

Lester

Minnesota's State Soil

Minnesota Association of Professional Soil Scientists
MAPSS





John & Maria Lester

The Naming of Lester Prairie

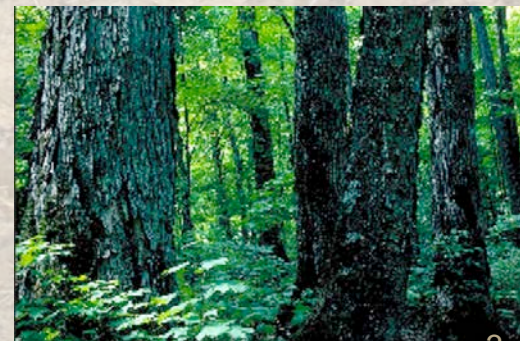
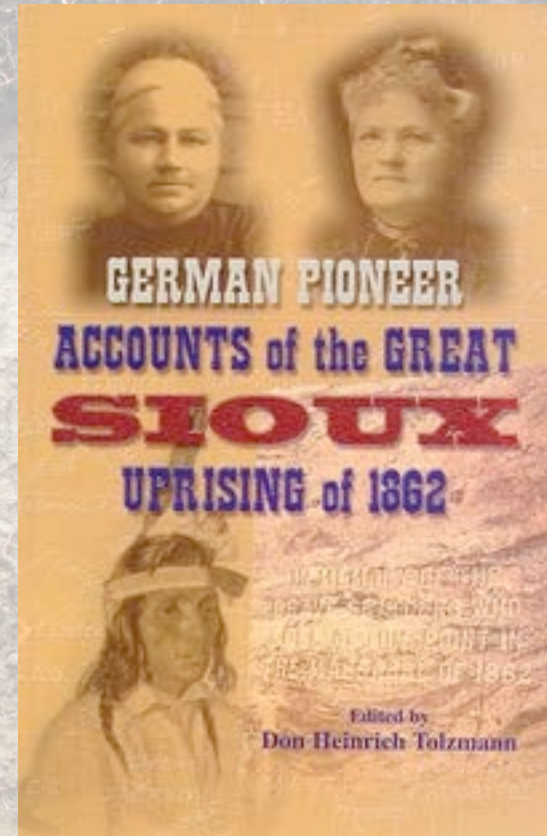
- Lester Prairie was named “Lester” in honor of John and Maria Lester and their family, who settled in the area, and “Prairie” for the little prairie on which it was situated.
- In 1856 when the prairie opened up, they staked their homestead.
- The Lester farm is on the NW ¼ of the section that the town of Lester Prairie sits on.

Photo of John and Maria Lester used with permission from the Lester Prairie Herald Journal/McLeod County Historical society

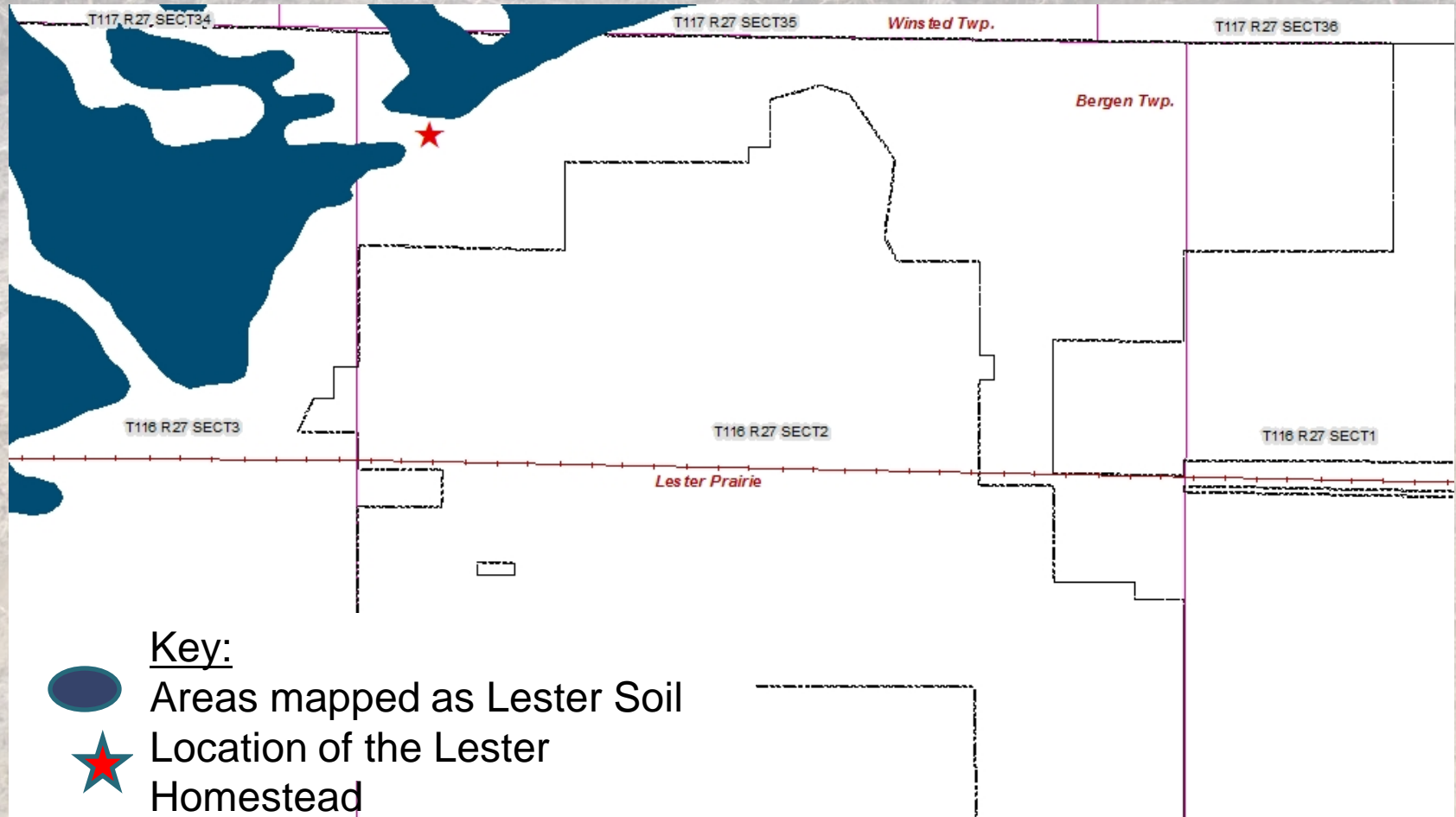


Sioux Uprising -

- In August of 1862 the Sioux Uprising flared up, starting out in Meeker County, close by where some settlers were killed. The Lester's fled to Hutchinson after reportedly burying their wagon.
- Maria Lester was related to 2 U.S. Presidents: She was the Niece of John Adams; and the first cousin of John Quincy Adams.
- We name soils after the place it is first recognized and since Lester Prairie is named after the Lester farm on the prairie, it is a natural fit to talk about the pre-settlement vegetation and how this soil is located near the edge of the forest



The Lester Farm Near Lester Prairie



The Story of Lester

- The Lester soil was first proposed in 1939, in McLeod County – near Lester Prairie, Minnesota.
- Lester was established in 1945, in Dakota County Minnesota.
- Lester developed at the prairie/forest interface and is currently mapped on approximately 400,000 acres in 16 Minnesota Counties.
- Lester soils have properties developed from both grassland and forest environments and are primarily used for forage, corn and soybean production.



Ron E. VanNimwegen

The Story of Lester



- In 1985, the Minnesota Association of Professional Soil Scientists (MAPSS), formed committee to designate a state soil.
- **Selection criteria was that the soil had to be:**
 1. *A Minnesota Soil Series;*
 2. *Extensive;*
 3. *Economically important;*
 4. *'Teachable' (photogenic).*
- The members voted to designate Lester as their state soil in 1987.
- In 2012, a significant legislative effort was undertaken to establish Lester as the "Official Minnesota State Soil".
- Legislation establishing Lester as the "Official Minnesota State Soil" was signed by Minnesota Governor Mark Dayton on **April 28, 2012**

Why is soil important? Just ask yourself:

- Where does food come from?
- Where does paper and wood come from?
- How is spent water and our waste water cleaned or filtered before entering streams, rivers, lakes, and groundwater?
- What supports our homes and buildings, gardens, lawns, parks, and recreation areas?
- The answer is **Soil** - Without soil, clean water and air we can not exist.



What is soil?

- All natural resources...are soil or derivatives of soil. Farms, ranges, crops, and livestock, forests, irrigation water and even water power resolve themselves into questions of soil. Soil is therefore the basic natural resource. --- Aldo Leopold
- **Soil** - The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.



NRCS Photo



Photo by L. Clarke

or.... What is soil ?

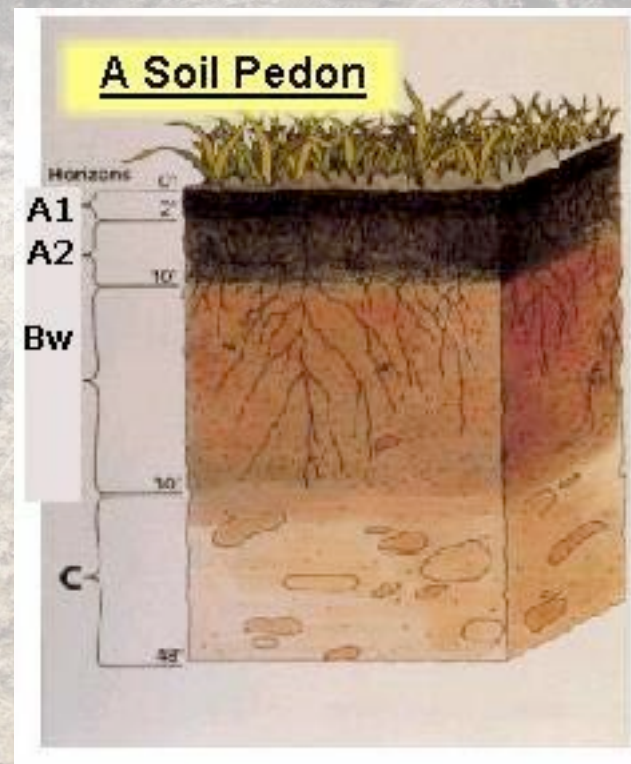
- The unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of **genetic and environmental factors** of:

1. **Climate;**
2. **Organisms;**
3. **Relief;**
4. **Parent Material; &**
5. **Time**



What is a soil series

- **Soil series** as established by the National Cooperative Soil Survey of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) are a level of classification in the USDA Soil Taxonomy classification system hierarchy.
- The actual object of classification is the so-called soil individual, or pedon.
- Soil series consist of pedons that are grouped together because of their similar pedogenesis, soil chemistry, and physical properties.

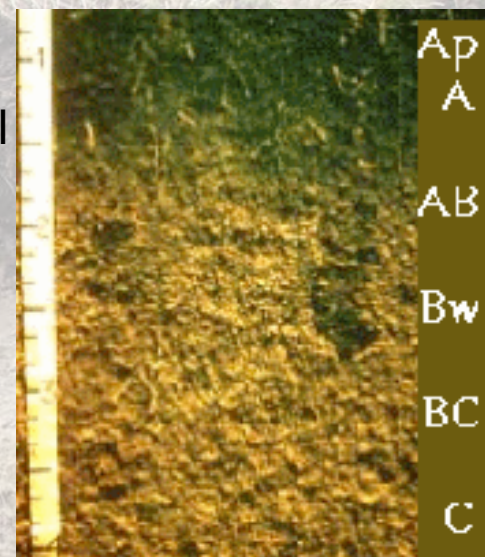


A Soil Series

A prairie soil

- More specifically, each soil series consists of pedons having soil horizons that are similar in
 - *soil color,*
 - *soil texture,*
 - *soil structure,*
 - *soil pH,*
 - *mineral and chemical composition*
 - *arrangement in the soil profile.*
- These result in soils which perform similarly for land use purposes.
- There are approximately 963 different soil series mapped in Minnesota

Clarion Soil Series



A forest soil



Field Determination of Soil Properties

Soil Scientists have to study the soil in the field. They will use soil pits, soil probes or road cuts to sample the soil horizons.

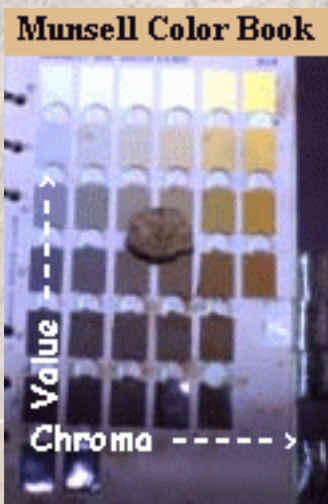
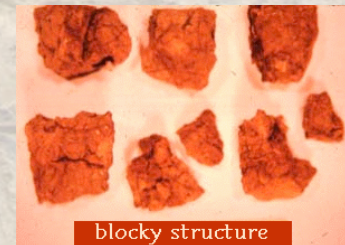
The soil is next classified using field techniques:

- Soil Texture - soil scientists push moist soil between their thumb and index finger to form a ribbon. The length of the ribbon along with if the soil feels gritty, sticky or smooth will determine the soil texture.

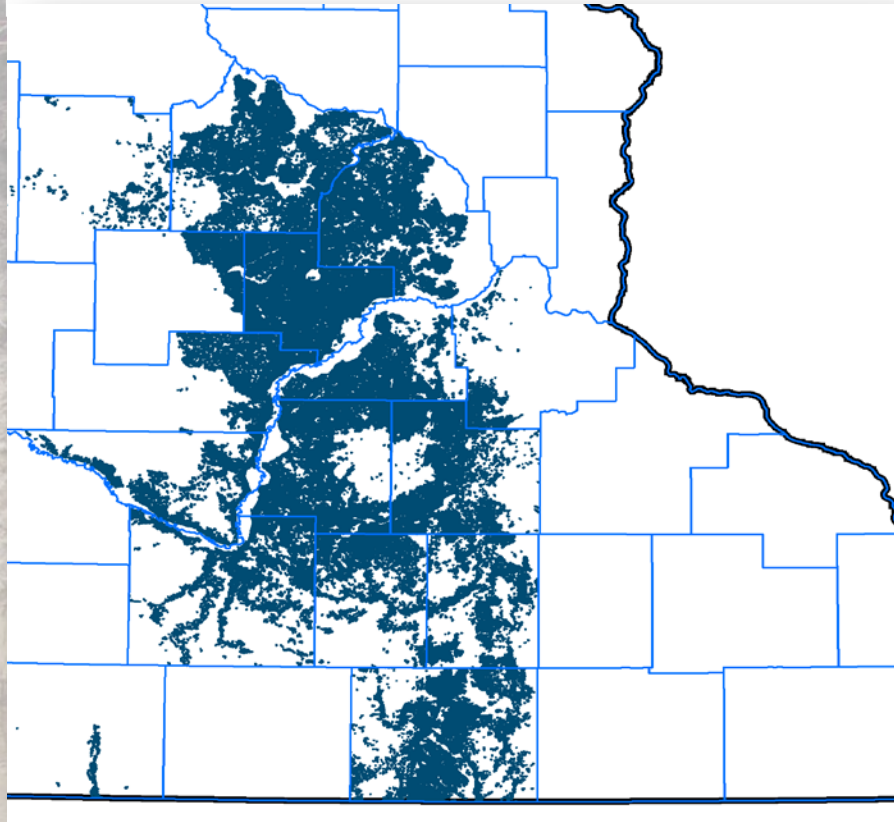
- Click to play Soil Texture Ribboning Video:



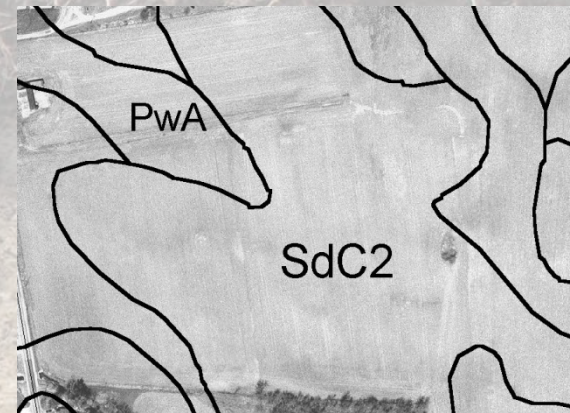
- Soil Color -A 'Munsell' soil color book is used to determine the soil color (soil is held behind the hole in the page to determine the color).
- Soil Structure – Soil peds are the shape of the soil, blocky, platy and prismatic are some of the shapes.



Areas Where Lester is Mapped



What is a soil map?



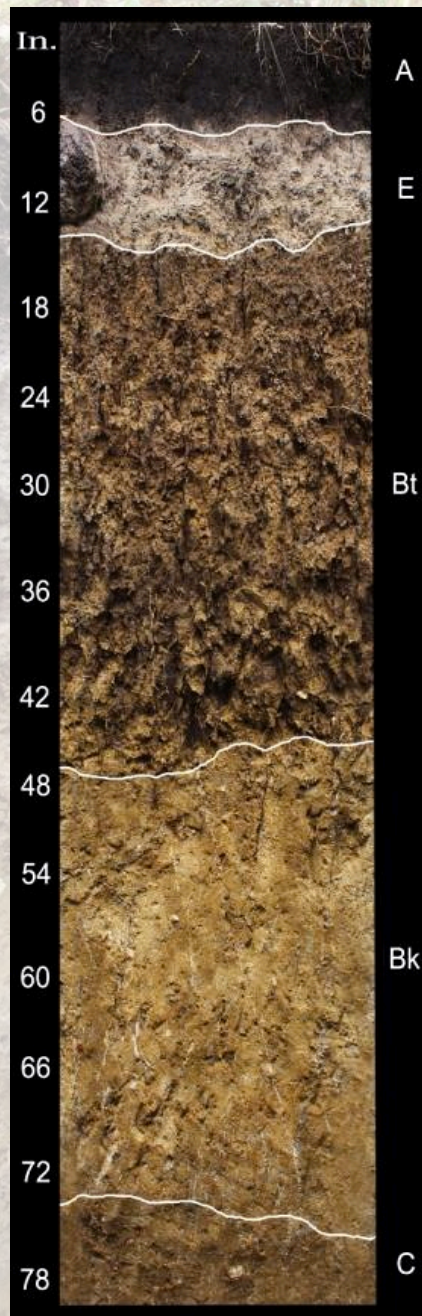
- * describes the characteristics of the soils in a given area.
- * plots the boundaries of the soils on a map, the map uses an aerial photo as the base
- * makes predictions about the behavior of soils



Properties and Interpretations For Lester

Slope	2 -70%
Depth to Seasonal High Water Table	> 6 feet in normal years
Drainage Class	Well Drained
Parent Material	Calcareous, loamy glacial till
Potential for Frost Action	Moderate
Acres Mapped in MN	Approximately 400,000
Prime Farmland	On slopes of less than 6%

Scientists classify soils according to a National taxonomic key (NRCS Keys to Soil Taxonomy, 11th Edition, 2010). **Lester is classified as a: *Mollic Hapludalf, fine-loamy, mixed, superactive, mesic.***



A Lester Soil Profile

- This monolith is a Lester soil profile as it would look if you dug a hole straight down into the soil to 78 inches.
- The color, texture and structure change as you go deeper into the earth.
- Soil scientists describe the layers as “horizons” using the scientific notation on the right side of the monolith.

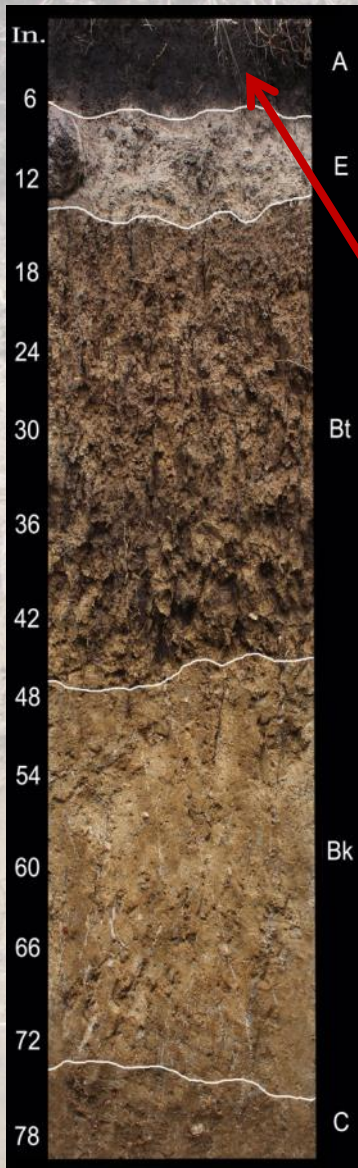
Lester Soil Horizons

The following is a brief description of each horizon:

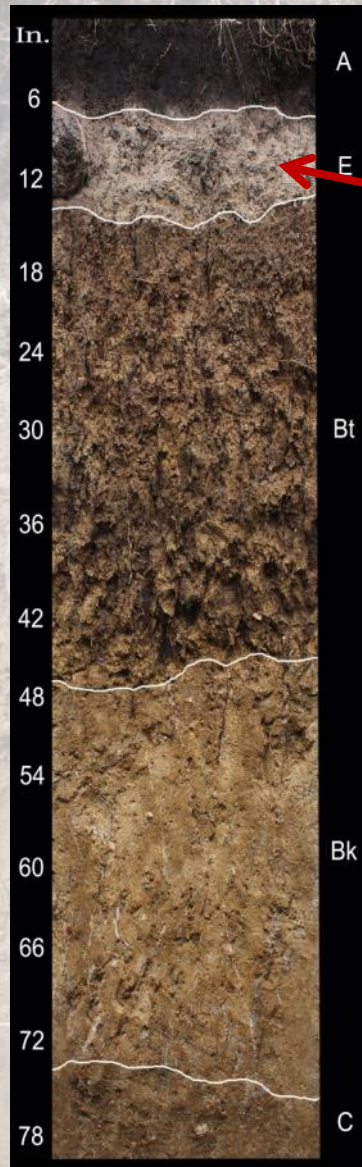
The A Horizon – This is the surface horizon. It is darker than other horizons as it contains the most organic matter.

Organic matter coats and stains the soil particles.

The organic matter comes from annual accumulation of plant material that decomposes in the soil each year.



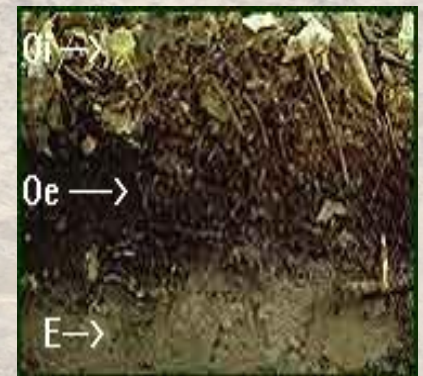
Lester Soil Horizons



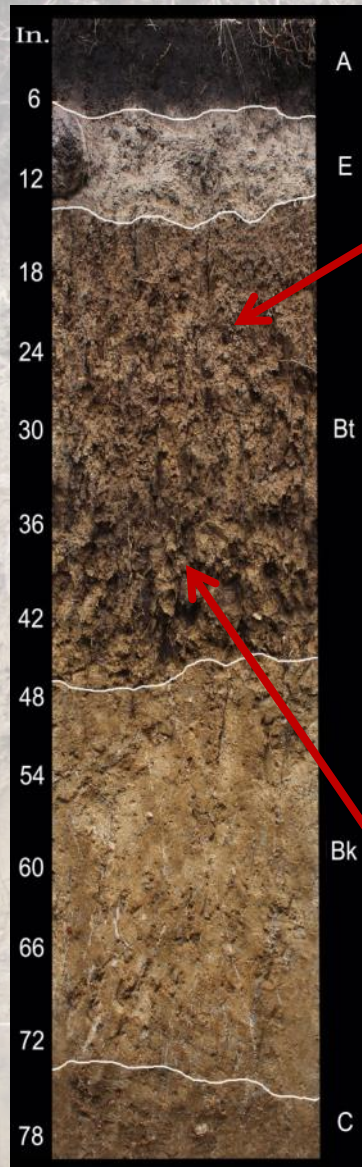
The E Horizon – This horizon is lighter in color than horizons above or below. The E has been leached of clay and organic matter by water movement through the soil.

Soils that have formed under a forest have these horizons as the decomposing leaf litter is more acid creating a more intensive leaching zone.

Soils that have formed under prairie grasses typically lack E horizons.



Lester Soil Horizons



The Bt Horizon – This horizon has clay accumulation that leached from the horizons above. (t = clay)

This layer has the most clay in the Lester profile and has the most effect on water movement, (slower) density (higher), and ease of root movement (harder).

The lower part of this horizon has the most clay and organic coatings in root and earth worm pores and faces of peds, thus it looks a little darker



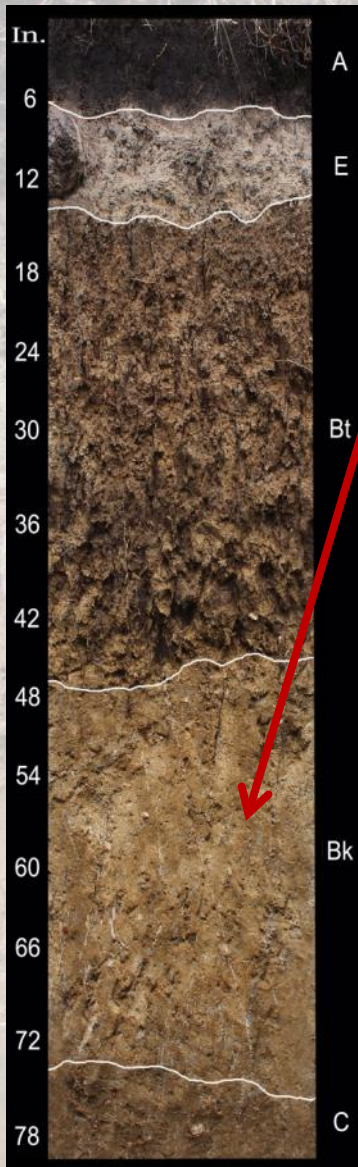
Lester Soil Horizons

The Bk Horizon – Calcium carbonate (lime) accumulates in this horizon. (k = calcium carbonate)

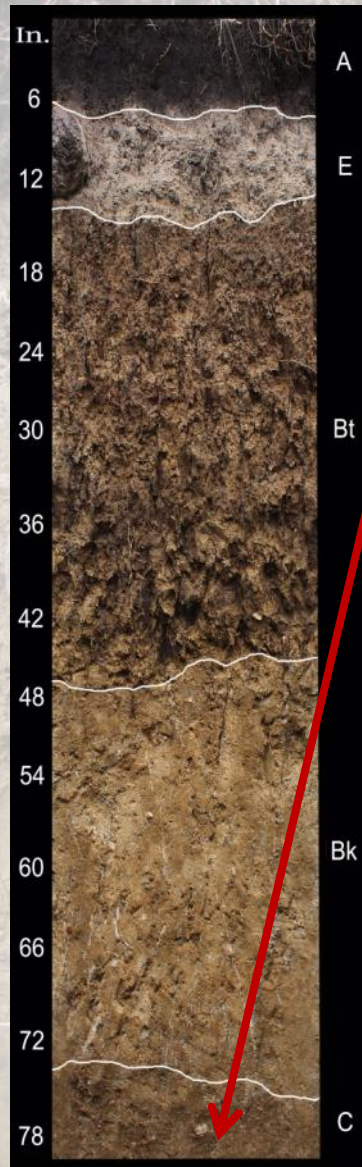
The parent material (till) was high in lime and the lime leached from the surface when the soil was first forming about 12,000 years before present.

Because of the lime this horizon has a higher pH than horizons above.

This horizon will bubble or fizz when HCl is added to the soil.



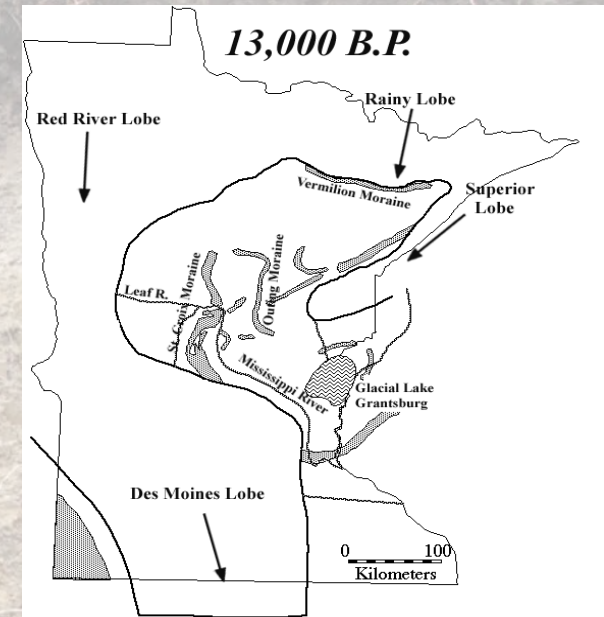
Lester Soil Horizons



The C Horizon – This is the unaltered parent material (Des Moines Lobe glacial till) produced by glaciers grinding up rocks, boulders and stones as they bulldozed their way through Minnesota.

The till originated in Canada north of Lake Winnipeg.

The C has had little or no soil development and looks much like it did when first deposited by the glacier.



Physical and Chemical Properties

Horizon	Textures	Clay %	CEC	CaCO ₃ %	pH	AWC	OM %	M-BD
A	Loam	20-27	10-24	0	5.6-7.3	.20-.22	1.0-4.0	1.30-1.40
E	Loam	20-27	10-20	0	5.1-7.3	.15-.19	.05-1.0	1.45-1.55
Bt	Loam, Clay Loam	24-32	10-20	0	5.1-7.7	.15-.19	.05-1.0	1.45-1.55
Bk	Loam, Clay Loam	20-30	10-20	15-25	7.4-8.4	.15-.19	.01-.50	1.35-1.55
C	Loam, Clay Loam	20-30	10-20	10-20	7.4-8.4	.15-.19	.01-.50	1.35-1.55

CEC = Cation Exchange Capacity (meq/100 grams)

CaCO₃ = Calcium carbonate (percent)

AWC = Available Water Capacity (inch/inch)

OM = Organic Matter (percent)

M-BD = Moist Bulk Density (grams/cubic centimeter).



Soil our Sustainable Resource

- All of our soils in Minnesota directly support crop production, horticulture, livestock, energy production, forestry and fiber production, home lawns, recreation areas and parks, wastewater and biosolid treatment;
- The indirect benefits of this primary production include the production of food, meat and dairy products, and wood and paper products;
- With careful and wise management that includes soil and water conservation practices, our critical soil resources, highlighted by the Minnesota State Soil - Lester, are sustainable for us and future generations.



Soil Education Websites

- **MN Association of Prof. Soil Scientists (MAPSS)**
www.mnsoilscientist.org
- **Places to see Lester in MN (Google Maps App)**
<https://www.google.com/maps/ms?msid=202692426412454181396.0004cdc6fe1f86c0566f0&msa=0>
- **Soil Science Society of America (SSSA)**
www.soils.org
www.soils4teachers.org
www.iheartsoil.org
www.facebook.com/IheartSoil#!/IheartSoil
- **Global Soil Partnership** www.fao.org/globalsoilpartnership/home/en/
- **Web Soil Survey**
<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- **UC Davis Soil Web**
<http://casoilresource.lawr.ucdavis.edu/soilweb/>
- **Lets Talk about soil video**
<http://vimeo.com/iasspotsdam/letstalkaboutsoil-english>
- **Smithsonian Forces of Soil Website**
<http://forces.si.edu/soils/>



For Additional Information

- **Visit with MAPSS members to:**
 - -Learn more about Soil Science and our organization;
 - -Learn about soil science careers;
 - -Get a copy of up the state soil poster and postcard.
- To Download this Presentation go to:
www.mnsoilscientist.org/resources-for-teachers

Questions?

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