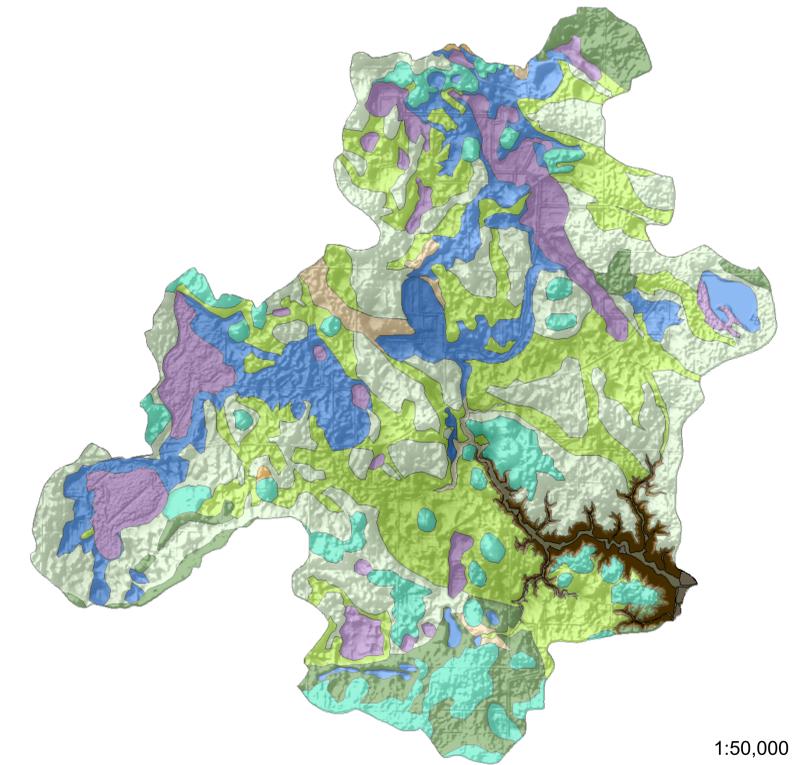
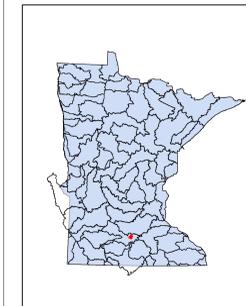


# Draft Surficial Geology and Geomorphology of Seven Mile Creek Watershed August, 2010 Carrie E. Jennings



1:50,000

Surficial geology superimposed on terrain model derived from LIDAR



### Unit description

**Sediment deposited during the Holocene—**  
Post-glacial to pre-settlement sediment derived from loose, initially unvegetated glacial sediment is portrayed in 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 in places owing to reworking of glacial stream sediment. May also include areas of decomposing organic material and fine 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 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), 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 surface given in feet and expressed in slightly different color. Terraces began evolving after the initial glacial River Warren channel incision, 11,500 reph (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 (diamiction); compact, forms a low relief surface. Subglacial till.

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

**Qlm** Ridge of poorly sorted glacial sediment (diamiction); interpreted as demarcating 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 (diamiction); 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 lag resulting from the removal of finer particles by water and a drape of fine sediment deposited by waning flows. Washed till.

**Qcss** Poorly sorted gravel and sand intercalated with loamy, poorly sorted glacial sediment (diamiction); 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 color of overlying unit on black and white aerial photo indicating dryer conditions. Buried, collapsed stream sediment.

Grimm, E., 1983, Chronology and dynamics of vegetation change in the prairie-woodland region of southern Minnesota, USA. New Phytology, v. 93, p. 311-350.

Webb, T., III, Cushing, E.J., and Wright, H.E., Jr., 1984, Holocene changes in the vegetation of the Midwest, in Wright, H.E., Jr. (ed.), Late-Quaternary environments of the United States, v. 2, The Holocene: Minneapolis, University of Minnesota Press, p. 142-165. Webb, T., III, Ruddiman, W.F., Street-Perrott, F.A., Martignole, V., Kutzbach, J.E., Bartlein, P.J., Wright, H.E., Jr., and Prell, W.L., 1993, Climatic changes during the past 18,000 years: regional syntheses, mechanisms, and causes, in Wright, H.E., Jr., et al., (eds.), Global climates since the Last Glacial Maximum: Minneapolis, University of Minnesota Press, p. 514-535.

### Legend

- 2008gpspts
- photos

### Surficial Polys

#### Unit

- Ha
- Hc
- Hf
- Hl
- Hp
- Ht
- Qcss
- Qcssb
- Qliw
- Qt
- Qtm
- Qtw

1:24,000

0 0.25 0.5 1 Miles

0 0.350.7 1.4 Kilometers

