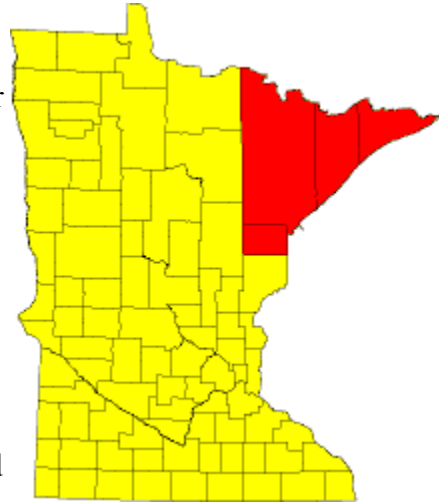


Ground Water Profile: **Arrowhead Region**

This is a ground-water profile for Minnesota's Arrowhead Region, which is comprised of Carlton, Cook, Lake and St. Louis Counties.



HYDROGEOLOGY:

- Glacial aquifers commonly are thin and limited in their extent and yield.
- Bedrock aquifers have limited yield, generally from fractures; ground-water movement is difficult to define.
- The Biwabik Iron Formation is the only source of ground water for many Iron Range cities.

QUANTITY ISSUES:

- Ground water is scarce in some areas and property values increase with the presence of a good well (e.g. North Shore).
- There are no large-scale regional aquifers.
- Drought conditions may impact water availability to Iron Range cities.

QUALITY ISSUES:

- High salinity (presence of salt) along the North Shore is poorly understood and highly variable. Elevated boron, fluoride, and trace metals are common.
- The impact of land use and ground-water recharge to mine pits that are used for public water supplies are an issue.

INFORMATION NEEDED:

- The impacts of ground-water quality on water usage need to be better defined, especially in population centers.
- Techniques to determine ground-water flow in fractured rocks need to be developed.
- The relationship between surficial and bedrock aquifers

needs to be better defined for this area.

DESIRED ACTIONS:

- Assess mine-pit interaction with ground water and impacts of land use on ground-water quality.
- Determine how future mining activities (nonferrous minerals mining and in-pit taconite tailings disposal) may affect ground water.
- Baseline information is needed now, so that we have a basis for comparison as conditions change.
- Assess whether the Biwabik Iron Formation should be designated a sole-source aquifer.