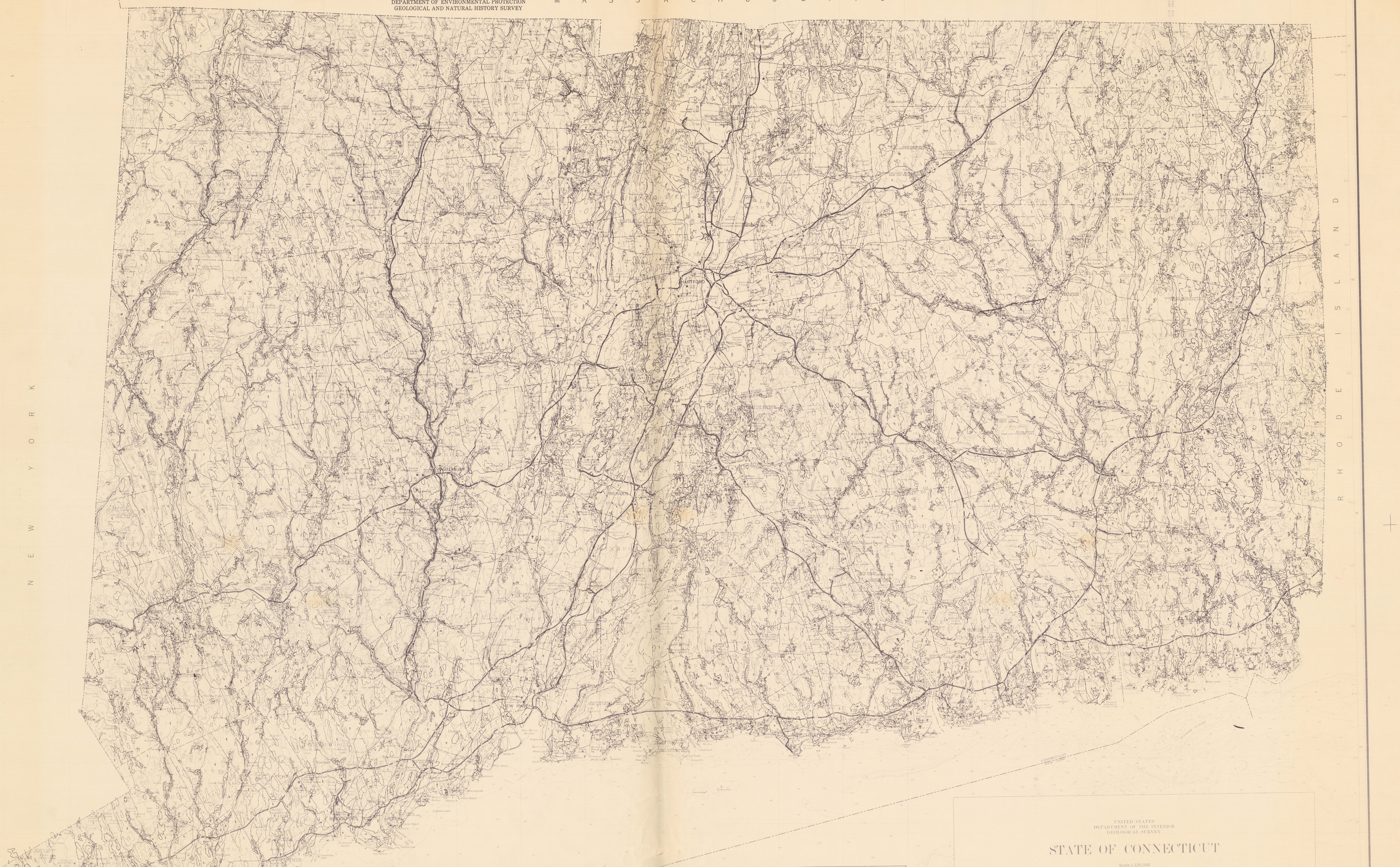
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
GEOLOGICAL AND NATURAL HISTORY SURVEY

CONNECTICUT
OPEN FILE REPORT—85-266
SHEET 1 OF 3



The unconsolidated deposits overlying bedrock in Connecticut range from a few feet to several hundred feet in thickness. These earth materials significantly affect human development of the land. Most of the unconsolidated materials are deposits of continental glaciers that covered all of New England at least twice during the Pleistocene ice age. These glacial deposits are divided into two broad categories, glacial till and glacial stratified deposits. Till, the most widespread glacial deposit, was laid down directly by glacier ice and is characterized by a poorly sorted matrix of sand, silt, and clay with variable amounts of stones and large boulders. Glacial stratified deposits are concentrated in both small and large valleys and were laid down by glacial meltwater in streams and lakes in front of the retreating ice margin during deglaciation. These deposits are characterized by layers of well-sorted to poorly sorted gravel, sand, silt, and clay. Postglacial sediments, primarily floodplain alluvium and swamp deposits, make up a lesser proportion of the unconsolidated materials of Connecticut. These deposits are largely reworked from glacial materials and have similar physical characteristics.

The distribution of surficial (unconsolidated) materials that lie between the land surface (below the pedogenic soil) and the bedrock surface is shown on this map to the extent that it is known or can be inferred. Cross sections (figs. 1 and 2) and a block diagram (fig. 3) illustrate the characteristic vertical distribution of glacial till, glacial stratified deposits, and postglacial deposits encountered in Connecticut. The areal distribution of till and stratified deposits is related to the physiographic regions of the State: the eastern and western highlands and the central lowland (figs. 4 and 5). Cross section A-A' (fig. 1) transects the central lowland and extends into the bordering eastern and western highlands. In highland areas, till is the major unconsolidated material, present as a discontinuous mantle of variable thickness over the bedrock surface. Till is thickest in drumlins and on the northwest slopes of hills (shaded till areas on map). Glacial stratified deposits that average 10-40 feet in thickness overlie the till in small upland valleys and commonly in north-sloping pockets between bedrock hills. In the central lowland, especially in the north half, glacial stratified deposits are the predominant surficial materials. These deposits generally overlie till; however, well logs indicate that in some places till is not present and the stratified deposits lie directly on bedrock. The extensive stratified deposits of the central lowland average 50-100 feet in thickness, and in the northern part they almost completely mask the till-draped bedrock surface. Postglacial materials locally overlie the glacial deposits throughout the State. Alluvium occurs on the floodplains of most streams and rivers. Swamp deposits occur in poorly drained areas. Talus occurs along the bases of steep bedrock cliffs, principally along the traprock ridges within the central lowland. Salt-marsh and estuarine deposits occur mainly along the tidal portions of streams and rivers entering Long Island Sound. Beach deposits occur along the shoreline of Long Island Sound.

This map is a companion to the Quaternary Geologic Map of Connecticut (Schafer, Stone, London, and Thompson, unpublished data). Till and postglacial deposits are shown similarly on both maps. Glacial stratified deposits are particularly emphasized on both maps. These sediments are the major ground-water aquifers in the State and are also the major sources of construction aggregate. On the Quaternary Geologic Map, the glacial stratified deposits are described in terms of depositional environments (fluvial or lacustrine) and depositional chronology. On the Surficial Materials Map, the texture (grain-size distribution) of these deposits is shown. The units on this map delineate textural changes in the subsurface as well as areally at the surface. An earlier map at 1:125,000 scale of central Connecticut (Stone, London, and Langer, 1979) shows only surface textural units; a separate map in the same series (Langer, 1979) shows subsurface deposits of fine-grained materials. Several previous 1:24,000-scale quadrangle maps in Connecticut show three-dimensional textural units and refer to them as "superposed deposits" (see Stone, 1976; and Radway and Schnabel, 1976, as examples). On this map, the term "stack unit" (Kempton, 1981) is used in place of superposed deposits.

The distribution of textural units is extrapolated from both point data (well and test-hole logs, gravel pits, and shovel holes) and from interpretation of landforms based on the principles of morphosequence deposition and systematic northward ice retreat (Koteff, 1974; Koteff and Pessl, 1981). These concepts provide a model by which grain-size distribution can be predicted from the morphology of a deposit, given primary data about the textures at specific points. A morphosequence is a package of sediments deposited contemporaneously by meltwater flowing from the glacier margin to a specific base level. Within a morphosequence, grain size decreases and sorting improves from the ice-marginal (proximal) end of a deposit downstream to the distal end. Landforms are transitional within a sequence as well, ranging from ice-contact forms (eskers, kettles, kames) at the head (proximal end) of a deposit to uncollapsed forms (delta-foreset slopes, lake-bottom plains, valley trains) downstream (distal end). Coarser grained sediments are associated with the proximal parts of morphosequences, finer grained sediments are associated with distal parts; given this principle, textural distribution can be mapped using point data that serve as controls.

The relationship between textural variations and morphosequences is illustrated by cross section B-B' (fig. 2), which shows the distribution of texture units in the northern Quinnipiac River valley. This north-south section transects seven chronologically numbered morphosequences. Dashed lines drawn to the six southern sequences represent the probable generalized surface gradients of the heads of these deposits, prior to collapse (due to melting of buried ice) and subsequent stream entrenchment. From north to south within each of these sequences, the textures grade from coarse- to fine-grained sediments and the topography changes from collapsed to non-collapsed landforms. The longitudinal and vertical relationships illustrated by this section are common in other valleys as well.

Stack units similar to those on cross section B-B' occur throughout the stratified deposits of Connecticut. Many deposits having similar superposition of materials of differing texture were produced by geologic processes that occurred repeatedly in time and space during the deglaciation of Connecticut. For example, the **sg/s/f** and **s/f** stack units commonly occur in glacial-lake deltas. Morphosequences 1 through 6 on section B-B' are in fact a series of ice-marginal deltas. The **sg/f** stack unit commonly results from fluvial meltwater (or postglacial stream) terrace deposition on slightly older lake bottom deposits, as in sequence 7 on section B-B'. The **f/sg** and **s/sg** units commonly occur in the distal parts of morphosequences where the sand or fines overlap the collapsed, coarser, proximal parts of other (older) sequences. Examples of this are found in the distal parts of sequences 4 and 7. Many basic texture units (**g, sg, s, f**) likewise have broadly common origins. Units of gravel or sand and gravel often occur in the proximal parts of deposits, or were commonly laid down in glaciofluvial environments. Units of sand and fine-grained sediment are typically associated with distal parts of sequences and were usually laid down in lacustrine environments.

The thickness of surficial materials in Connecticut varies considerably because of such factors as the high relief of the bedrock surface, changing conditions of deposition during deglaciation, and various effects of postglacial erosion and removal of glacial sediments. The point data shown on the map are modified logs of wells and test holes (see fig. 6) that provide information about thicknesses. The point data are not uniformly distributed across the State. Some logs may describe a textural stacking that is more detailed than, or in disagreement with, the map unit. Typical situations where this may occur are explained below and examples are located on the map view of the block diagram (fig. 3).

In areas where coarser material overlies finer material, for example units **sg/s** and **sg/f**, the upper coarse material is commonly absent in places where later stream erosion has taken place (fig. 3, locality 1) or on steep frontal slopes of deltas (fig. 3, locality 2); the details of these areas are too small to show at the scale of this map. Point data from these places will indicate only sand or fines.

Some point data indicate a thickness of sand and gravel or gravel at the base of the section, but this information is not reflected in the map unit (fig. 3, locality 3 and fig. 1). This situation arises because the distribution of coarse-grained material in the subsurface is more patchy and harder to map than subsurface fine-grained materials. Where the point data are adequate, units such as **f/sg** and **s/sg** are shown on the map; otherwise, scattered points indicate the presence of unmapped bodies of coarse-grained material in the subsurface.

Some points located in areas shown as sand and gravel (**sg**) on the map indicate a more detailed textural stacking of small bodies of sand or fines within the coarser materials (fig. 3, locality 4).

The block diagram shown in figure 3 illustrates that the general location of the thickest stratified materials is in the middle of valleys (except where they have been removed by postglacial erosion along modern streams) and that these deposits thin toward the valley sides.

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EXPLANATION

—— Contact between units

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF CONNECTICUT

Scale 1:125,000
1 inch equals approximately 2 miles

Contour interval 50 feet
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Compiled, edited, and published by the Geological Survey in cooperation with State of Connecticut agencies
1927 North American datum. Polyconic projection
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER

LEGEND

State capital
City, town, or village
Universities and colleges
Built-up area
Town boundary
County boundary
State park
Interstate highway
U. S. highway
State highway
Other divided highways with interchange
Other roads
Areas subject to controlled inundation
State forest, Fish and Wildlife areas

SOURCE DATA
U. S. Dept. of the Interior—Geological Survey topographic maps

BASE MAP
WITH HIGHWAYS AND CONTOURS

POPULATION KEY

HARTFORD	more than 100,000
NORWALK	50,000 to 100,000
Danbury	10,000 to 50,000
Mystic	2,500 to 10,000
Canaan	less than 2,500

Population indicated by size of letters

Selected hydrographic data compiled from NOS/NOAA Charts
This information is not intended for navigational purposes

Principal built-up areas based on Connecticut Department of Finance and Control 1970 land use survey

FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
COMPILED IN 1965
REVISED IN 1974

25,000-foot grid based on Connecticut coordinate system
10,000-metre Universal Transverse Mercator grid ticks, zones 18 and 19

SURFICIAL MATERIALS MAP OF CONNECTICUT

By

Janet Radway Stone, John P. Schafer, Elizabeth Haley London, and Woodrow B. Thompson

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.