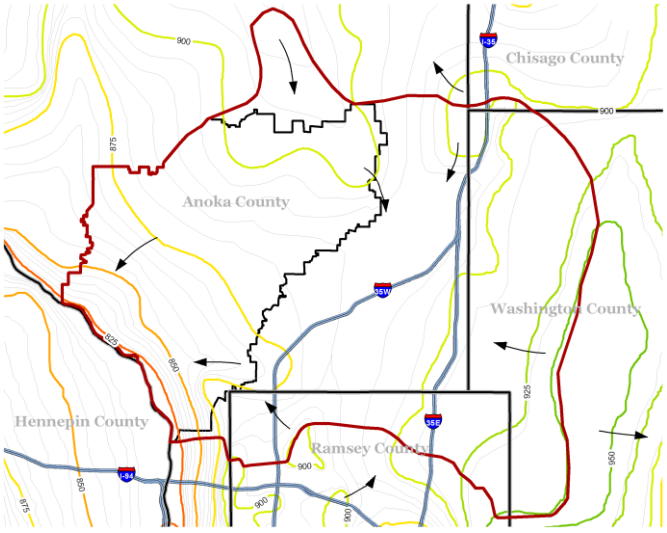
Groundwater Storage & Flux

Current Plan

Presents a review of the geology of the District and assumes that 5% (23.9 mgy) of precipitation that falls on the watershed recharges the surficial aquifer.

Surficial groundwater flow is conceptualized as follows

Flow System	Depth (Ft)	Flow Pattern	Length (mi)	Response Time (yrs)
Shallow	0-16	Mirrors surface	3.1	2 - 10
Intermediate	16-300	Influenced by Bed-rock &/or large surface feature	<25	10-50
Regional	>300	Function of geology	>25	≥100+



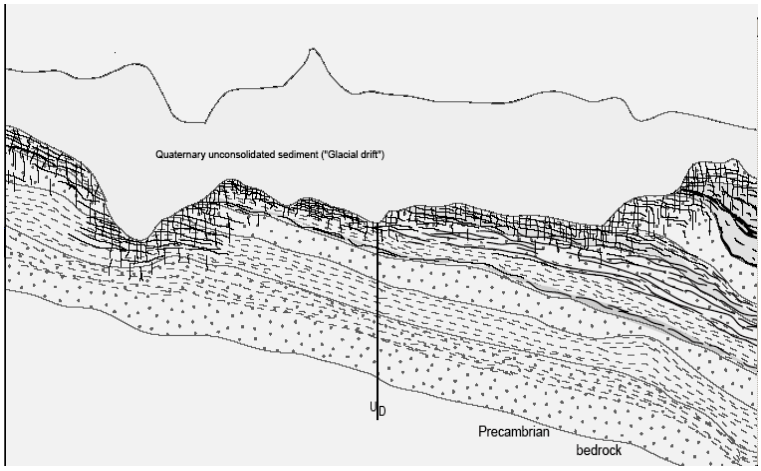
Shallow and intermediate groundwater source and flow within Coon Creek Watershed

Glacial Unconsolidated Sediment

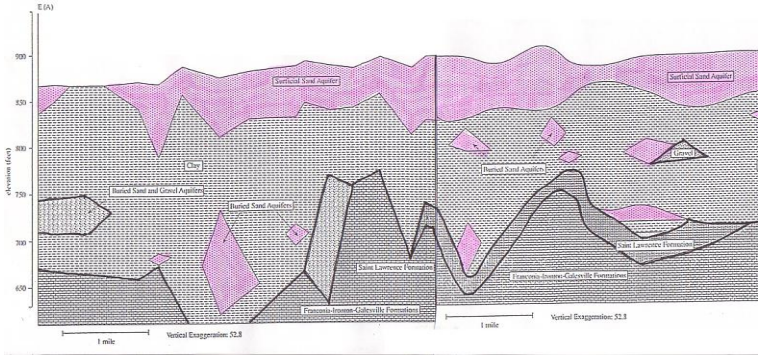
The 2010 Resource Assessment focuses on the hydrology of the glacial drift that covers the watershed and retains the surficial aquifer.

Groundwater Storage & Flux

Northwest Metro Cross-Section. MDNR



Example of the Upper 300 Feet



West to East Cross Section of Coon Creek Watershed, MPCA 1997

Surficial Groundwater Flow

The 2010 Resource Assessment looks at the surficial aquifer from a landscape perspective and identifies two geomorphic land types within the watershed that influence shallow and intermediate groundwater flow.

1. Lake Deposits of Glacial Lakes Hugo and Fridley (shown below)
2. River Terrace Deposits of the Mississippi River (shown below)

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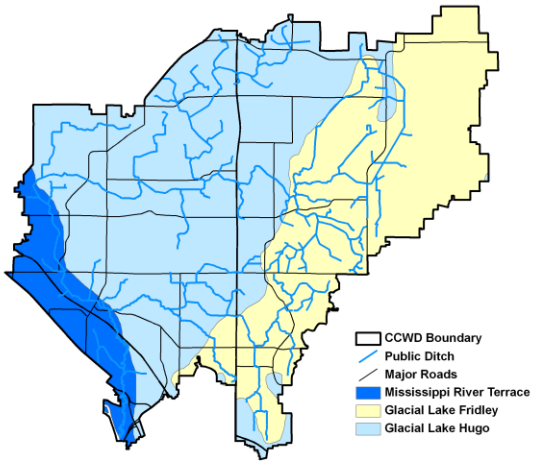
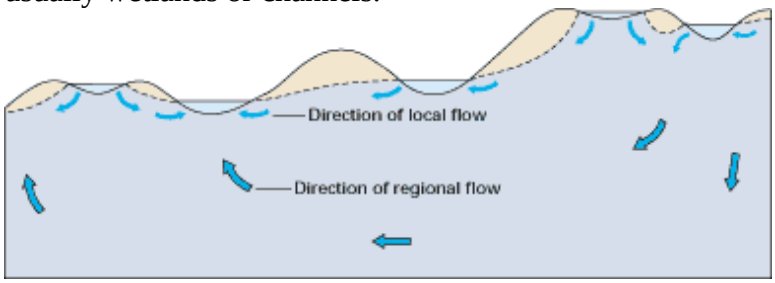


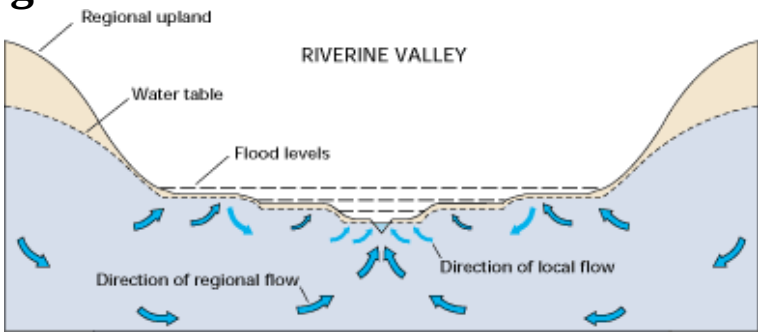
Lake Deposits The Lake Deposits of the majority of the watershed are comprised of medium to fine sands with typical infiltration rates of 6 to 20 inches per hour. The hydraulic conductivity of the top 16 to 20 feet of soils is governed by slope and the rate at which water moves laterally (transmisivity) through the soils. The slopes and gradient are influenced by the thickness and density of material.

Within the Anoka Sand Plain, shallow groundwater flow can be expected to be between 1 and 10 feet per day and generally flow to areas of the lowest potential which is usually wetlands or channels.



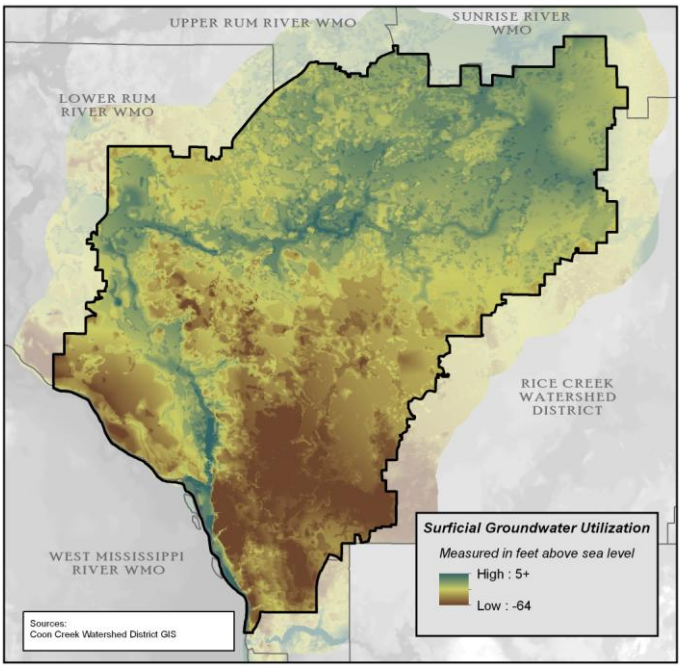
The Mississippi river is a major influence on shallow and regional groundwater flows within the watershed. For water that does not discharge to the surface through lakes or wetlands, or percolate to the regional groundwater system, the Mississipi river is the ultimate destination of not only surface waters but groundwater as well.

Groundwater Storage & Flux



Conceptualized shallow groundwater flow within a river valley

Trends in Surficial Groundwater Use



Surficial Water Table Elevation Change 1979-2008 (CCWD 2010)

Implications of Changes in Surficial Groundwater Supplies

Three major implications for water management can be drawn from these trends:

More Storage As surficial groundwater declines there is more groundwater storage available.

Infiltration Should be Easy Given the soils over most of the watershed, infiltration will be very difficult to prevent (vice versa: Infiltration of groundwater and therefore groundwater recharge should be easy to accomplish).

Loss of Groundwater If surficial groundwater levels continue to fall between

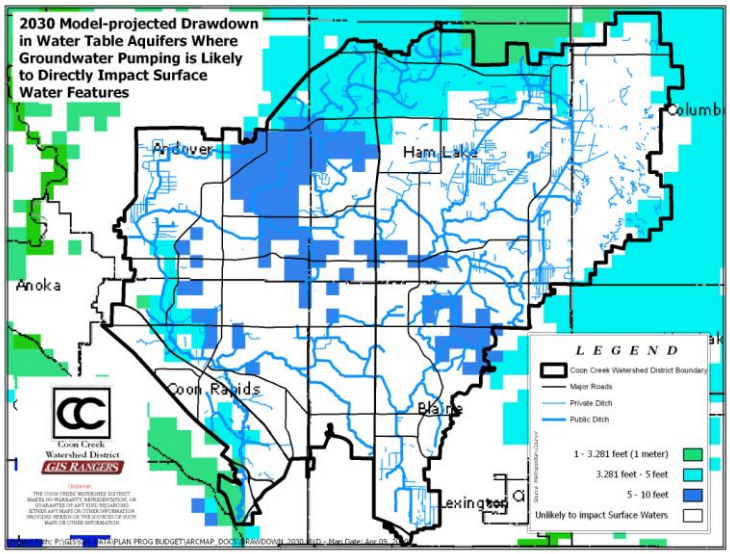
Groundwater Storage & Flux

Driven Surface Water Features

2010 and 2020, surficial water features, such as

a. Lakes (decline of 50% surface area)
b. Wetlands (8,375 acres)
c. Base Flow

will be difficult to protect and sustain in the areas shown below:



Metropolitan Council, 2009

Management Needs

Increased Infiltration/ Groundwater Recharge

If precipitations and groundwater continues to decline, an aggressive program of infiltration and groundwater recharge will be essential to slow, halt or reverse the effects of a decline in surficial groundwater levels.