CGNHS Miscellaneous Map MM-2013-08
Connecticut Geothermal Map Series No. 8 of 8

Connecticut Geothermal Energy Project:
Surficial Materials Thermal Conductivity
2013

About This Map

This map shows the location of surficial material samples from which thermal conductivity measurements in W/m/°K were obtained in the laboratory at the University of Massachusetts. The samples were acquired by augering 0.5 to 1.2 m through both A and B soil horizons and driving a 20 cm long by 5 cm wide cylindrical core, with a polycarbonate sleeve, into the underlying surficial material (C soil horizon) with a slide hammer.

Cores were extracted, capped and brought back to the lab where they were weighed and measured to determine bulk density. Grab samples from each location were also acquired and used to determine organic matter and gravimetric moisture content.

In the lab, caps were replaced with filter paper and cores immersed in buckets of water for up to 1 week to allow them to saturate. Saturated thermal conductivity was determined using a Decagon KD2 Pro thermal conductivity meter affixed with a 10 cm long TR-1 probe. The instrument uses the transient line source method for thermal conductivity measurements. Measurement procedure follows ASTM Standard D5334-08.

Generally 5 to 6 measurements were made on each core to obtain an overall average and only those measurements with an instrumental error of <1% were retained. The standard error for this overall average is typically within ±0.14 W/m/°K (~7%). Replicate measurements on the reference standard DB2412, using thermal grease as a contact agent, gave a thermal conductivity of 0.366±0.014 W/m/°K compared with the standard value provided by the manufacturer of 0.369 W/m/°K.

Sources

Surficial geology mapping units from the Connecticut Surficial Aquifer Texture Map, which is a derivative data product of the 1:24,000-scale Connecticut Surficial Materials Map (Stone et al, 1992) to describe unconsolidated areas of the subsurface with similar properties relative to ground water flow.

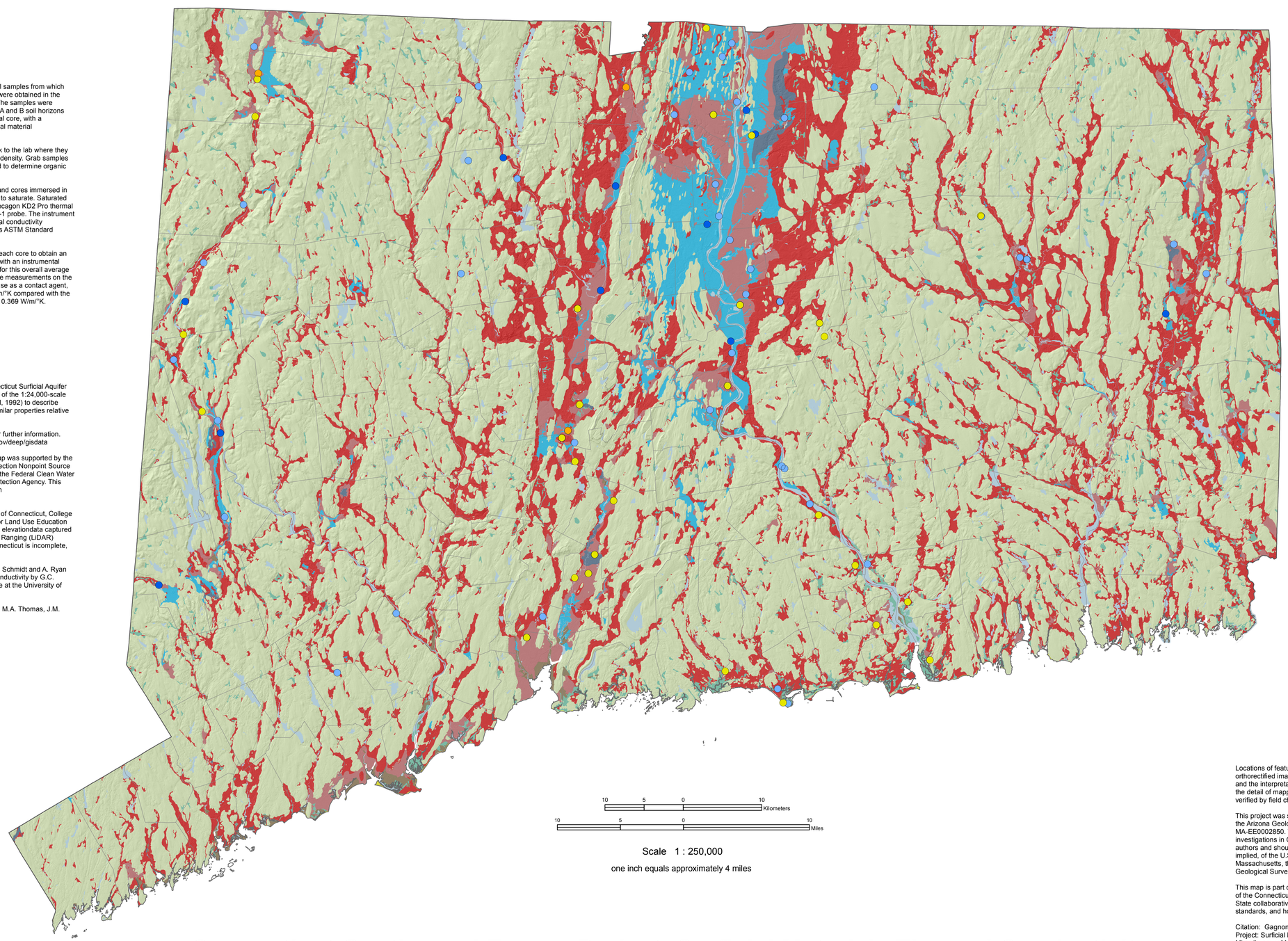
See http://cteco.uconn.edu/data_guides.htm for further information.
This data is available for download at www.ct.gov/deep/gisdata

Development of the Surficial Aquifer Texture Map was supported by the Connecticut Department of Environmental Protection Nonpoint Source Management Program, through Section 319 of the Federal Clean Water Act, administered by the US Environmental Protection Agency. This data and additional information is available from www.ct.gov/deep/gisdata

Hillshade base was produced by the University of Connecticut, College of Agriculture and Natural Resources, Center for Land Use Education and Research (CLEAR). It is derived from point elevationdata captured during the year 2000 using Light Detection And Ranging (LiDAR) technology. Note, the 2000 LiDAR data for Connecticut is incomplete, necessitating interpolation in some areas.

Field sampling by T.K. Gagnon, G.C. Koteas, J. Schmidt and A. Ryan (2010-2012). Lab measurements of thermal conductivity by G.C. Koteas, A. Ryan, F. Iwanik, J. Gilbert, S. Mabee at the University of Massachusetts (2010-2012).

Digital cartography and editing by T.K. Gagnon, M.A. Thomas, J.M. Rhodes, S.B. Mabee, L.C. Belliveau (2013).



Surficial Geology

- Fine
- Fine overlying Coarse
- Coarse
- Coarse overlying Fine
- Till
- Salt Marsh; Swamp
- Beach
- Artificial Fill

NOTE ON SURFICIAL GEOLOGY CLASSIFIED UNITS:
Fine includes very fine sand, silt and clay
Coarse includes gravel, sand & gravel, coarse to medium sand.
Till includes unsorted mixture of boulder to clay sized materials
Salt Marsh, Swamp, Beach and Artificial Fill are post-glacial deposits.

Saturated Soil Thermal Conductivity ($W/m^{0}K$)	Number of Samples
2.5 - 3.0	3
2.0 - 2.5	29
1.5 - 2.0	54
1.0 -1.5	14
Sample Total	**100**

Connecticut Geothermal Energy Project: Surficial Materials Thermal Conductivity

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Comments to Map Users

Locations of features shown on this map are not surveyed, but are determined by GPS and verified using orthorectified images; therefore, the accuracy of feature locations depends on the scale of the mapping and the interpretation of the mapper(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site specific conditions should be verified by field checking.

This project was supported by the U.S. Department of Energy through a subcontract award granted by the Arizona Geological Survey to the Massachusetts Geological Survey under award number MA-EE0002850. The Connecticut Geological Survey was a cooperative partner in the project for investigations in Connecticut.The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing official policies, either expressed or implied, of the U.S.Government, Commonwealth of Massachusetts, State of Connecticut, the University of Massachusetts, the Connecticut Department of Energy and Environmental Protection, Massachusetts Geological Survey, or the Connecticut Geological Survey.

This map is part of a Connecticut Geothermal Energy Project Map Series. All data and mapping products of the Connecticut Geothermal Energy Project are available through www.stategeothermaldata.org, a 50 State collaborative portal, built on U.S. Geosciences Information Network (USGIN) protocols and standards, and hosted by the Arizona Geological Survey.

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This map and other Connecticut Geological and Natural History Survey Publications are available at www.ct.gov/deep/geology

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