DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

IN MOUNTING OVERLAP TO LINE

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-1074-F (SHEET 2 OF 2)

Base from U.S. Geological Survey, 1974

SCALE 1:125 000

5 4 3 2 1 0 5 MILES

5 4 3 2 1 0 5 10 KILOMETERS

CONTOUR INTERVAL 50 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NOTE: The slope zones on this map are unedited. They were generated by a semiautomated photomechanical process which translates distance between adjacent contours into percentage of slope. Proximity of the same contour or absence of adjacent contours may have produced false slope information at small tops and depressions, on cuts and fills, in saddles and narrow drains, along shores of open water, and at the edges of the map.

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INTRODUCTION

The Connecticut Valley Urban Area covers about 5,000 square miles from New Haven and New London, Conn., on Long Island Sound north to Brattleboro, Vt., and Keene, N. H. Major cities within the project area include New Haven and Hartford, Conn., and Springfield, Mass. Commuter traffic to these urban centers reaches almost all parts of the project area. Interstate routes provide major north-south and east-west transportation corridors. Urbanization and industrial development are likely to continue within this central valley area of New England. If anticipated growth is to be accomplished in an orderly manner and with a minimum of adverse environmental effects, information on the nature and distribution of natural resources will be necessary. The objective of the Connecticut Valley Urban Area Project (CVUAP) was to anticipate this need by providing geologic, hydrologic, and topographic information to aid in planning and resource management. This information is presented in the form of maps, each showing a single resource characteristic or combination of related characteristics of the land surface, earth materials, or water resources at a common scale and in a simplified format. This is one in a series of CVUAP maps.

USE OF CVUAP MAPS

Regional and local planners and other decisionmakers responsible for resource management should find these maps helpful in land-use analysis. Because statutory regulations, technological capabilities, available funding, and local land-use priorities vary from place to place and can be expected to change with time, these maps are designed to provide a resource-data base with maximum flexibility for long-term usefulness. The maps can be used in various combinations, as in a series of overlays, according to the specific needs of a particular planning problem. As planning criteria change, the selection of pertinent resource-characteristic maps can be adjusted to meet the changing needs.

These maps are at a scale of 1:125,000 (1 inch equals about 2 miles). The average line width on these maps would be more than 50-feet wide on the ground, and the smallest area easily distinguished would be a square larger than 40 acres. In addition, the units portrayed on the maps and the method of data collection were designed for 1:125,000-scale presentation. Therefore, CVUAP maps or maps derived from them are not intended to replace onsite investigations, and they should not be enlarged or otherwise manipulated in an attempt to increase map resolution.

PREPARATION OF THIS MAP

This slope map summarizes the information provided by the contours on a topographic map. The distance between adjacent contours (measured perpendicular to the contours) is translated into percent slope. A photomechanical method was used to measure the spacing between contours. Contour line widths are then manipulated to show areas of prevalent slope. On the Connecticut Valley Urban Area 1:125,000-scale base map, 1 inch equals 10,416 feet on the ground, and the contour interval is 50 feet. Contour lines spaced .03 inches apart represent a 15 percent slope as determined by the formula

$$D = \frac{100\,I}{PS}$$

where D = distance between contour in inches
I = contour interval in feet
P = percent slope
S = scale of map in feet per inch.

By photographically "thickening" the contour lines on this map until they are .03 inches wide, areas of 15 percent or more slope are blacked out. Then by "thinning" the remaining contour lines until they disappear, only areas of 15 percent slope or more are left on the map. Using this same technique, but with a different amount of "thickening" (.06 inches), areas of 8 percent or more slope can be delineated. The slope map is produced by combining the plates upon which each limit has been depicted.

SIGNIFICANCE FOR LAND-USE PLANNING

The use of this slope map, in combination with other regional resource-characteristic maps, permits the regional interpretation of slope stability, foundation and excavation conditions, and erodibility. In the Connecticut Valley Urban Area, where competition is keen for the remaining undeveloped gently sloping land, this map can help to properly distribute the various needs of a growning population.

Slope is a major factor affecting the accessibility and suitability of land for various uses. Historically, many housing, commercial, and industrial areas have been concentrated on the 0–8 percent lands, which also include some of the best farmland. Lands in the 8–15 percent category are less urbanized than gently sloping land,, but around urbanized areas they are rapidly being developed. Other factors being equal, 15 percent is generally the grade limitation for conventional houses and intensive urban land uses. Development commonly is restricted in areas having slopes greater than 15 percent; these sites usually require substantial preparation or engineering design before building can proceed.

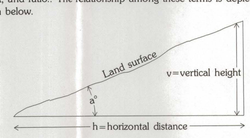
Customary (English) units of measurement are used for present purposes in preference to International System (SI or metric) units. Some conversion factors are given below:

Multiply	By	To obtain
inches	2.54	centimeters
feet	30.48	centimeters
feet	0.3048	meters
miles	1.609	kilometers
square miles	2.6	square kilometers
feet per mile	0.189	meters per kilometers
acres	0.004	square kilometers

EXPLANATION

DERIVATION OF SLOPE UNITS

Slope is the degree of inclination or gradient of the land surface. On this map, slope is expressed in terms of percent—the vertical change in altitude per 100 feet of horizontal distance. It can also be expressed in terms of angle, gradient, and ratio.. The relationship among these terms is depicted by the diagram below.

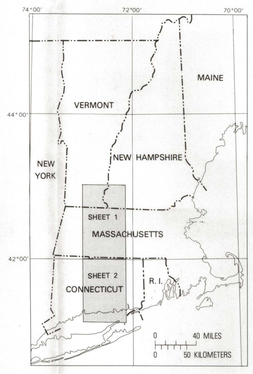


Slope in percent = $\frac{v}{h} \times 100$
Slope in angle = a°
Slope in gradient = v:h
Slope in ratio = h:v

On a slope map, areas having similar slopes are grouped into a single unit. Each unit thus comprises a range of slopes. In addition, the actual ground surface is considerably more varied in relief than can be portrayed at this map scale and contour interval. Thus slopes of different ranges are included in each map unit. As a result, map units show areas of prevalent slope ranges. For this 1:125,000-scale map, three units of prevalent slope ranges have been selected to categorize topography meaningfully and to coincide with major breaks in land use.

RANGES OF PREVALENT SLOPES

- Nearly level to gently sloping (0–8 percent)
- Moderately sloping (8–15 percent)
- Moderately steep to steep (>15 percent)



CONNECTICUT VALLEY URBAN AREA

SLOPE MAP, CONNECTICUT VALLEY URBAN AREA, CENTRAL NEW ENGLAND

By
United States Geological Survey

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