SURFICIAL GEOLOGY
MILLE LACS KATHIO STATE PARK

HEATHER ANDERSON
1998

HOLOCENE
DUNES & DUNG: Partially emerged sand material, includes shell fragments, and marl. Found in landforms near lakes or in small isolated depressions within the moraines.
WATER: Lakes and swamps.

PLIIOGENE
Sediments associated with the Superior Lake during the Island Stage.

REACH & SEDEMENT: Well sorted, fine sand, with occasional layers of silt and gravel. Rooted in clay, forms a relatively flat surface with a gentle slope toward water bodies.
MILLE LACS Lakes Lagoons: Large lakes along the shoreline near the 1300 elevation contour. Interpreted as sediments deposited during the late glacial period.

SEEDMENTS OF CHANNELS: Alluvial fans are common and gravel with some silt and clay layers, moderately sorted. May be due to accumulations of organic material or water. Forms a relatively flat surface with a gentle slope toward water bodies.
CITY FORMS: Fine to coarse sand and gravel, some silt and clay layers, moderately sorted. May be due to accumulations of organic material or water.

OUTWASH: Medium to fine sand and gravel with silt, pebbles, and gravel. Moderately sorted. Rooted in clay or silt. Forms a relatively flat surface with a gentle slope toward water bodies.
FITTED OUTWASH: Fine sand and gravel with silt and pebbles, moderately sorted. Rooted in clay or silt. Forms a relatively flat surface with a gentle slope toward water bodies.
TILL: Typically a warm boulder till ranging from sandy silt to clay. Moderately sorted. Moderately sorted. Rooted in clay or silt. Forms a relatively flat surface with a gentle slope toward water bodies.

Inundated TILL: Tills with partially saturated, root-sorted topsoil or clay. Moderately sorted. Rooted in clay or silt. Forms a relatively flat surface with a gentle slope toward water bodies.

LAKE FORMS
- Eroded ridge
- Outlet channel scar
- Burned-in map
- Ice front margin
- Ice front depression

Scale: 1:18,000
0 1 2 3 Miles
0 1 2 3 Kilometers

Geologic contact
- Well defined
- Moderately defined
- Gradual
- Water

Landforms

Public Land Survey 153 Project, Minnesota Department of Natural Resources, Division of Minerals.
Roads from State of Minnesota Raster, Department of Transportation Surveying and Mapping.
Minnesota Department of Natural Resources.

© 1998, State of Minnesota, Department of Natural Resources.

Surficial geology based on interpretation of aerial photography, field work, and delination by Heather Anderson.
Design and cartography by Renee Johnson.