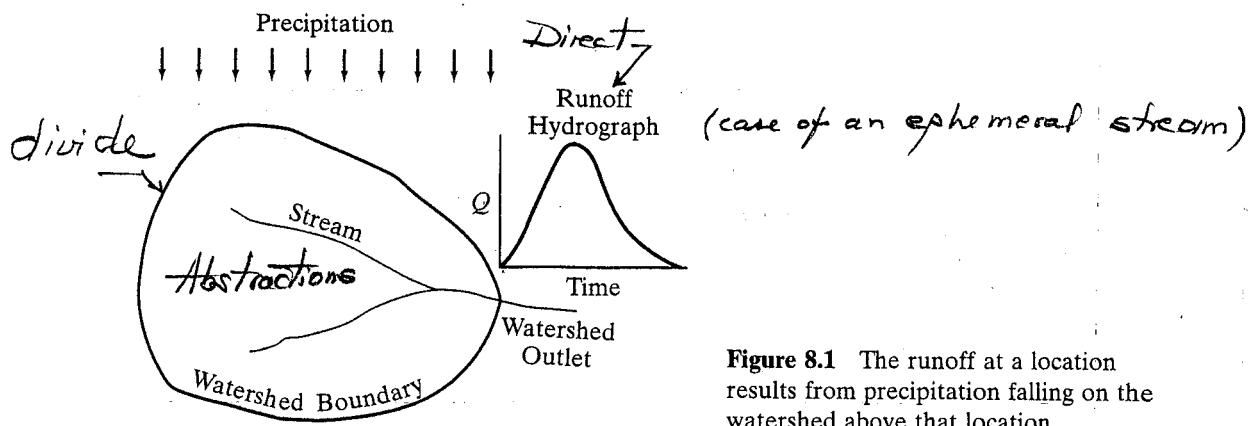


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Abstractions: interception, depression storage, infiltration, and ET

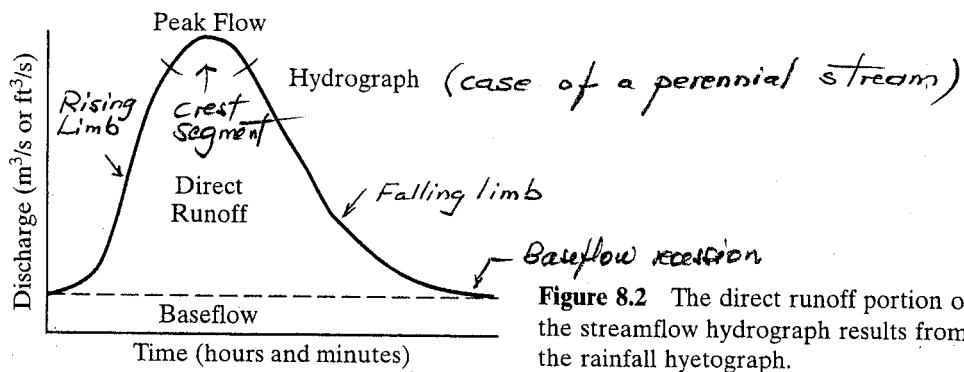
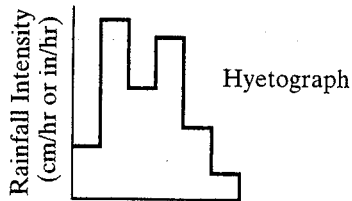


Figure 8.2 The direct runoff portion of the streamflow hydrograph results from the rainfall hyetograph.

Baseflow \Rightarrow from previous precip. that infiltrated to become groundwater flow

SOURCE: Wurbs & James, 2002

8.3.2 Lag Time

Lag t_L is sometimes viewed as the time between the center of mass of rainfall and center of mass of the runoff hydrograph. However, more typically, t_L is defined as the time between the center of mass of the rainfall and peak of the hydrograph, as illustrated in Fig. 8.5. The t_L can be measured directly from gaged precipitation and streamflow data. However, the primary application of t_L is as a parameter in synthetic unit hydrographs for ungaged watersheds as discussed in Section 8.6. The t_L characterizing an ungaged watershed must be estimated using information available from maps and field surveys, empirical equations or concentration time, t_c , if known:

$$t_L = 0.6 t_c \quad \text{or} \quad t_c = \frac{5}{3} t_L \quad (8.2)$$

Regardless of the method adopted, estimates of t_L and t_c for ungaged watersheds are necessarily approximate and require considerable engineering judgment.

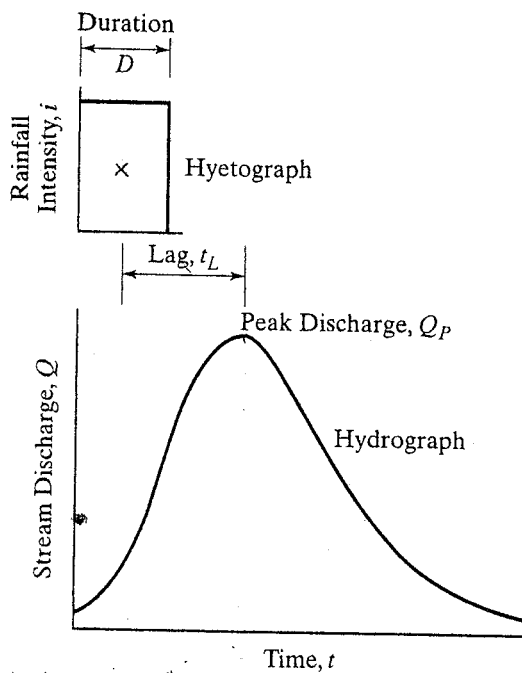


Figure 8.5 The basin lag t_L is the time from the center of mass of the rainfall to the peak of the hydrograph.

SOURCE: *Worbs & James, 2002*