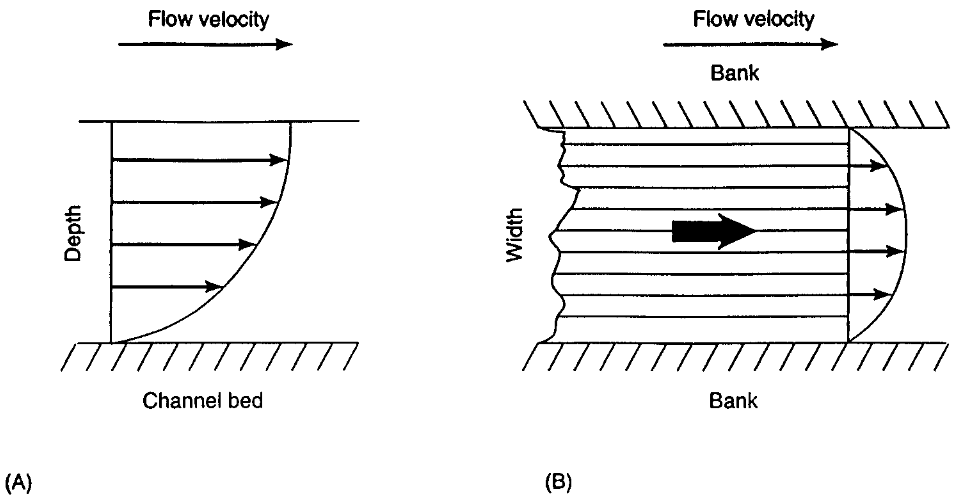

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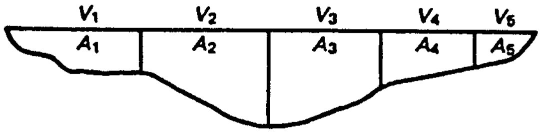
FIGURE 6.1

Diagram showing the changes in flow velocity with (A) flow depth and (B) flow width. Resistance to flow along the bed and banks allows the greatest velocities to occur toward the center of the channel near the water surface.



subareas of velocity domains.

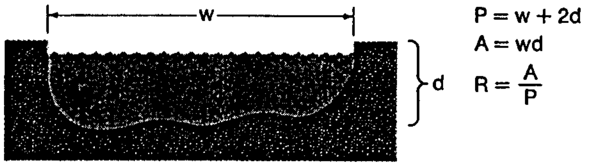


FIGURE 6.2

Cross-sectional measurements of a stream channel: w = width, d = depth, A = area, R = hydraulic radius, P = distance along wetted perimeter.

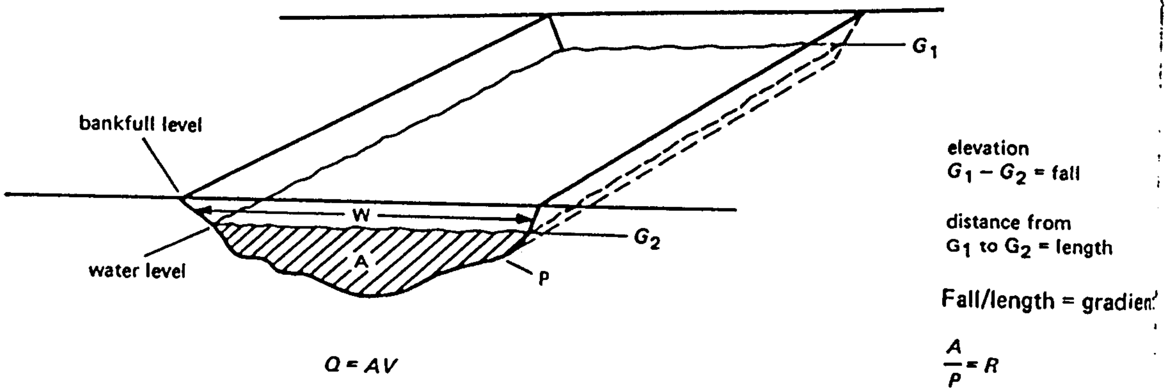


Figure 9.2. Nomenclature of channel morphology.

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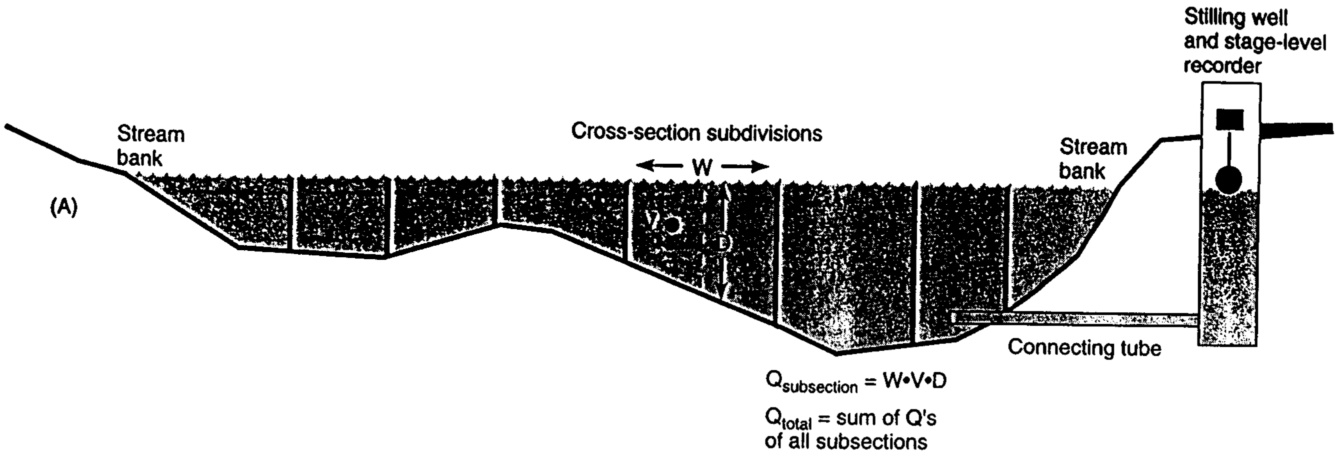

(D)

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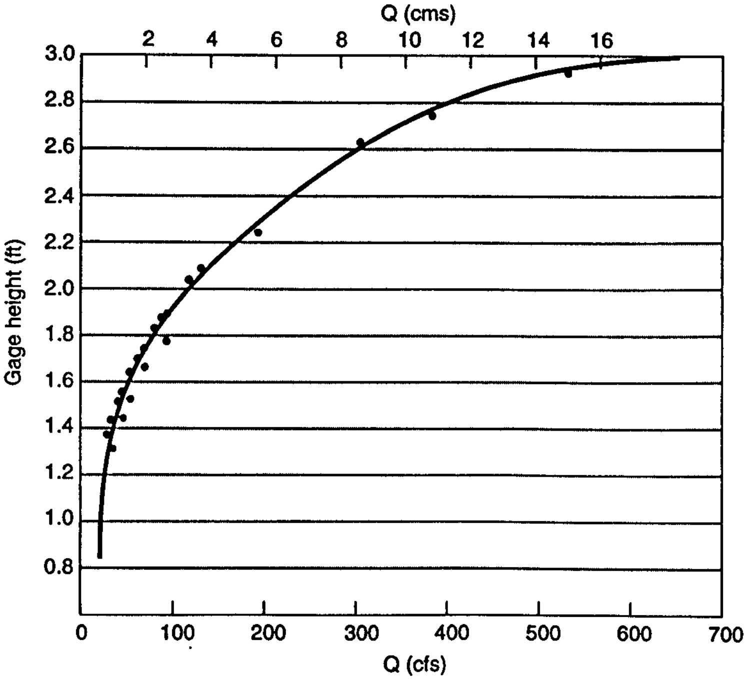
FIGURE 5.33

Rating curve for low flow. Rock Creek near Red Lodge, Mont.



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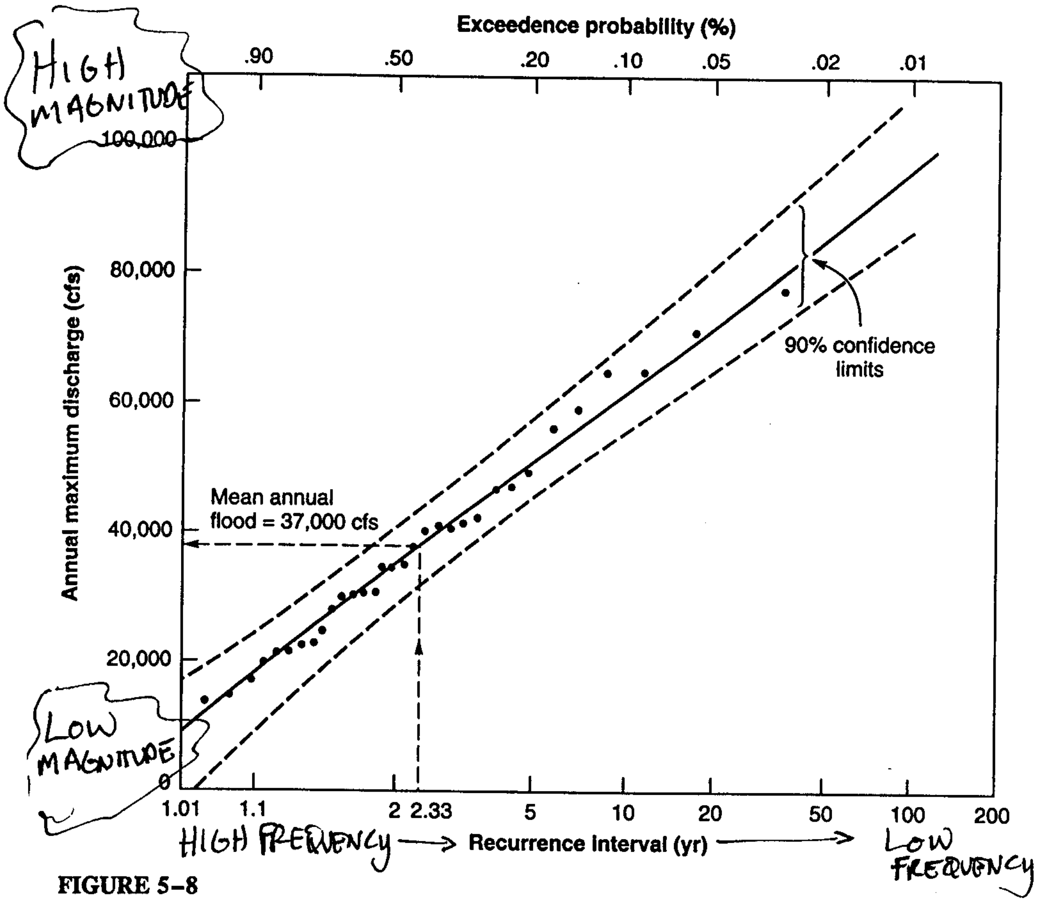

FIGURE 5–8
Flood frequency curve for annual floods on the Skykomish River, Washington. Dashed lines are 90-percent confidence limits. (Data from U.S. Geological Survey; plot from Dunne and Leopold, 1978)

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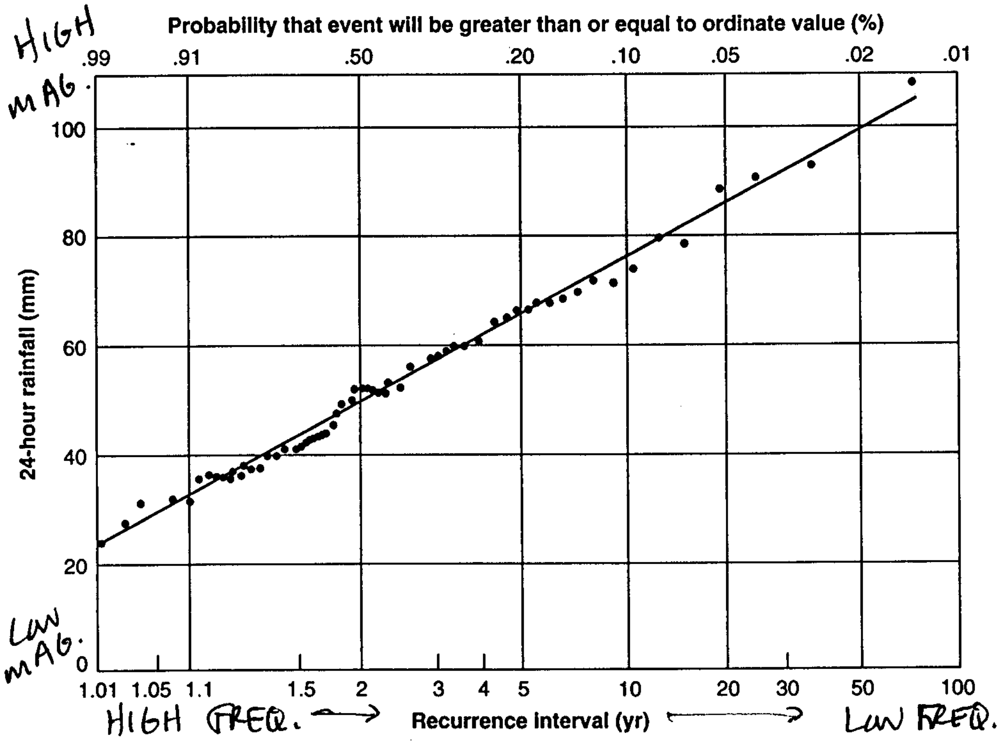

FIGURE 5–1
Recurrence interval of 24-hour precipitation, Buffalo, New York, 1891–1961. (From Dunne and Leopold, 1978)

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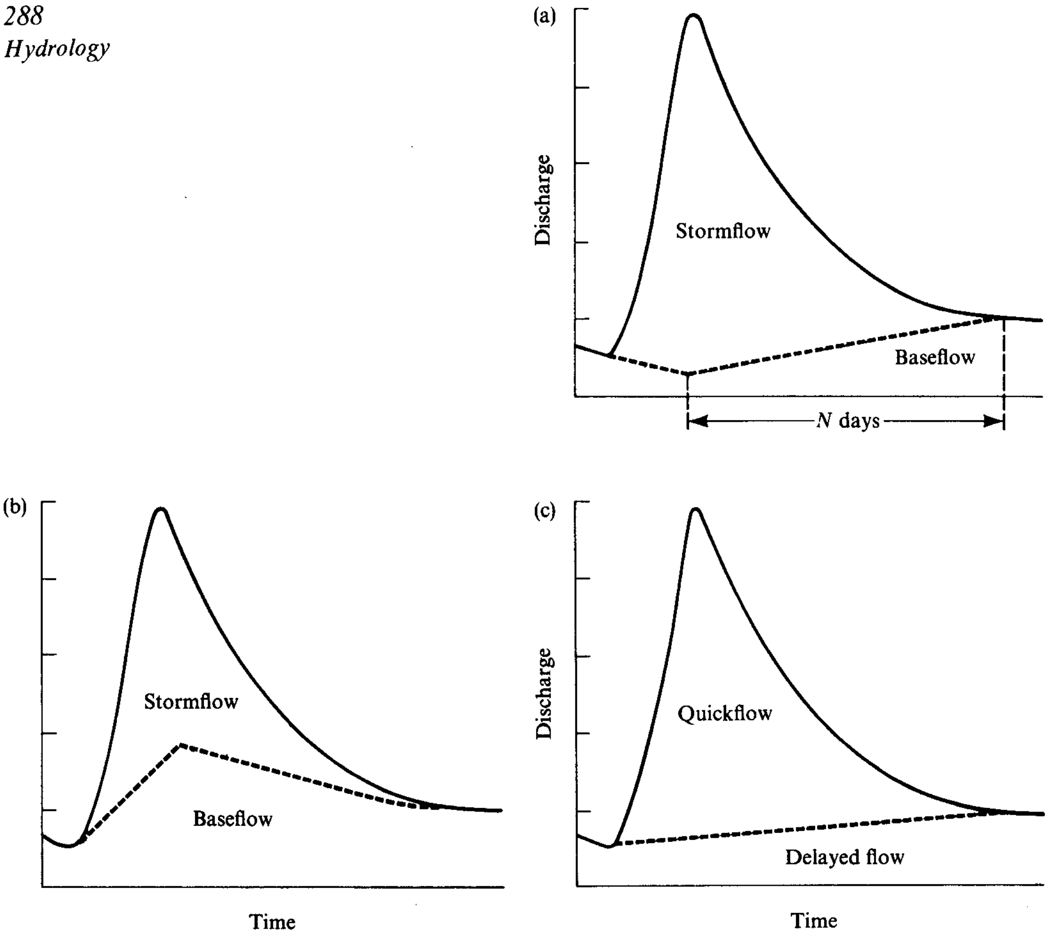

Figure 10-4 Methods of hydrograph separation. (a) Project the pre-storm baseflow under the peak. Draw the separation line rising from beneath the peak to a point on the recession limb that is N days after the peak, where N (days) $= A^{0.2}$ (sq mi). (b) Plot the hydrograph on semi-logarithmic paper with discharge on the logarithmic scale. Fit a straight line to the lower part of the recession limb on this paper and project it backward under the peak. Transfer the values on this line to arithmetic graph paper. Sketch a rising limb for the baseflow to meet the projected curve. (After Barnes 1939.) (c) From the point of initial rise, draw a line rising at a rate of 0.05 cfs per square mile of drainage basin per hour. For catchments smaller than 20 sq. mi. (After Hewlett and Hibbert 1967).

antecedent moisture conditions in the basin. Their predictive power can often be improved by incorporating an index of the antecedent wetness of the catchment. Such an index is often developed from the pre-storm baseflow (see Figure 10-6). In other applications the curves in Figure 10-6 could be labeled with values of an *antecedent precipitation index,* which indicates the effect of previous rainfall in wetting the soil and of natural drainage and

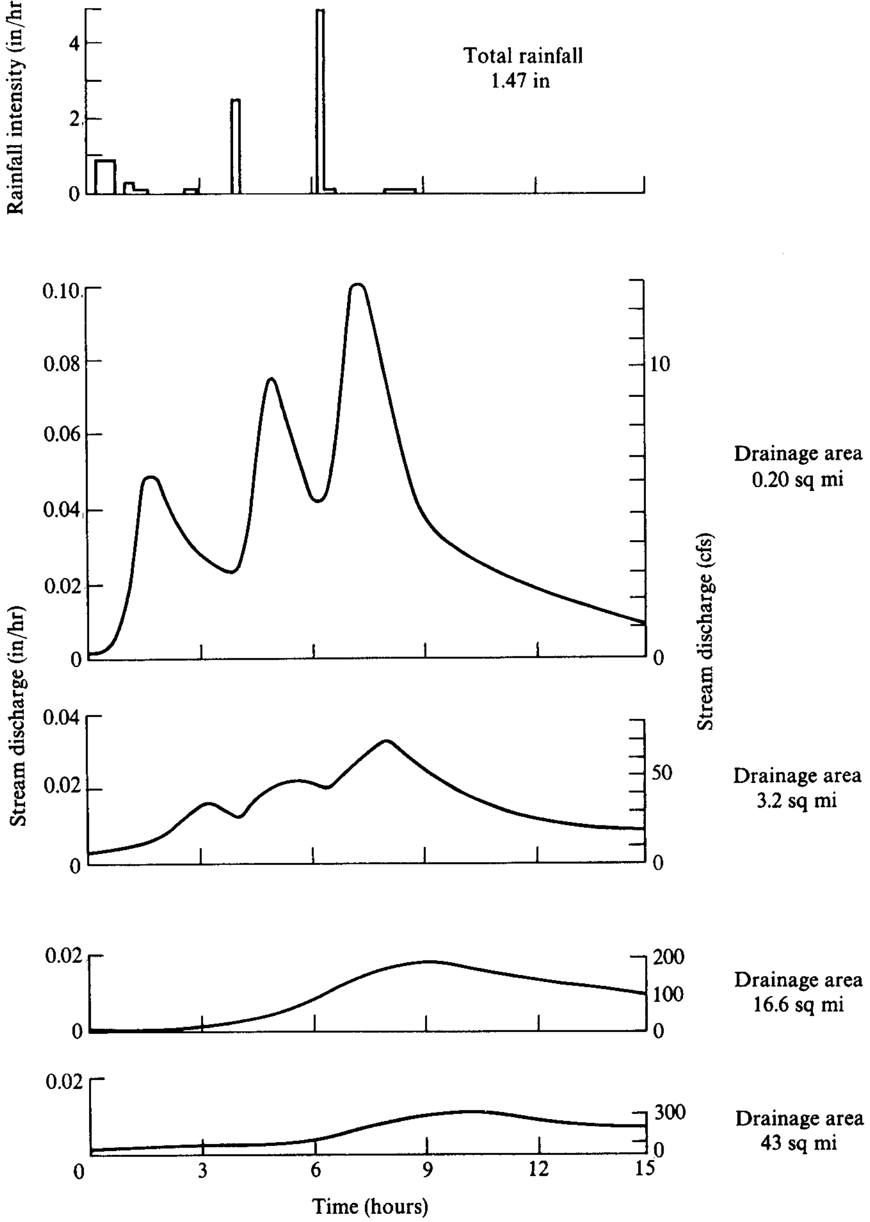

Figure 10-3 Changes in hydrograph shape at a series of stations along the Sleepers River, near Danville, Vermont. (Data from the Agricultural Research Service, U.S. Department of Agriculture.)

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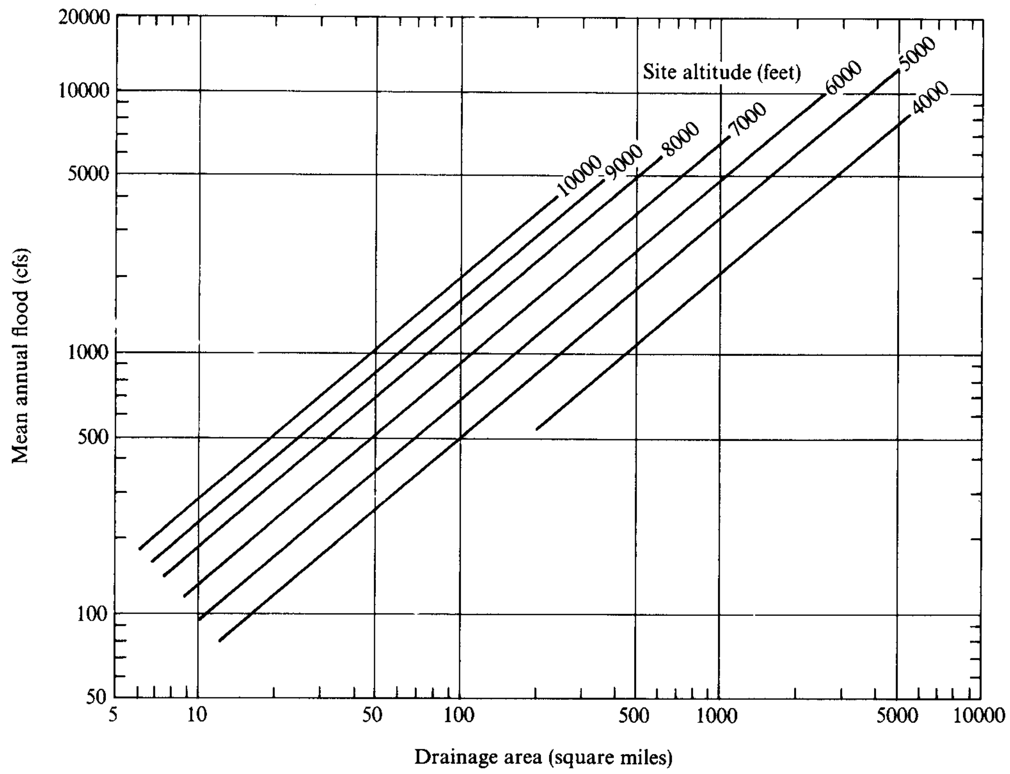

Figure 10-22 Variation of mean annual flood with drainage area and altitude of the gauging site for a region in northern Wyoming. Note that for a fixed altitude, $Q_{2.33}$ is proportional to $A^{0.85}$. (From Carter and Green 1963.)

values derived from nearby stations having the same topographic aspect, size, and vegetation characteristics as the area under study. Local data for the individual basin may be considered. Local residents can be asked how often the stream flows out of its banks and whether the frequency of overbank flow has changed in past decades.

Dalrymple's manual gives detailed instructions for the compilation of regional flood-frequency curves, including such matters as how to fill in gaps in the record of annual floods, how to adjust records of unequal length to a common base period, and how to adjust a short record by means of a longer one.

The regionalization of flood data for an area of uniform physiography can be extended to the analysis of flood heights. An example of the results of such an exercise is presented in Figure 10-23. Planners will immediately recognize the utility of such a graph. At any streamside site on which development is proposed, the drainage area can be measured from a topographic map. Reading upward from the drainage area on the abscissa of the