

SURFICIAL MATERIALS GLACIAL AND POSTGLACIAL DEPOSITS BETHLEHEM, CONNECTICUT

GLACIAL ICE-LAID DEPOSITS	POSTGLACIAL DEPOSITS
t Thin Till	a Floodplain Alluvium
tt Thick Till	aa* Alluvium overlying undifferentiated Coarse deposits (g, sg, s)
em End Moraine deposits	as Alluvium overlying Sand
GLACIAL MELTWATER DEPOSITS	af Alluvium overlying Fines
Fine Deposits	afst* Alluvium overlying undifferentiated Coarse deposits overlying Fine deposits
f Fines (very fine sand, silt, and clay)	afstg* Alluvium overlying undifferentiated Fine deposits overlying Coarse deposits
Coarse Deposits	sw Swamp deposits
g Gravel	sws Swamp deposits overlying Sand
sg Sand and Gravel	swsf Swamp deposits overlying Fines
s Sand	swsfst Swamp deposits overlying Fines overlying Sand
Stacked Coarse Deposits	sm Salt-Marsh and Tidal-Marsh deposits
gsg Gravel overlying Sand and Gravel	smst Salt-Marsh and Tidal-Marsh deposits overlying Sand
gsa Gravel overlying Sand	smstf Salt-Marsh and Tidal-Marsh deposits overlying Fines
sgsg Sand and Gravel overlying Sand	ta Talus
sgsbg Sand and Gravel overlying Sand overlying Sand and Gravel	b Beach deposits
sgsgs Sand overlying Gravel	art Artificial Fill
sgsgsa Sand overlying Sand and Gravel	
Stacked Coarse Deposits Overlying Fine Deposits	
gaf Gravel overlying Sand overlying Fines	
gafg Gravel overlying Fines	
sgaf Sand and Gravel overlying Sand overlying Fines	
sgafg Sand and Gravel overlying Fines	
sgf Sand overlying Fines	
Stacked Fine Deposits Overlying Coarse Deposits	
fsg Fines overlying Sand and Gravel	
fsa Fines overlying Sand	

PARTICLE DIAMETER										
10	2.5	16	08	04	02	01	005	0025	0015	in
Boulders	Cobbles	Pebbles	Gravels	Coarse Sand	Very Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay
GRAVEL PARTICLES			SAND PARTICLES				FINE PARTICLES			

Grain-size classification (modified from Wentworth, 1922)

EXPLANATION

Unconsolidated glacial and postglacial deposits, that range from a few feet to several hundred feet in thickness, overlie the bedrock surface of Connecticut (see Block Diagram). This map portrays the areal extent and subsurface grain-size (textural) distributions of these surficial materials. The map legend is designed to highlight the relationship between the depositional origins and the distribution and character of the materials portrayed. Most of Connecticut's surficial material is glacially derived, and can be divided into two broad depositional categories: Glacial Ice-Laid deposits (tills and moraine) which are generally exposed in the uplands, and are the most widespread surficial deposit in Connecticut; and Glacial Meltwater deposits (stratified deposits) which are most commonly concentrated in valleys and lowlands. A mapping emphasis is placed on stratified meltwater deposits because their distribution and character have historically influenced development patterns throughout the state.

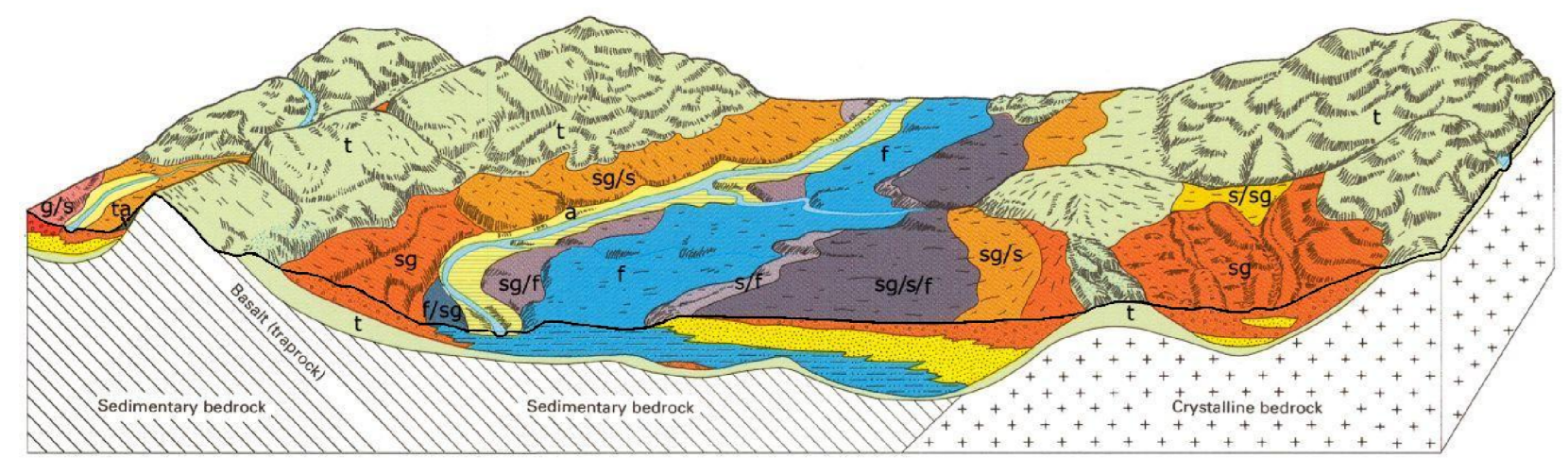
For a complete description of surficial materials map units, and further information concerning their thickness and modes of occurrence, please refer to the published Surficial Materials Map of Connecticut and the companion Quaternary Geologic Map of Connecticut and Long Island Sound Basin (see Data Sources).

Glacial Ice-Laid deposits (tills and moraine) were derived directly from the ice and consist of nonsorted, generally nonstratified mixtures of grain-sizes ranging from clay to large boulders. The matrix of most tills is predominantly sand and silt and boulders can be sparse to abundant. Some tills contain lenses of sorted sand and gravel and occasionally masses of laminated fine-grained sediment. The lack of sorting and stratification typical of ice-laid deposits often makes them poorly drained, difficult to dig in or plow, mediocre sources of groundwater and unsuited for septic systems. Till blankets the bedrock surface in variable thicknesses and commonly underlies stratified meltwater deposits (see Block Diagram). End moraine deposits (primarily ablation till) occur principally in southeastern Connecticut.

Glacial Meltwater deposits (stratified deposits) were laid down in glacial streams, lakes and ponds which occupied the valleys and lowlands of Connecticut as the last ice sheet melted away to the north. They are often composed of layers of well-sorted sands, gravels, silts and clays with few to no boulders, and owing to their water-related depositional origins they have many characteristics that are favorable for development. Because water is a better sorting agent than ice, glacial meltwater deposits are commonly better sorted, more permeable, and better aquifers than ice-laid deposits. They can be good sources of construction aggregate, and are relatively easy to excavate and build highways and buildings on.

Meltwater deposits are depicted using four basic texturally-based map units: gravel, sand and gravel, sand, and fines. To the extent that it is known or can be inferred, the subsurface textural composition of meltwater deposits is shown for their entire vertical thickness. In many places similar conditions persisted for the entire time that a meltwater deposit was being laid down, and a single map unit (e.g. s-sand) is sufficient to describe the entire meltwater section. Areal and vertical textural variability can occur within the meltwater deposits because the amount of energy available to carry sediment varies with each meltwater setting (stream, delta, lake, etc.), and settings can change over time. High-energy depositional environments near glacial margins (proximal) tend to favor deposition of coarse material but as time passes, and the glacial margins melt back, less energy is available and finer grained distal deposits can become predominant. Where more complex stratigraphic relationships existed because of changing conditions during deposition, "stacked" map units are used to characterize the subsurface (e.g. sg/sf - sand and gravel overlying sand overlying fines). Where postglacial deposits overlie meltwater deposits, this relationship is also shown (e.g. as* - alluvium overlying sand).

Postglacial Sediments (primarily floodplain alluvium and swamp deposits) are less widely distributed and are typically thinner than the glacial deposits that they overlie, but they are locally important ecological, agricultural, commercial, and recreational resources. Talus, a result of rockfall at the base of steep bedrock (primarily trap rock) cliffs, provides a cool damp ecological niche. Beach, marsh and swamp deposits are key ecological elements of coastal and poorly drained inland settings. Deposits of floodplain alluvium are largely composed of sands, gravels and silts that have been reworked from glacial deposits and mixed with organic matter which increases their fertility. Despite their flood-prone nature, low, flat, fertile floodplains have historically been attractive for agricultural uses and development related to water-dependant commerce.



EXPLANATION OF CROSS-SECTION VIEW	EXPLANATION OF SURFACE VIEW
Gravel deposits	Sand and gravel deposits
Sand and gravel deposits	Fine deposits
Sand deposits	Gravel overlying sand
Fine deposits	Sand and gravel overlying sand
Alluvium	Sand overlying sand and gravel
Till	Sand and gravel overlying sand overlying fines
Talus	Sand and gravel overlying fine
	Sand overlying fines
	Fines overlying sand and gravel
	Alluvium
	Alluvium overlying fines
	Till and bedrock
	Thick till

DATA SOURCES

SURFICIAL MATERIALS DATA - Surficial Materials shown on this map are from the Surficial Material Poly dataset which contains polygon data intended to be used at 1:24,000 scale. Based on Connecticut Surficial Materials digital data published in 1995 by the Connecticut Department of Environmental Protection, in cooperation with the U.S. Geological Survey. These data were digitized from the 1:24,000-scale compilation sheets prepared for the statewide Surficial Materials Map of Connecticut (Stone, J.R., Schafer, J.P., London, E.H. and Thompson, W.B., 1992, U.S. Geological Survey special map, 2 sheets, scale 1:125,000).

BASE MAP DATA - Based on data originally from 1:24,000-scale USGS 7.5 minute topographic quadrangle maps published between 1969 and 1992. It includes political boundaries, railroads, airports, hydrography, geographic names and geographic places. Streets and street names are from Tele Atlas® copyrighted data. Base map information is neither current nor complete.

RELATED INFORMATION - This map is intended to be printed at its original dimensions in order to maintain the 1:24,000 scale (1 inch = 2000 feet).

QUATERNARY GEOLOGY AND SURFICIAL MATERIALS DATA - 1:24,000-scale digital spatial data of Connecticut Quaternary Geology and Surficial Materials combined into one dataset, published by the Connecticut Department of Environmental Protection, in cooperation with the U.S. Geological Survey. These data were digitized from the 1:24,000-scale compilation sheets prepared for both the Surficial Materials Map of Connecticut, Stone and others, 1992, 1:125,000 and the Quaternary Geologic Map of Connecticut and Long Island Sound Basin, Stone and others, 2005, 1:125,000.

OTHER GEOLOGIC MAPS - This map is also available for individual USGS topographic quadrangles of Connecticut. Other bedrock, surficial, and quaternary (glacial) geology quadrangle maps and reports published by the Connecticut Geological and Natural History Survey, USGS, and others are also available from CT DEP.

MAPS AND DIGITAL DATA - Go to the CT ECO website for this map and a variety of others. Go to the CT DEP website for the digital spatial data shown on this map.

