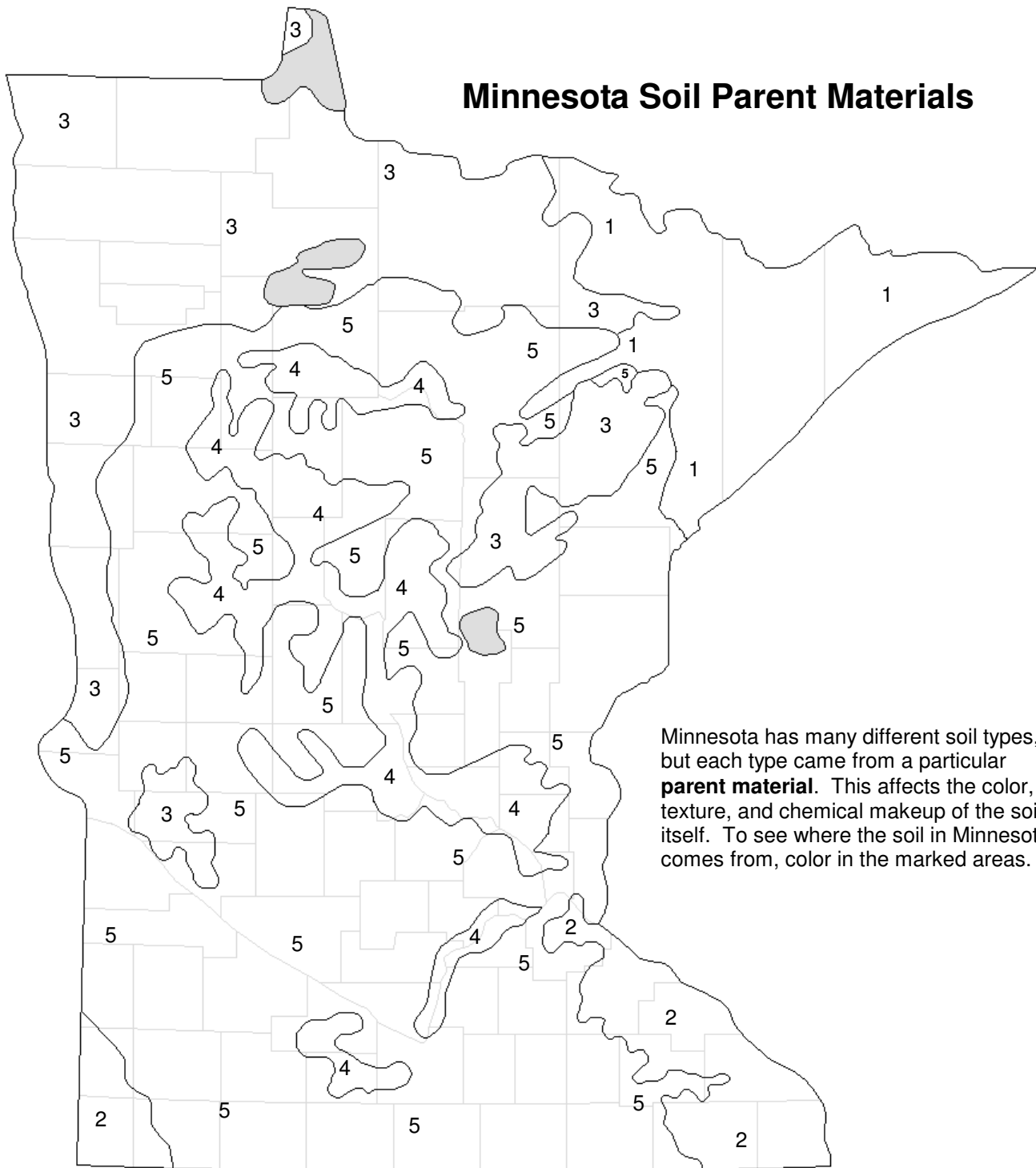


Name: _____



Soil Parent Materials

- 1 Till/Bedrock
- 2 Loess
- 3 Lacustrine
- 4 Outwash
- 5 Till

PARENT MATERIAL

One of the most important elements affecting soil formation in Minnesota is the parent material. The color, texture (number of various size particles, such as sand silt, and clay), and chemical makeup of the soil are closely related to the color, texture, and chemistry of the parent material. The texture of a soil helps determine its ability to hold and transmit water, thereby determining the wetness of the soil. The moisture and nutrient supplying properties of the soil greatly affect what kind of plants can grow on it.

Between ten and twenty thousand years ago, Minnesota was largely covered with glaciers. The materials deposited through the direct and indirect action of the glaciers provide the parent material for our soils. The material deposited directly by the glaciers is called **till**, and is an unsorted mixture of material ranging in size from very fine clay to stones and boulders. As the glaciers melted, considerable quantities of water were released. These waters washed the till, removing fine particles and sorting the remaining sands and gravels, which formed glacial **outwash** sediments. Outwash material is a very common parent material in Minnesota.

In some cases, melt waters collected in low areas, often behind dams of unmelted ice. Lakes were formed that lasted from a few years to thousands of years. One of the best known of these lakes is glacial Lake Agassiz, which occupied the area now known as the Red River Valley in northwestern Minnesota. This lake actually extended, in its early stages, well into northeastern Minnesota. **Lacustrine** deposits, materials that settled out of glacial lakes, vary from sandy and gravelly at the beaches to clayey near the middle of the lake. The topography of the land that was once covered by these lakes is often subdued, with extensive level areas.

For long periods, both during glaciation and while the ice melted, very little vegetation grew on till and outwash areas. Wind blowing over these areas picked up silt and clay-sized particles and carried them for many miles before depositing them. Areas in both southwestern and southeastern Minnesota are covered by these materials called **loess**. The loess may rest on older till, on weathered bedrock, or on fresh bedrock. In northeastern Minnesota the fixed bedrock is near the surface so that soil development must take place in both a thin veneer of glacially deposited material and underlying **bedrock**.

In addition to differences in parent material associated with differences in mode of deposition, the material carried by the glaciers differed depending on the direction from which the glaciers originated. Glaciers moved over Minnesota from both the northwest and the northeast. Glaciers originating in the northwest passed over limestone deposits in southern Canada and carried materials high in lime. Glaciers from the northeast passed over the Laurentian Shield (granite, sandstone and basalt). Depending on the kind of bedrock, these deposits have diverse chemistries but they all lack lime, which affects many other chemical properties.

This information is adapted from "Soils and Landscapes of Minnesota"
<http://www.extension.umn.edu/distribution/cropsystems/DC2331.html>