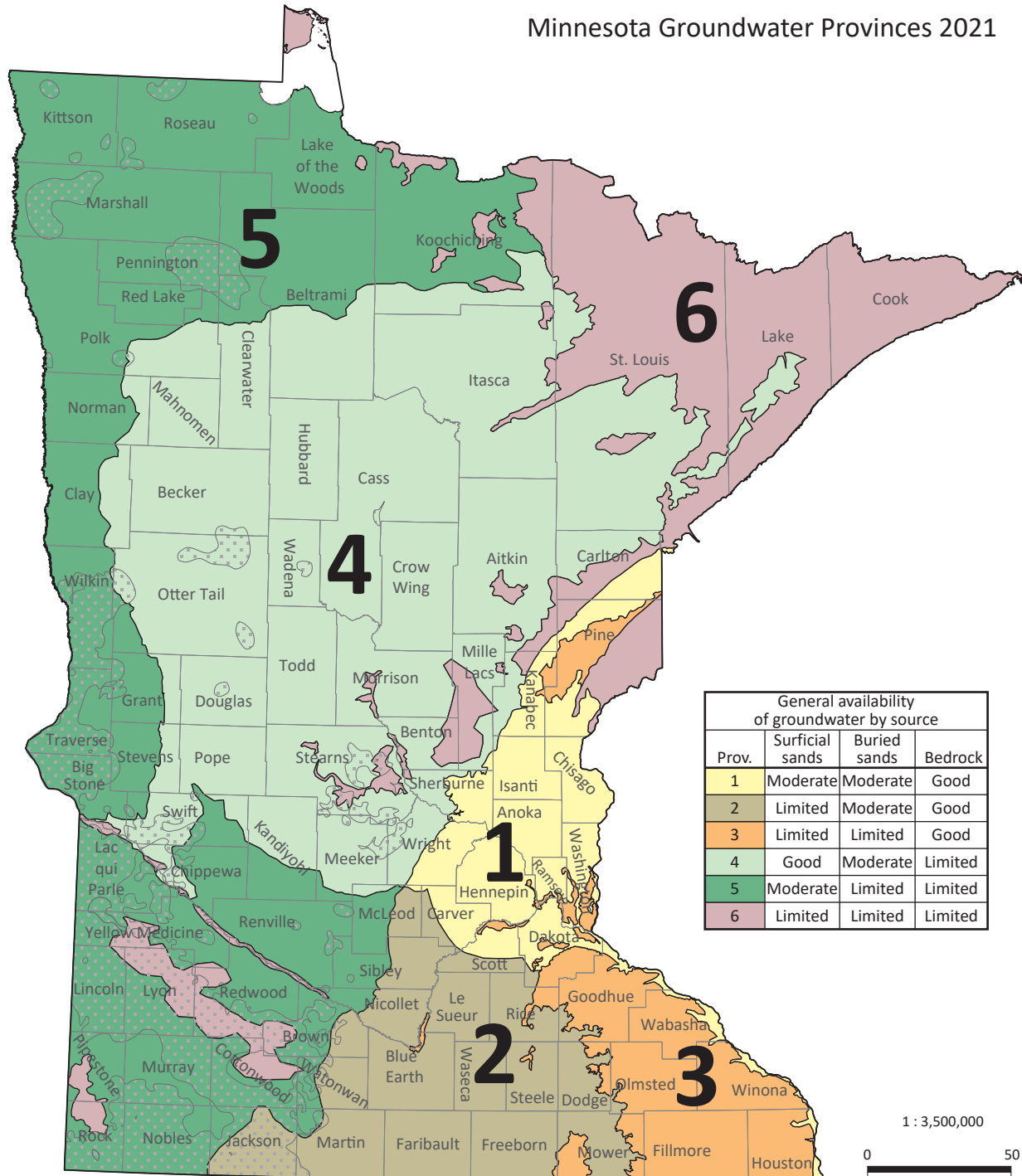



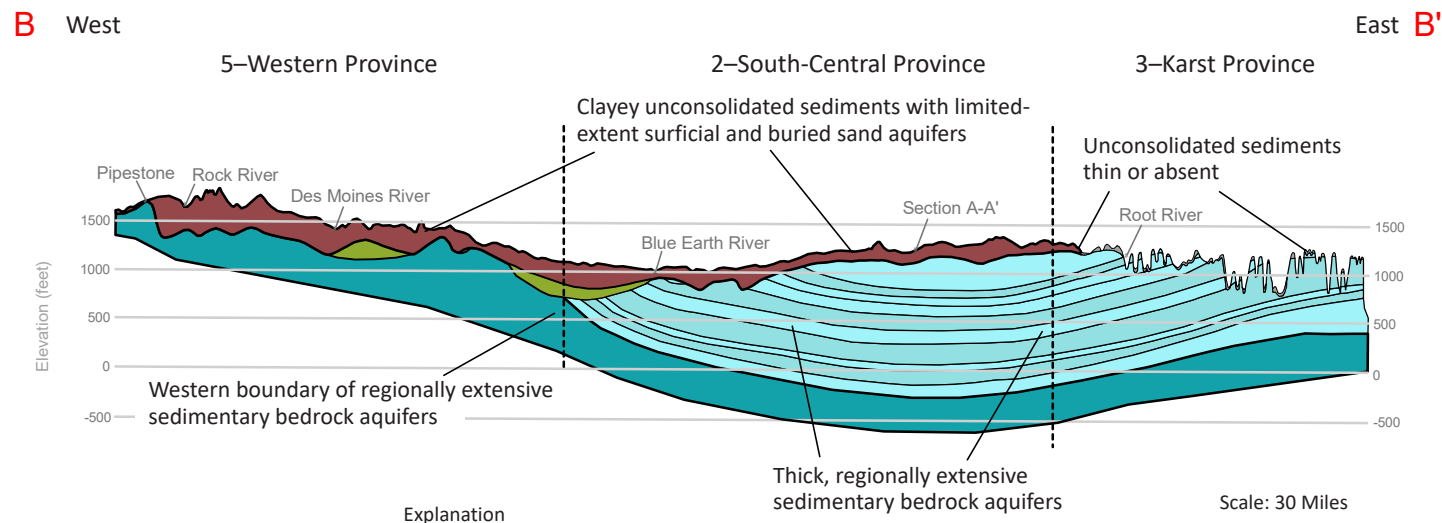
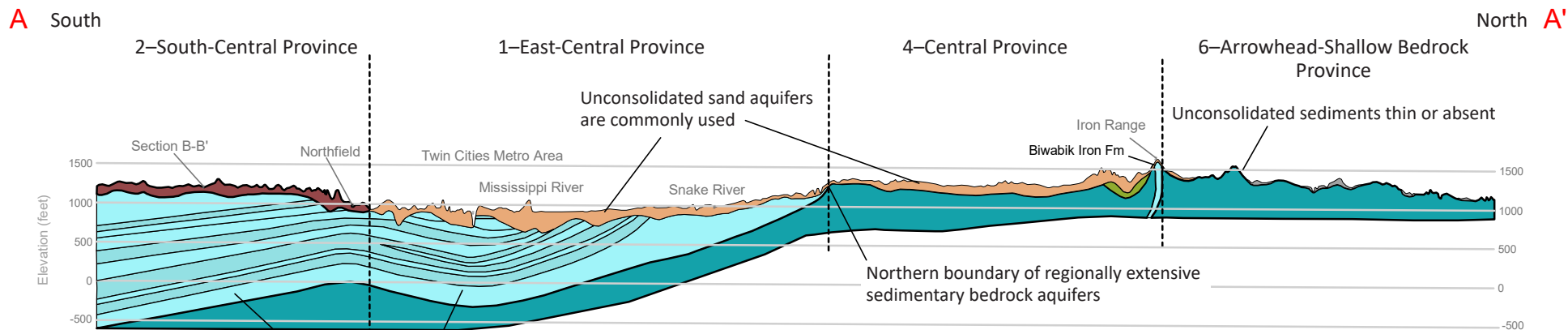
Minnesota Groundwater Provinces 2021



General availability of groundwater by source			
Prov.	Surficial sands	Buried sands	Bedrock
1	Moderate	Moderate	Good
2	Limited	Moderate	Good
3	Limited	Limited	Good
4	Good	Moderate	Limited
5	Moderate	Limited	Limited
6	Limited	Limited	Limited

- 1 East-Central Province**
 Surficial and buried sand and gravel aquifers are common. These unconsolidated aquifers are underlain by thick and extensive Paleozoic (sandstone and carbonate) and Precambrian (sandstone) aquifers.
 - 2 South-Central Province**
 Thick loam and clay loam glacial sediment, with limited extent surficial and buried sand aquifers, overlying thick and extensive Paleozoic (sandstone and carbonate) aquifers
 - 3 Karst Province**
 Thin (less than 50 feet) glacial sediment overlying thick and extensive bedrock (carbonate and sandstone) prone to karst features such as solution conduits, sinkholes and caves.
 - 4 Central Province**
 Surficial and buried sand and gravel aquifers are common. The underlying Cretaceous (shale and sandstone) and Precambrian (igneous and metamorphic) bedrock are typically limited aquifers.
 - 5 Western Province**
 Loam and clay loam glacial sediment is common with limited surficial and buried sand aquifers. The underlying Cretaceous (shale and sandstone) and Precambrian (igneous and metamorphic) bedrock are typically limited aquifers.
 - 6 Arrowhead/Shallow Bedrock Province**
 Exposed or shallow (less than 50 feet) Precambrian bedrock, and to a lesser extent Cretaceous bedrock. These types of bedrock have limited aquifers.
- 
Cretaceous Bedrock
 Sandstone layers that are interbedded with thick layers of shale or mudstone. Used locally as water sources with limited aquifer characteristics. These units occur beneath the glacial sediment but above the Precambrian bedrock.

Minnesota Groundwater Provinces 2021 - Generalized Cross Sections



Explanation

- Clayey unconsolidated sediments with limited-extent sand aquifers (Quaternary)
- Sandy unconsolidated sediments; sand aquifers common (Quaternary)
- Thin, unconsolidated sediments with the exception of sand aquifers (Quaternary) in major river valleys that are frequently used
- Cretaceous shale and sandstone; used locally as water source
- Precambrian bedrock; can provide groundwater locally from fractures

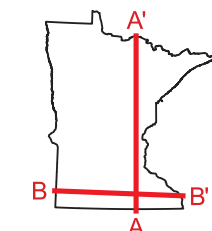
Regional sedimentary bedrock

- Bedrock aquifers*
- Confining units*

*Aquifer and confining unit characteristics can vary regionally, locally, and according to depth below top of bedrock.

Scale: 30 Miles

Approximate vertical exaggeration X 100



Cross section line locations

