

A runoff hydrograph is a continuous plot of discharge (runoff rate) versus time at a catchment outlet, representing the total response to rainfall, including surface runoff, interflow, and groundwater base flow. It is essential for flood forecasting, reservoir design, and water management, showing the volume of runoff as the area under the curve.

Key Aspects of Runoff Hydrographs

Components: The total storm hydrograph includes direct runoff (surface runoff and quick interflow) and base flow (delayed groundwater contribution).

Direct Runoff Hydrograph (DRH): This shows only the quick response flow from the rainfall, derived by separating the base flow from the total storm hydrograph.

Key Factors: The shape of the hydrograph is governed by:

Storm characteristics: Rainfall intensity and duration.

Catchment characteristics: Shape, size, slope, and land use.

Base Flow Separation: Common methods to isolate direct runoff include the straight-line method, which connects the start of runoff to a point on the recession curve.

Effective Rainfall: The DRH is directly related to the effective rainfall (total rainfall minus infiltration/losses).

Hydrograph Components:

Rising Limb: Increases flow as surface runoff reaches the outlet.

Peak Discharge: Maximum flow rate.

Recession Curve: Decreases flow as runoff decreases, representing storage depletion.