Drainage Basin Map of Montgomery County, Maryland

by L. Mayer

A drainage basin is a physiographic unit that includes all of the area contributing runoff to a stream. Each drainage basin is bounded by topographic divides that separate the drainage of adjacent basins. Many modern approaches to comprehensive land-use planning utilize the drainage basin as a basic reference unit to which earth-science and other data are related.

Each drainage basin of Montgomery County in its natural condition had a characteristic pattern of runoff, infiltration and evapo-transpiration. With clearing, cultivation, and other activities of man, this pattern has changed. During the process of development, increases in impervious area cause more surface-water runoff and less infiltration. More surface-water runoff creates problems of increased flooding, erosion, and siltation. Reduced infiltration affects the low flow of streams which depends on ground-water seepage to the stream channels. Different parts of each basin are susceptible to such problems in varying degrees. For example, urban development at the headwaters of a stream can degrade the floodplain and channel system throughout its length, whereas similar development near the mouth has less impact on the system. Similarly, pavement, roofs, and concrete strom-water runoff conduits in areas of high natural infiltration are more likely to cause increases in runoff than they would in areas of low infiltration.

By using the drainage basin map in conjunction with the county soils survey (Matthews and others, 1961) and the surface materials

map (Froelich, 1975a), areas of naturally low infiltration (clay-rich soils or shallow bedrock) in a given basin can be identified; conversely, naturally pervious areas of thick overburden with high infiltration capacity (Froelich, 1975b) can also be identified. By using the drainage basin map with a flood-prone area map and the shallow water table map (Richardson, 1976a),other sensitive or critical areas within a basin can be identified.

The drainage basin map provides a natural framework for the inventory of factors that are critical to urban development in a given basin. By superimposing a county map showing existing urban areas with extensive artificial surfaces and a map showing natural impervious surfaces onto the drainage basin map, new development proposals in any part of the basin can be assessed with regard to their potential impact on the entire basin. By avoiding development of those parts of the basin that are most sensitive to environmental disruption, the adverse impacts of urbanization on the drainage basin can be minimized.

Selected References

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