

# QUATERNARY GEOLOGY

## BETHANY, CONNECTICUT

### LIST OF MAP UNITS

<p><b>POSTGLACIAL DEPOSITS - late Holocene, late Wisconsinan</b></p> <ul style="list-style-type: none"> <li>Artificial Fill</li> <li>Coastal Beach and Dune Deposits</li> <li>Tidal Marsh Deposits</li> <li>Floodplain Alluvium</li> <li>Swamp Deposits</li> <li>Talus</li> </ul> <p><b>EARLY POSTGLACIAL DEPOSITS - early Holocene, late Wisconsinan</b></p> <ul style="list-style-type: none"> <li>Stream Terrace Deposits</li> <li>Inland Dune Deposits</li> </ul>	<p><b>GLACIAL MELT-WATER DEPOSITS - late Wisconsinan</b></p> <ul style="list-style-type: none"> <li>Undifferentiated Meltwater Deposits</li> <li>Deposits of Major Ice-Dammed Lakes</li> <li>Deposits of Major Sediment-Dammed Lakes</li> <li>Deposits of Related Series of Major Ice-Dammed Ponds</li> <li>Deposits of Related Series of Major Sediment-Dammed Ponds</li> <li>Deposits of Proximal Meltwater Streams</li> <li>Deposits of Distal Meltwater Streams</li> </ul> <p><b>GLACIAL ICE-LAKE DEPOSITS - late Wisconsinan, Illinoian</b></p> <ul style="list-style-type: none"> <li>Thin Till Deposits</li> <li>Thick Till Deposits</li> <li>End Moraine Deposits</li> </ul>	<p><b>Explanation of Map Symbols</b></p> <ul style="list-style-type: none"> <li>Ice Margin Position</li> <li>Inferred Ice Margin Position</li> <li>Esker</li> <li>Glacial Striation or Groove</li> <li>Drumlin Axis and Center</li> <li>Meltwater Channel</li> <li>Glacial Lake Spillway</li> <li>Location of Lower Till</li> <li>Two-Till Outcrop</li> <li>Delatic Bedding Locality</li> <li>Weathered Bedrock Outcrop</li> <li>Radiocarbon-Dated Locality</li> </ul>
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### EXPLANATION

Quaternary Geology is a 1:24,000-scale data that illustrates the geologic features formed in Connecticut during the Quaternary Period, which spans from 2,588 ± 0.005 million years ago to the present and includes the Pleistocene (glacial) and Holocene (postglacial) Epochs. The Quaternary Period has been a time of development of many dunes, overlie the bedrock surface and underlie the organic soil layer of Connecticut. Quaternary Geology is mapped without regard for any organic soil layer that may occur on the surface.

The Quaternary Geology information illustrates the geologic history and the distribution of depositional environments during the emplacement of unconsolidated glacial and postglacial sediments and the landforms resulting from these events 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 that may occur on the surface.

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 of the Surficial Materials Map of Connecticut emphasizes the surface and subsurface texture (grain-size distribution) of these materials. The quaternary geology and surficial material features portrayed on these two maps are very closely related, each contributing to the interpretation of the other.

Most of Connecticut's surficial material is glacially derived, and can be divided into two broad depositional categories: Glacial Ice-Lake Deposits (non-sorted and generally nonstratified till, thick till, and end moraine) which are generally exposed in the uplands, and are the most widespread surficial deposit in Connecticut; and Glacial Meltwater Deposits (sorted and stratified delatic, river bottom, lake bottom, and inland dune deposits) which are most commonly concentrated in valleys and lowlands.

Particular attention has been paid to understanding the distribution and characteristics of stratified meltwater deposits because they have historically influenced development patterns and groundwater availability throughout the state. Within the meltwater category, six classes of deposits have been recognized based on the conditions that prevail during their emplacement. Four of the seven indicate whether previously deposited sediment, or the glacier itself, impounded the lake or pond where emplacement occurred (see the meltwater deposit discussion below). Meltwater stream deposits are differentiated based on their distance (proximal or distal) from the ice sheet when they were emplaced, and a separate meltwater map unit is reserved for deposits of undetermined provenance (unaccounted).

Postglacial Deposits were emplaced by various processes after the melt back of the last ice sheet. Some of these deposits were emplaced early in post-glacial time and have been grouped together as Early Postglacial Deposits. Later deposits, resulting from processes that are still active (or are man-made), have been grouped together as Postglacial Deposits.

**Glacial Ice-Lake Deposits** (non-sorted and generally nonstratified till, thick till, and end moraine), Glacial Meltwater Deposits (sorted and stratified delatic, river bottom, lake bottom, and inland dune deposits)

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 terrace, delta plains), that were deposited simultaneously as and beyond the margin of a glacier, graded to a specific base level. Grain-size decreases from coarse gravel at ice-contact, through sand and gravel and sand beneath delta plains and forest slopes to silt and clay in lake-bottom deposits (after Stone and others, 2005).

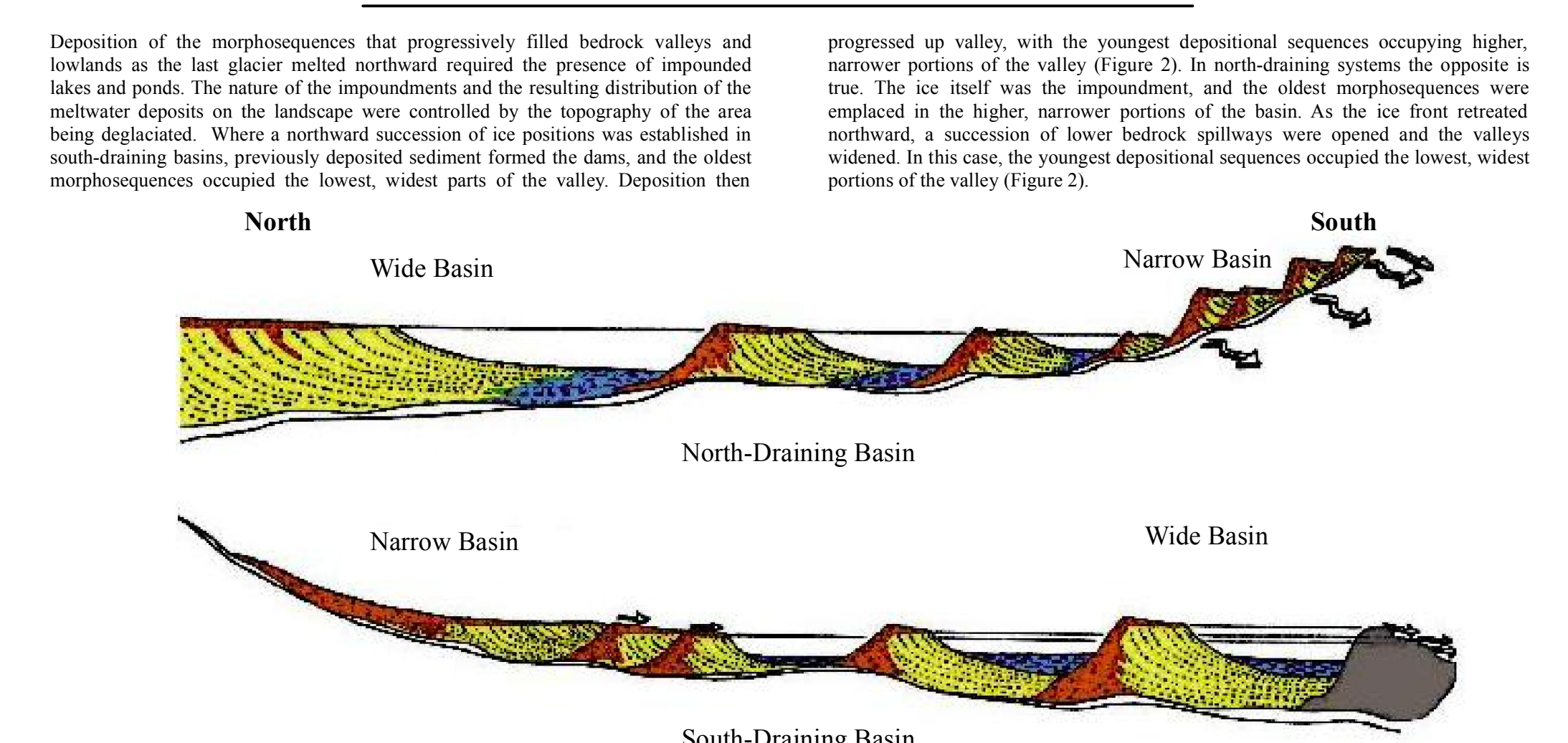


Figure 2: Scenario for morphosequence development in ice-dammed (top) and sediment-dammed basins (bottom). The mechanism of impoundment and the chronological and topographic positions of the deposits are related to the orientation of the basin relative to the direction of ice retreat. These relationships are reflected in the organization and color coding of the List of Map Units (after Stone and others, 2005).

Postglacial Deposits (flood-plain alluvium and swamp deposits, but also including 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 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.

Postglacial deposits provide locally important ecological, agricultural, commercial, and recreational resources. Talus, a result of rockfall at the base of steep bedrock (primarily map rock) cliffs, and inland dune deposits, that developed as winds swept across newly exposed glacial lake beds, provide ecological niches that are unique to 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 flood-prone nature, low, flat, fertile floodplains have historically been attractive for agricultural uses and development related to water-dependent commerce.

### 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. Geological 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., Schaller, J.P., London, E.H., DiGiacoia-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, hydrographic features, names, and geographic places. Streets and street names are from Tele Atlas' copyrighted data. Base map information is neither current nor complete.

**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 lines data is known to be incorrect in some areas due to anomalies in the underlying elevation data used to generate these 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 erroneous data.

**RELATED INFORMATION** - 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** - 1:24,000-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, J.R., Schaller, J.P., London, E.H., Thompson, W.B., 1992, U.S. Geological Survey Special Map, 2 sheets, scale 1:125,000, map and pamphlet, 71 p.) and the Quaternary Geology Map of Connecticut and Long Island Sound Basin, (Stone, J.R., Schaller, J.P., London, E.H., DiGiacoia-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 maps are reports are also available from CT DEP.

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

