



Natural Resources

Soils

Soil, a layer of weathered, unconsolidated material on top of bedrock, can be used for many different resource opportunities.

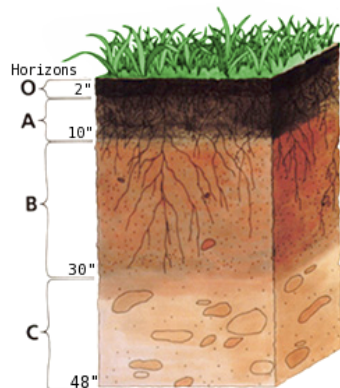
Soils data are used for establishing general patterns of soil suitability and limitations for land uses. From this data, recommendations may be made in relation to flooding potential, safe water table levels, load bearing capacities, permeability, surface drainage, and percolation rates.

Processes acting on materials deposited or accumulated by geologic events produce soils. The soils of Rice County were created from weathering processes that occurred on the bedrock and materials left behind by the glaciers during the Ice Age. Several factors lead to the formation of soils in Rice County. The characteristics of soils are determined by the composition of the parent material, the climate under which the material was produced, the plant and animal life in and on the soil, and the relief or topography of the land.

The properties of soils affect their suitability, use, and management needs.

Properties include the color, texture, and chemical makeup of the soil. These properties are closely related to the properties of the parent material. The texture of the soil determines its ability to hold and transmit water, and thus its overall moisture content. These properties also affect the fertility of the soil in its ability to provide nutrients.

Soil Profile



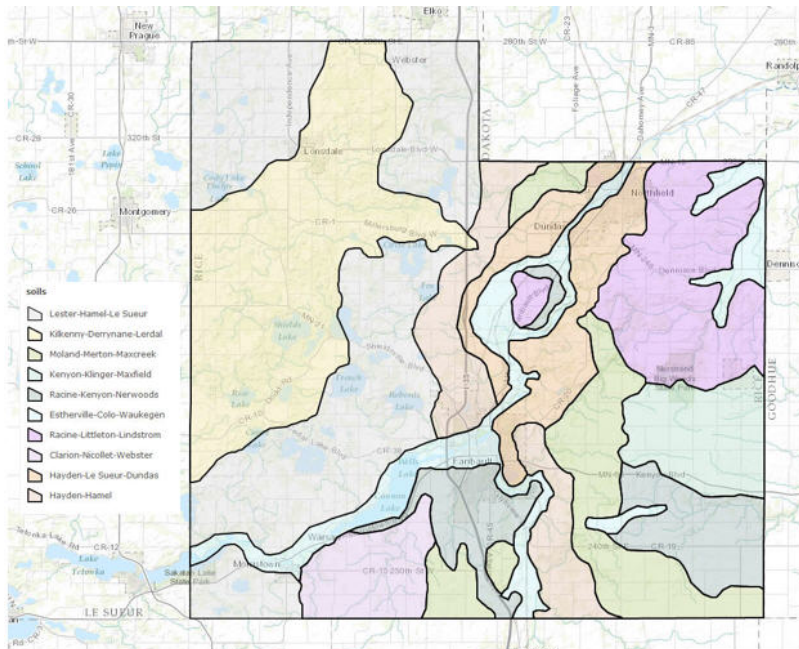
- Most soils have three major horizons -- the surface horizon (A) the subsoil (B), and the substratum (C)
- Some soils have an organic horizon (O) on the surface, but this horizon can also be buried.
- The master horizon, E, is used for horizons that have a significant loss of minerals (eluviation).
- Hard bedrock, which is not soil, uses the letter R.

In Rice County, the underlying bedrock is sandstone and limestone deposited by ancient seas. The majority of the glacial sediment in the county is graying calcareous loam-textured till. This till has a clay content that makes it relatively impermeable to water. Along with the poorly sorted deposits (till), very well sorted sand and gravel were also deposited in Rice County. Weathering processes on the parent materials, the bedrock and glacial deposits, produced the soils of Rice County.

Rice County contains eight major soil associations. Each association contains several major soils and two or more minor soils. These associations define a unique natural landscape with distinctive patterns, relief, and drainage. Soil associations are found in a generalized area, therefore these associations should not be used to assess specific parcels of land. More detailed information can be found in the Soil Survey of Rice County created by the United States Department of Agriculture's Natural Resource Conservation Service (NRCS).

Soil associations as shown on the general county soils map are defined by the NRCS, where the basic unit employed in mapping is the suitability for agriculture. The other basic environmental inputs utilized in the development of the soil associations are the physical properties and the soil characteristics. The modern term now used in evaluating the production potential for agricultural crops is the Crop Production Index, or CPI. The ability of the dominant soil within a mapped association of soils to support the production of one or more categories of crops has been estimated on a soil's overall characteristics. In general, an increase in agricultural production in the various soil associations can be attributed to improved management practices or local variations of soil characteristics. Generalized soil categories county-wide are depicted on the following map and chart:

Rice County Soil Types



Click on the following map to access:

<http://www.arcgis.com/home/webmap/viewer.html?webmap=fd4415157bae4798b4222a8af7d150b0>

More detailed site-specific soil indices are available in the information supported by the NRCS Web Soil Survey at: <http://websoilsurvey.nrcs.usda.gov/app/>

Major Soil Associations in Rice County, Minnesota

Soil Association		Lester-Hamel-Le Sueur (Composes 26% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 0 to 25 percent	Lester: 50% Hamel: 20% Le Sueur: 15% Minor soils: 15%	Hayden Cordova Dundas Terril	Soil	<u>Lester</u>	<u>Hamel</u>	<u>Le Sueur</u>
			Drainage Class	Well Drained	Poorly Drained	Moderate
			Parent Material	Till	Alluvium or Colluvium and Till	Till
			Surface Character	Loam	Loam	Clay loam

Soil Association		Kilkenny-Derrynane-Lerdal (Composes 20% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 1 to 25 percent	Kilkenny: 50% Derrynane: 20% Lerdal: 15% Minor soils: 15%	Mazaska Okoboji Muskego Shields	Soil	<u>Kilkenny</u>	<u>Derrynane</u>	<u>Lerdal</u>
			Drainage Class	Moderate	Poorly Drained	Somewhat Poorly Drained
			Parent Material	Glaciolacustrine Deposits and Till	Alluvium or Colluvium and Till	Glaciolacustrine Deposits and Till
			Surface Character	Clay Loam	Clay Loam	Clay Loam

Soil Association		Racine-Littleton-Lindstrom (Composes 5% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 1 to 18 percent	Racine: 40% Littleton: 30% Lindstrom: 25% Minor soils: 5%	Blooming Moland Garwin Brodale Eyota Copaston	Soil	<u>Racine</u>	<u>Littleton</u>	<u>Lindstrom</u>
			Drainage Class	Well Drained	Somewhat Poorly Drained	Well Drained
			Parent Material	Glaciolacustrine Deposits and Till	Alluvium or Colluvium and Till	Alluvium or Colluvium
			Surface Character	Silt Loam	Silt Loam	Silt Loam

Soil Association		Clarion-Nicollet-Webster (Composes 4% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 0 to 5 percent	Clarion: 40% Nicollet: 25% Webster: 20% Minor soils: 15%	Storden Le Sueur Hamel Glencoe Shields Derrynane Okoboji	Soil	<u>Clarion</u>	<u>Nicollet</u>	<u>Webster</u>
			Drainage Class	Well Drained	Somewhat Poorly Drained	Poorly Drained
			Parent Material	Till	Till	Till
			Surface Character	Loam	Clay Loam	Clay Loam

Soil Association		Moland-Merton-Maxcreek (Composes 8% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 0 to 4 percent	Moland: 45% Merton: 30% Maxcreek: 20% Minor Soils: 5%	Blooming Racine Maxfield	Soil	<u>Moland</u>	<u>Merton</u>	<u>Maxcreek</u>
			Drainage Class	Well Drained	Somewhat Poorly Drained	Poorly Drained
			Parent Material	Eolian Deposits over Till	Eolian Deposits over Till	Glaciolacustrine Deposits and Till
			Surface Character	Silt Loam	Silt Loam	Silty Clay Loam

Soil Association		Hayden-Le Sueur-Dundas (Composes 8% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 1 to 25 percent	Hayden: 35% Le Sueur: 25% Dundas: 25% Minor soils: 15%	Lester Hamel Terril Glencoe Brodale Eyota Copaston	Soil	<u>Hayden</u>	<u>Le Sueur</u>	<u>Dundas</u>
			Drainage Class	Well Drained	Moderate	Somewhat Poorly Drained
			Parent Material	Till	Till	Till
			Surface Character	Loam	Loam	Silt Loam

Soil Association		Hayden-Hamel (Composes 8% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 0 to 25 percent	Hayden: 50% Hamel: 35% Minor soils: 15%	Lester Storden Le Sueur Glencoe Klossner	Soil	<u>Hayden</u>	<u>Hamel</u>	
			Drainage Class	Well Drained	Poorly Drained	
			Parent Material	Till	Alluvium or Colluvium and Till	
			Surface Character	Loam	Loam	

Soil Association		Racine-Kenyon-Nerwoods (Composes 8% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 1 to 18 percent	Racine: 50% Kenyon: 25% Nerwoods: 20% Minor soils: 5%	Blooming Epsom	Soil	<u>Racine</u>	<u>Kenyon</u>	<u>Nerwoods</u>
			Drainage Class	Well Drained	Moderate	Somewhat Poorly Drained
			Parent Material	Glaciolacustrine Deposits and Till	Glaciolacustrine Deposits and Till	Alluvium or Colluvium and Till
			Surface Character	Silt Loam	Silt Loam	Loam

Soil Association		Kenyon-Klinger-Maxfield (Composes 4% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Moraines. Slope range: 0 to 4 percent	Kenyon: 50% Klinger: 25% Maxfield: 15% Minor soils: 10%	Racine Prinsburg Maxcreek	Soil	<u>Kenyon</u>	<u>Klinger</u>	<u>Maxfield</u>
			Drainage Class	Moderate	Somewhat Poorly Drained	Poorly Drained
			Parent Material	Glaciolacustrine Deposits and Till	Glaciolacustrine Deposits and Till	Glaciolacustrine Deposits and Till
			Surface Character	Silt Loam	Silt Loam	Silty Clay Loam

Soil Association		Esterville-Colo-Waukegan (Composes 9% of the Survey Area)				
Major Use		Cropland, Hayland				
Setting	Soil Composition	Minor Soils	Properties and Qualities			
Outwash plains and terraces. Slope range: 0 to 6 percent	Esterville: 40% Colo: 30% Waukegan: 20% Minor soils: 10%	Hawick Kato	Soil	<u>Esterville</u>	<u>Colo</u>	<u>Waukegan</u>
			Drainage Class	Somewhat Excessively Drained	Poorly Drained	Well Drained
			Parent Material	Glacial Outwash	Alluvium	Alluvium and Outwash
			Surface Character	Silt Loam	Silt Loam	Silt Loam

Whether soils with apparently high potential for agricultural potential will be agricultural in the future depends upon a number of difficult-to-predict variables. In general, the pattern in Rice County, and in many counties in Minnesota, is for areas with large tracts of contiguous, high quality agricultural land to continue in agriculture. Areas that are in close proximity to urban areas or fractured landscapes with multiple uses create an environment that makes agriculture more difficult to sustain over a period of many years. Over time, as agricultural land is converted to other purposes, the potential for the land to be utilized for agricultural purposes diminishes with each passing year.