EXPLANATION

Percent slope is the vertical change in altitude per 100 feet of horizontal distance. For example, a 12 percent slope is a 12 foot vertical change in 100 feet of horizontal distance.

1

Areas of gentle slopes – Slopes generally less than 12 percent. Gently undulating to rolling broad valleys, borders of major streams, and narrow strips on top of broad ridges.

2

Areas of variable slopes – Includes areas of less than 12 percent slope and areas of greater than 12 percent slope in about equal proportions. Relatively broad rounded hills with steep narrow stream valleys.

3

Areas of steep slopes – Slopes mostly greater than 12 percent. Closely spaced, irregularly eroded hills or narrow steep linear ridges.

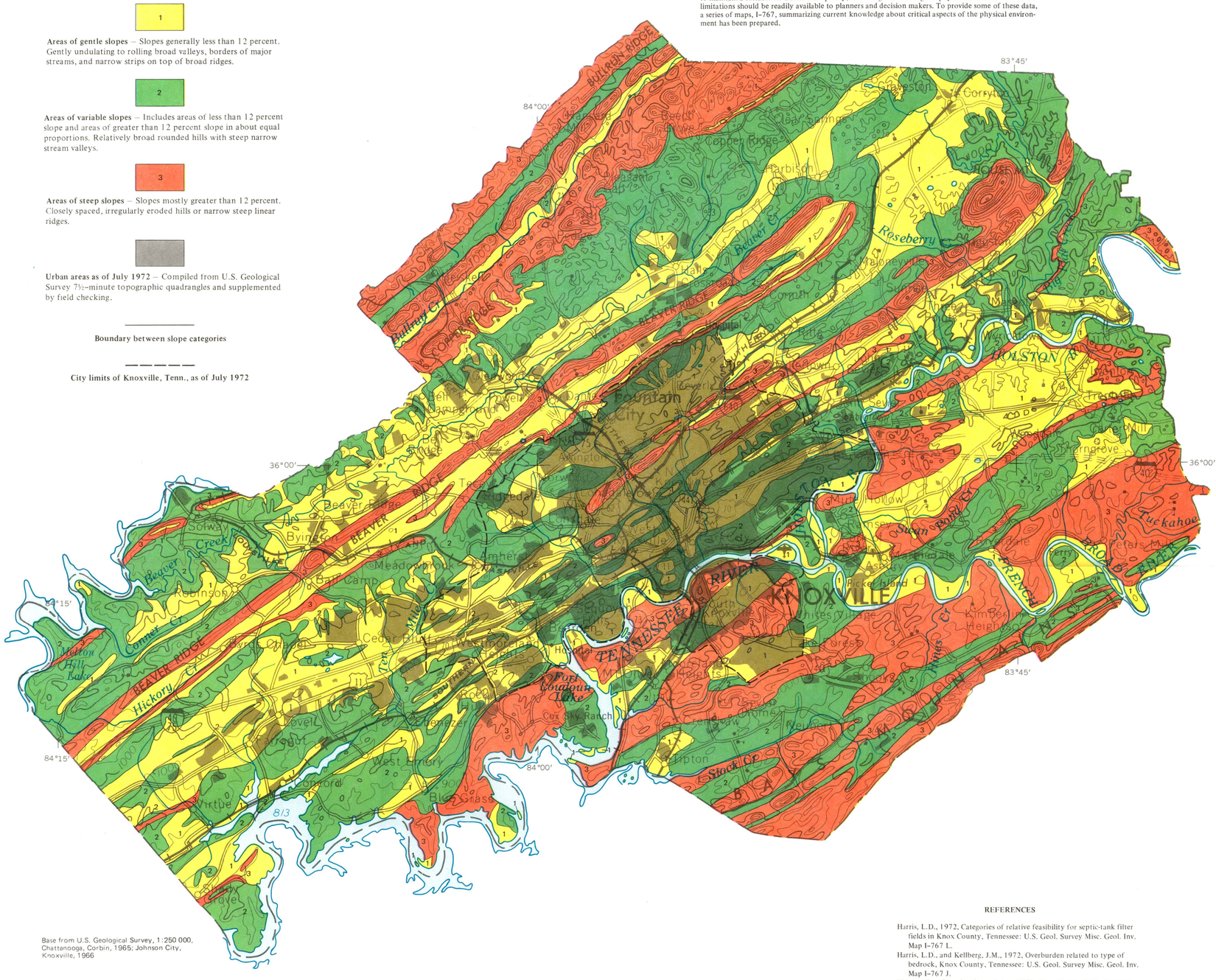
Urban areas as of July 1972 – Compiled from U.S. Geological Survey 7½-minute topographic quadrangles and supplemented by field checking.

Boundary between slope categories

City limits of Knoxville, Tenn., as of July 1972

LAND RESOURCE ANALYSIS MAPS OF KNOX COUNTY

Knox County has a 1972 population in excess of 270,000. The Metropolitan Planning Commission (1968) projects an increase in population to approximately 360,000 by 1990. As the population grows and favorable areas like west Knox County approach their limit of development, more and more marginal land will be utilized. In order to utilize the existing land resources safely and efficiently, and in order to maintain a suitable environmental quality, knowledge concerning the physical environment and its limitations should be readily available to planners and decision makers. To provide some of these data, a series of maps, I–767, summarizing current knowledge about critical aspects of the physical environment has been prepared.



Base from U.S. Geological Survey, 1:250 000, Chattanooga, Corbin, 1965; Johnson City, Knoxville, 1966

SCALE 1:125 000

5 4 3 2 1 0 5 MILES

5 4 3 2 1 0 5 10 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

Knox County, Tennessee, with the city of Knoxville as its principal urban center, is situated in a geologically complex terrane in the southern Appalachian Highlands. The physical geography of the county imposes natural controls that have played a major role in land use and will continue to do so in the future. Large-scale urbanization beyond the city of Knoxville has taken place where the natural controls are not restrictive. One conspicuous control is the parallel northeast-trending ridges and valleys that tend to guide and even restrict development to a linear pattern. This relationship is forcefully demonstrated by comparing the location of major subdivisions with areas characterized by different slopes of the land surface. In general, relatively flat areas with slopes of less than 12 percent do not have serious construction problems, whereas hilly areas with slopes greater than 12 percent make construction more difficult and expensive and require detailed planning even for minimum use.

Utilizing data in Roberts and others (1955), the land surface in the county can be divided into three categories based on the percent of slopes: (1) areas in which slopes are 12 percent or less; (2) areas in which slopes are variable and range from 1 to greater than 12 percent; and (3) areas in which slopes of greater than 12 percent are predominant.

Major development, for the most part, has been concentrated in large areas with slopes of 12 percent or less, but not all such areas are developed to the same degree. This selectivity appears to be controlled by other physical factors. For example, shallow depth to rock (Harris and Kellberg, 1972) or inadequate amount and type of soil material for septic-tank filter fields (Harris, 1972) has limited the usefulness of some of even the most favorable slope areas. Severe natural limitations have contributed to complex social, economic, and governmental actions that tend to restrict development to certain favorable areas. An analysis of data concerning such limiting physical factors as type of rock, attitude of rock layers, depth and type of soil, ground-water conditions, and engineering properties of natural materials, clearly indicates that the western part of Knox County contains the largest concentration of land readily adaptable to dense multipurpose use. Because of these favorable conditions, west Knox County is rapidly being transformed into an urban area, so much so that the center of population in the county is gradually shifting westward.

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LAND SLOPES AND URBANIZATION IN KNOX COUNTY, TENNESSEE

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