DESCRIPTION OF MAP UNITS

Sediment deposited during the Holocene—Post-glacial to pre-settlement sediment derived from loose, initially unvegetated glacigenic sediment is portrayed on this map. Profound landscape-altering events such as the incision of the deep, glacial River Warren channel immediately after ice withdrawal were followed by slower fluvial and slope processes operative in the warm and dry conditions of the mid-Holocene, approximately 9,000-5,000 radiocarbon years before present (Grimm 1983; Webb et al. 1984; Webb et al., 1993). After that prolonged dry period, climate and therefore geomorphic processes were much like today. Intensive landscape and drainage modifications by humans since European settlement have altered the land surface in a way that is not reflected in this map.

Ha Predominantly sand but including pebbly sand to mud (silt and clay, organic-rich in places), deposited in horizontal layers by modern streams in channels. Many modern streams re-occupy glacial channels so unit may be coarser-grained in places owing to reworking of glacial stream sediment. May also include areas of decomposing organic material and fine-grained sediment deposited by slack water. *Holocene alluvium*.

Hc Varying amounts of sediment and rock fragments deposited on steep slopes by wet and dry gravitational failure. May resemble glacial sediment or locally exposed rock on steep slopes or may have been sorted by gravity and water resulting in material with a different texture than the parent material. *Colluvium.*

Hf Sand and gravel forming a fan-shaped mound at the mouth of a modern stream where it enters a less-steep area, typically a terrace or floodplain. *Holocene alluvial fan.*

Hl Silt to clay with sand and organics near the shore; laminated in places. Deposited in ponded water in modern or drained lakes. *Holocene lake sediment*.

Hp Partially to fully decomposed organic matter infilling shallow depressions and water bodies such as seasonal or ephemeral ponds, lakes (peat mats typically form near shore and grow into deeper water), and along low-gradient modern and glacial streams. The low infiltration capacity of the fine-grained glacial sediment and irregular topography of ice stagnation landscapes created many isolated depressions that seasonally held standing water. *Holocene organic deposits*.

Ht Sand and gravel, well sorted, forming a nearly level surface with some areas of streamlined bars and shallow channels, lying above the modern floodplain; general elevation of the surface is given in feet and expressed in a slightly different color. Terraces began evolving after the initial glacial River Warren channel incision, 11,500 radiocarbon years before present (13,400 calendar years) as knickpoints migrated upstream on the tributaries. *Holocene alluvial terrace*.

Sediment associated with the northwest-source Des Moines lobe ice—Color of glacial sediment is typically olive-brown (Munsell soil color 2.5y 4/4) where oxidized and dark gray (Munsell soil color 2.5 Y 4/1) where unoxidized. Sorted sediment has the color associated with the dominant grain size (2.5 Y 3/1, very dark gray for clay; 2.5y 6/4, light yellowish-brown for silt and variable for sand depending on the mineral assemblage).

Qt Unsorted sediment with a loam matrix and containing clasts of gravel (diamicton); compact; forms a low relief surface. *Subglacial till.*

Qliw Silt and clay layers, bedded sand, and loamy, vaguely bedded glacial sediment (diamicton); interpreted as lake and debris flow deposits confined within growing holes in the stagnant ice surface resulting in flat-topped, circular hills. *Ice-walled lake-plain deposits.*

Qtm Ridge of poorly sorted glacial sediment (diamicton); interpreted as demarcating the margin of active ice and formed through a combination of ice-marginal processes including meltout of a basal debris layer, thrusting, and debris flows. *Moraine.*

Qtw Unsorted deposit of loamy glacial sediment with gravel (diamicton); surface expression is subdued and commonly streamlined. Interpreted as having been washed by water (rivers and lakes). Has the potential to be capped with a coarse-grained lag resulting from the removal of finer-grained particles by water and a drape of fine-grained sediment deposited by waning flows. *Washed till.*

Qcss Poorly sorted gravel and sand intercalated with loamy, poorly sorted glacial sediment (diamicton); in places fines up to silt; confined to narrow, low ridges. Interpreted to have been deposited in crevasses or low areas on the ice surface by running water and gravity. Also includes small areas interpreted as subglacial tunnel deposits (eskers). *Collapsed stream sediment*.

Qcssb As above but shallowly buried, commonly by lacustrine deposits. Close enough to the surface to lighten the color of the overlying unit on black and white aerial photos indicating dryer conditions. *Buried, collapsed stream sediment*.

REFERENCES

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