## QUATERNARY GEOLOGY SUFFIELD, CONNECTICUT

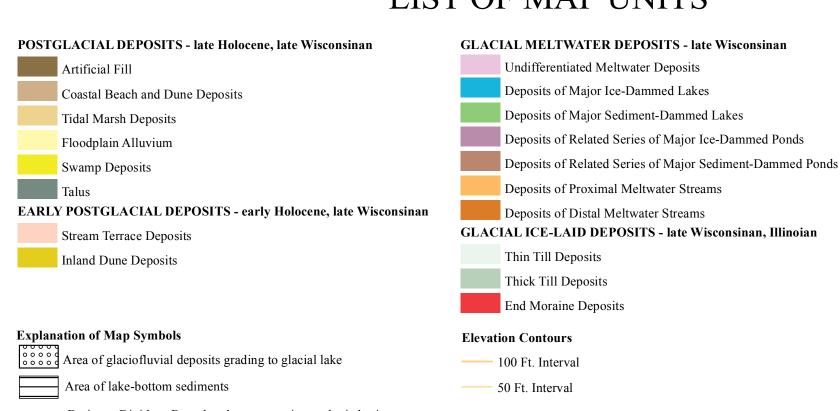
## LIST OF MAP UNITS

Undifferentiated Meltwater Deposits

Deposits of Major Ice-Dammed Lakes

Deposits of Proximal Meltwater Streams

Deposits of Distal Meltwater Streams



---- Drainage Divide -- Boundary within major geologic basin

that may overly the deposit.

each contributes to the interpretation of the other.

undetermined provenance (uncorrelated).

dividing it into north-draining and south-draining regions

effects are of pervasive importance to present-day occupants of the land.

The Quaternary Geology information illustrates the geologic history and the distribution of depositional environments during the emplacement of unconsolidated

in Connecticut. These deposits range from a few feet to several hundred feet in

thickness, overlie the bedrock surface and underlie the organic soil layer of

Connecticut. Quaternary Geology is mapped without regard for any organic soil layer

The Connecticut Quaternary Geology information was initially compiled at 1:24,000

scale (1 inch = 2,000 feet) then recompiled for a statewide 1:125,000-scale map, Quaternary Geology Map of Connecticut and Long Island Sound Basin. A companion

map, the Surficial Materials Map of Connecticut, emphasizes the surface and

and surficial material features portrayed on these two maps are very closely related;

dune deposits) which are most commonly concentrated in valleys and lowlands.

Particular attention has been paid to understanding the distribution and characteristics

deposited sediment, or the glacier itself, impounded the lake or pond where

end moraine); Glacial Meltwater Deposits (sorted and stratified deltaic, river bottom,

Ice-Contact (collapsed)

Thin Till Deposits Thick Till Deposits End Moraine Deposits **Elevation Contours** 100 Ft. Interval 50 Ft. Interval Drainage Divide -- Boundary between major geologic basins.

**EXPLANATION** Quaternary Geology is 1:24,000-scale data that illustrates the geologic features formed lake bottom, and inland dune deposits); and Postglacial Deposits (flood-plain alluvium in Connecticut during the Quaternary Period, which spans from 2.588 ± 0.005 million and swamp deposits, but also including stream-terrace, talus, dune, tidal-marsh, beach, years ago to the present and includes the Pleistocene (glacial) and Holocene channel fill, marine delta deposits, and artificial fill) that were emplaced in comparable (postglacial) Epochs. The Quaternary Period has been a time of development of many topographic and depositional settings, and therefore share similar characteristics, are details of the Connecticut landscape and all surficial deposits. At least twice in the last categorized and color coded in the Legend Description. Related Map Elements include Pleistocene, continental ice sheets swept across Connecticut from the north. Their eskers, drumlin axes, ice-margin positions, scarps, drainage divides, glacial lake spillways, meltwater channels, striations/grooves, dated sample locations, glaciofluvial

glacial and postglacial surficial deposits and the landforms resulting from those events

Glacial Ice-Laid Deposits (nonsorted and generally nonstratified thin till, thick till, and end 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 finegrained 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. End moraine deposits (primarily ablation till) occur principally in southeastern Connecticut. subsurface texture (grain-size distribution) of these materials. The quaternary geology

Ice-laid deposits are inferred to be of Wisconsinan age except where exposures of older (probably Illinoian) till are shown. Drumlins are inferred to be composed of older till mantled by younger till. Most of Connecticut's surficial material is glacially derived, and can be divided into Glacial Meltwater Deposits (sorted and stratified deltaic, river bottom, lake bottom,

and lake-bottom facies as overlays on glacial lake map units and various types of

**Explanation of Map Symbols** 

**— — —** Inferred Ice Margin Position

→ Glacial Striation or Groove

— Drumlin Axis and Center

Meltwater Channel

── Glacial Lake Spillway

Inferred Glacial Spillway

♦ Location of Lower Till

▲ Deltaic Bedding Locality

× Weathered Bedrock Outcrop

Radiocarbon-Dated Locality

♦ Two-Till Outcrop

Ice Margin Position

>>>> Esker

two broad depositional categories: Glacial Ice-Laid Deposits (nonsorted and generally and inland dune deposits) were laid down in glacial streams, lakes and ponds which nonstratified thin till, thick till, and end moraine) which are generally exposed in the occupied the valleys and lowlands of Connecticut as the last ice sheet systematically uplands, and are the most widespread surficial deposit in Connecticut; and Glacial (Koteff and Pessl, 1981) melted away to the north. They are often composed of layers Ieltwater Deposits (sorted and stratified deltaic, river bottom, lake bottom, and inland of well-to-poorly 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 of stratified meltwater deposits because they have historically influenced development than ice-laid deposits. They can be good sources of construction aggregate, and are patterns and groundwater availability throughout the state. Within the meltwater relatively easy to excavate and build highways and buildings on. Stratified meltwater category, six classes of deposits have been recognized based on the conditions that deposits include both fine and coarse grained deposits such as silt, clay, sand, and prevailed during their emplacement. Four of the seven indicate whether previously gravel.

emplacement occurred (see the meltwater deposit discussion below). Meltwater stream

The mapping presented here and on the Quaternary Geology Map of Connecticut and deposits are differentiated based on their distance (proximal or distal) from the ice sheet Long Island Sound Basin is based on recognizing single bodies of sediment or when they were emplaced, and a separate meltwater map unit is reserved for deposits of assemblages of glacial sedimentary facies that can be identified as mappable units known as morphosequences (Koteff and Pessl, 1981). Different sedimentary facies are associated with fluvial, deltaic and lake-bottom settings. Coarse proximal deposits are **Postglacial Deposits** were emplaced by various processes after the melt back of the last emplaced in high-energy settings at or near the ice front. Energy levels dropped off ice sheet. Some of these deposits were emplaced early in post-glacial time and have with distance from the glacier (distally) and grain size decreased along the path of been grouped together as Early Postglacial Deposits. Later deposits, resulting from meltwater flow. As a result, morphosequences are coarse grained at their collapsed, iceprocesses that are still active (or are manmade), have been grouped together as contact heads and become finer distally (Figure 1). A detailed discussion of the complexities and significance of morphosequences is contained in the pamphlet that accompanies the Quaternary Geology Map of Connecticut and Long Island Sound **Glacial Ice-Laid Deposits** (nonsorted and generally nonstratified thin till, thick till, and Basin.

Figure 1: A morphosequence is a body of meltwater deposits composed of a continuum of land forms, grading from ice-contact forms (eskers, kames) to non-ice-contact forms (flat valley

through sand and gravel and sand beneath delta plains and foreset slopes to silt and clay in lake-bottom deposits (after Stone and others, 2005).

terrace, delta plains), that were deposited simultaneously at and beyond the margin of a glacier, graded to a specific base level. Grain-size decreases from coarse gravel at ice-contact heads,

Deposition of the morphosequences that progressively filled bedrock valleys and lowlands as the last glacier melted northward required the presence of impounded lakes and ponds. The nature of the impoundments and the resulting distribution of the meltwater deposits on the landscape were controlled by the topography of the area being deglaciated. Where a northward succession of ice positions was established in south-draining basins, previously deposited sediment formed the dams, and the oldest morphosequences occupied the lowest, widest parts of the valley. Deposition then

progressed up valley, with the youngest depositional sequences occupying higher, narrower portions of the valley (Figure 2). In north-draining systems the opposite is true. The ice itself was the impoundment, and the oldest morphosequences were emplaced in the higher, narrower portions of the basin. As the ice front retreated northward, a succession of lower bedrock spillways were opened and the valleys widened. In this case, the youngest depositional sequences occupied the lowest, widest

North-Draining Basin

South-Draining Basin Figure 2: Scenario for morphosequence development in ice-dammed (Top) and sediment-dammed basins (Bottom). The mechanism of impoundment and the chronological and topographic positions of the deposits are related to the orientation of the basins relative to the direction of ice retreat. These relationships are reflected in the organization and color coding of the List of

Postglacial Deposits (flood-plain alluvium and swamp deposits, but also including and recreational resources. Talus, a result of rockfall at the base of steep bedrock stream-terrace, talus, dune, tidal-marsh, beach, channel fill, marine delta deposits, and artificial fill) are less widely distributed and are typically thinner than the glacial deposits that they overlie. The oldest postglacial deposits occur in Long Island Sound and in southeastern Connecticut because these areas were deglaciated first. Many of the depositional processes that were initiated as postglacial conditions began to prevail are still operative today.

(primarily trap rock) cliffs, and inland dune deposits, that developed as winds swept across newly exposed glacial lake beds, provide ecological niches that are atypical for Connecticut. Beach, dune, 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 floodprone nature, low, flat, fertile floodplains have historically been attractive for agricultural uses and development related to water-dependant commerce. Postglacial deposits provide locally important ecological, agricultural, commercial,

## DATA SOURCES

QUATERNARY GEOLOGY DATA – Quaternary Geology shown on this map are from the Quaternary Geology Poly, Point Feature, and Line Feature dataset intended to be used at 1:24,000 scale. Based on Connecticut Quaternary Geology digital spatial data published in 2005 by the U.S. Geologic Survey, in cooperation with the Connecticut Department of Environmental Protection. These data were digitized from the 1:24,000-scale compilation sheets prepared for the statewide Quaternary Geology Map of Connecticut, (Stone, J.R., Schafer, J.P., London, E.H., DiGiacomo-Cohen, M. L., Lewis R.S, and Thompson, W.B., 2005, 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.

erroneous data.

CONTOUR DATA - Derived from Connecticut's 2000 statewide LiDAR, (Light Detection And Ranging), dataset by the University of Connecticut, College of Agriculture and Natural Resources, Department of Natural Resources and the Environment. These data are a Beta product intended for research and demonstration purposes. NOTE: Contour line data is known to be incorrect in some areas due to anomalies in the underlying elevation data used to generate those specific contour lines. Areas where contour lines are too straight or angular, do not naturally curve where expected, or don't exist where they probably should are good indications of

This map is intended to be printed at its original dimensions, (48 x 36 in), in order to maintain the 1:24,000 scale (1 inch = 2,000 feet). QUATERNARY GEOLOGY AND SURFICIAL MATERIALS DATA - 1:24,000scale 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, J.R., Schafer, J.P., London, E.H. and Thompson, W.B., 1992, U.S. Geological Survey Special Map, 2 sheets, scale

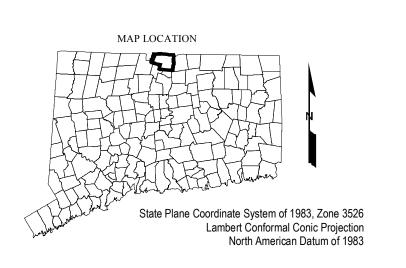
DiGiacomo-Cohen, M.L., Lewis, R.L., and Thompson, W.B., 2005, U.S. Geological Survey Scientific Investigation Map 2784, 2 sheets, scale 1:125,000). OTHER GEOLOGIC MAPS - This map is also available for individual USGS topographic quadrangles of Connecticut. This map is intended to be used with other bedrock, surficial, and quaternary (glacial) geology town maps and reports published by the Connecticut Geological and Natural History Survey, USGS, and others. Those

1:125,000, map and pamphlet, 71 p.) and the Quaternary Geologic Map of

Connecticut and Long Island Sound Basin, (Stone, J.R., Schafer, J.P., London, E.H.,

maps are reports 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

SCALE 1:24,000 (1 inch = 2,000 feet) when map is printed at original size (48 x 36 in)





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