Soil Types Common Within Echinacea Remnants and Their Characteristics

the echinacea project

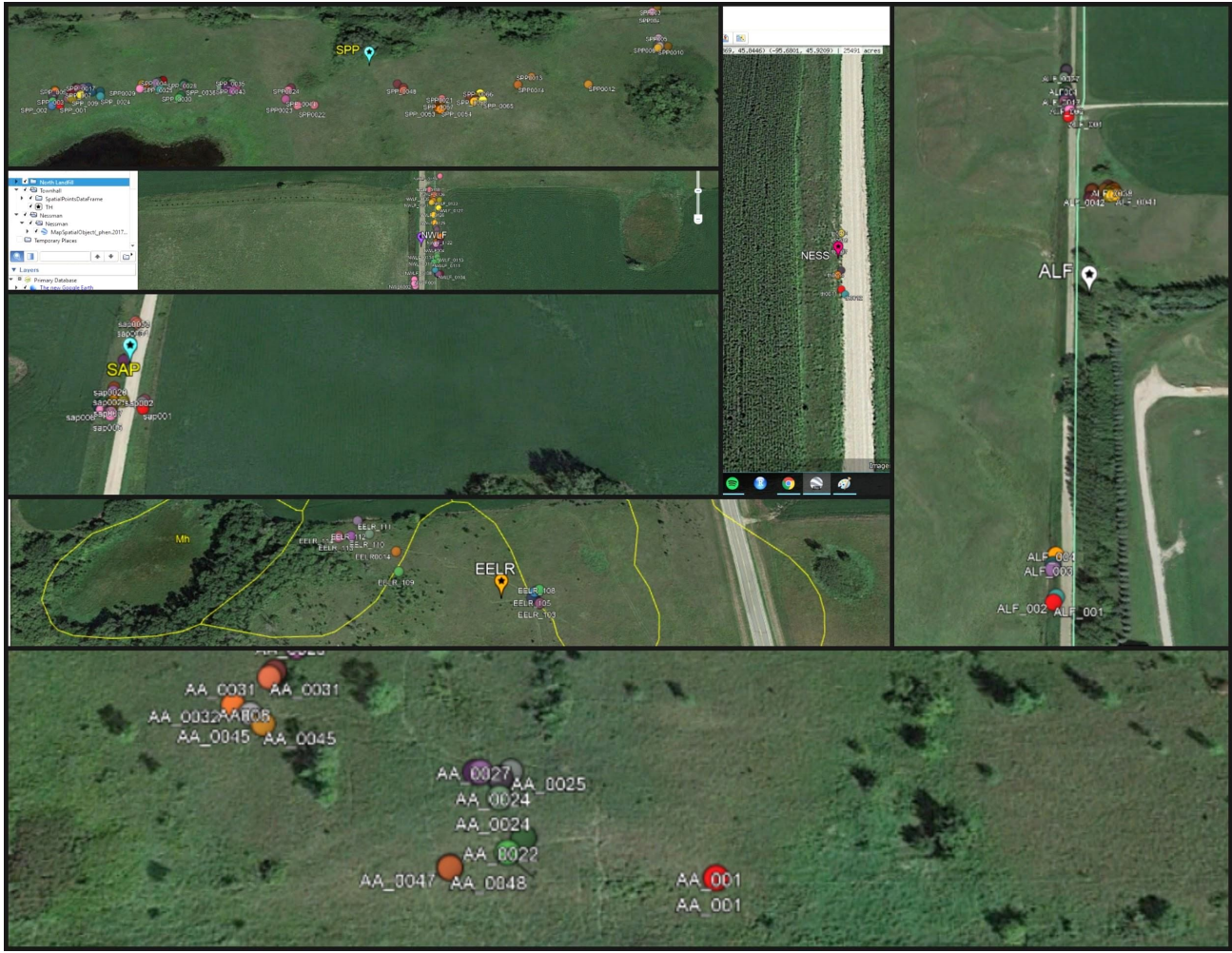
investigating ecology and evolution in fragmented prairie habitat since 1995

Goals:

- ➔ Understand how Google Earth, R Studio, and Soil Web can be used together
- ➔ Learn the different soil types within the Echinacea sites
- ➔ Learn some characteristics and differences between the soil types

Sites

- Around Landfill
- North Landfill
- Steven’s Approach
- Staffanson Prairie
- Nessman
- Townhall
- Aananson
- East Elk Lake Road



Plot KML

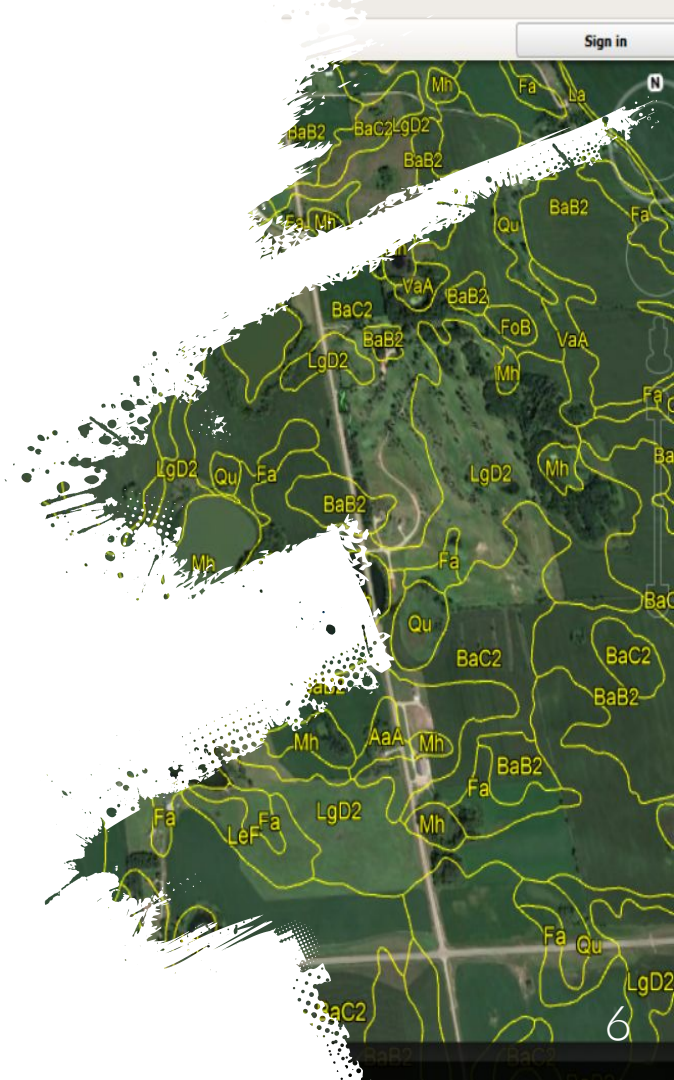
- Downloadable package for R Studio
- Allows you to convert CSV files to points on Google Earth

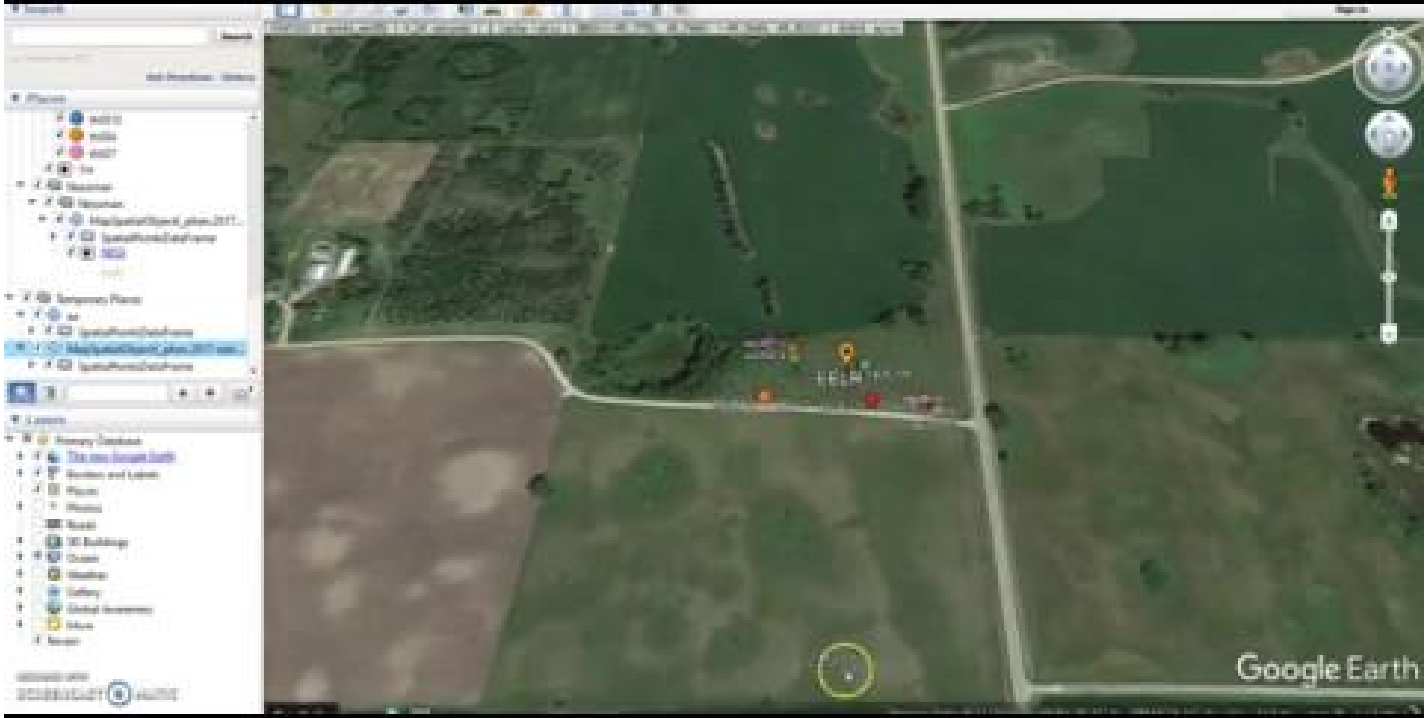
Google Earth Pro

- Downloadable program similar to google maps
- Allows you to create places, routes, and measure sites
- Is compatible with other applications such as Soil Web

Soil Web

- Downloadable application for Google Earth Pro
- Created by the University of California - Davis
- Shows the soil types and boundaries for anywhere in the United States
- Includes horizon and other information on the components of the soil you click on

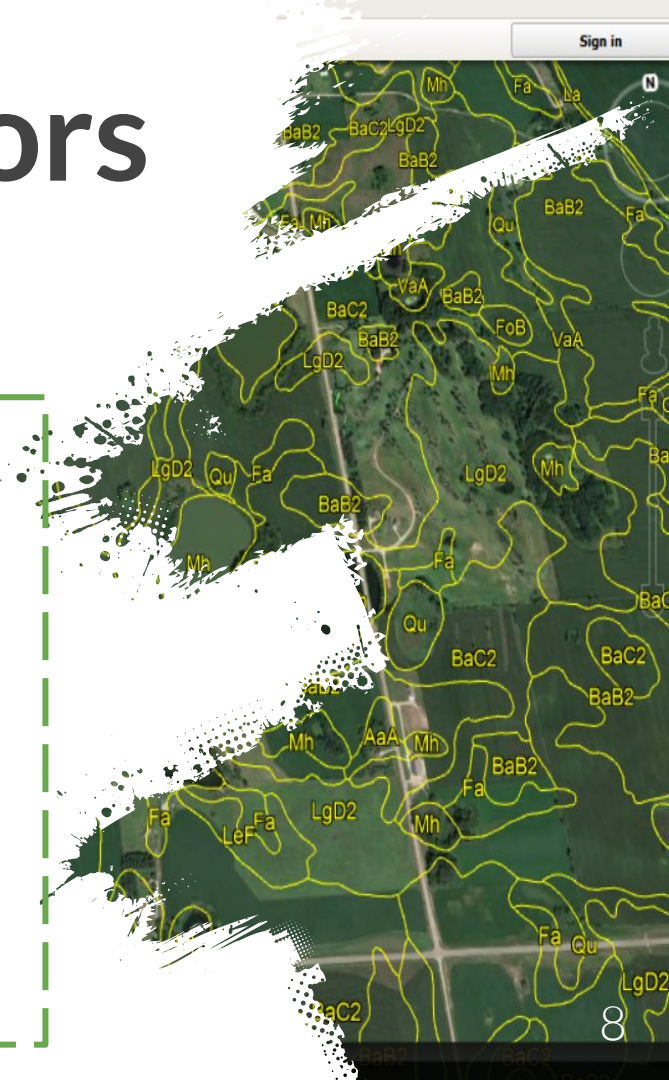



Google Earth

Soil Formation Factors and Orders

1) Parent material (till and outwash)
2) Climate
3) Lay of the land - slope, hills etc…
4) Organisms that live within the soil
5) The length of time the previous factors have interacted

- **Mollisols**
- **Alfisols**
- **Inceptisols**
- **Entisols**
- **Histosols**
- **Spodosols**
- **Vertisols**
- Andisols
- Aridisols
- Gellisols
- Oxisols
- Ultisols

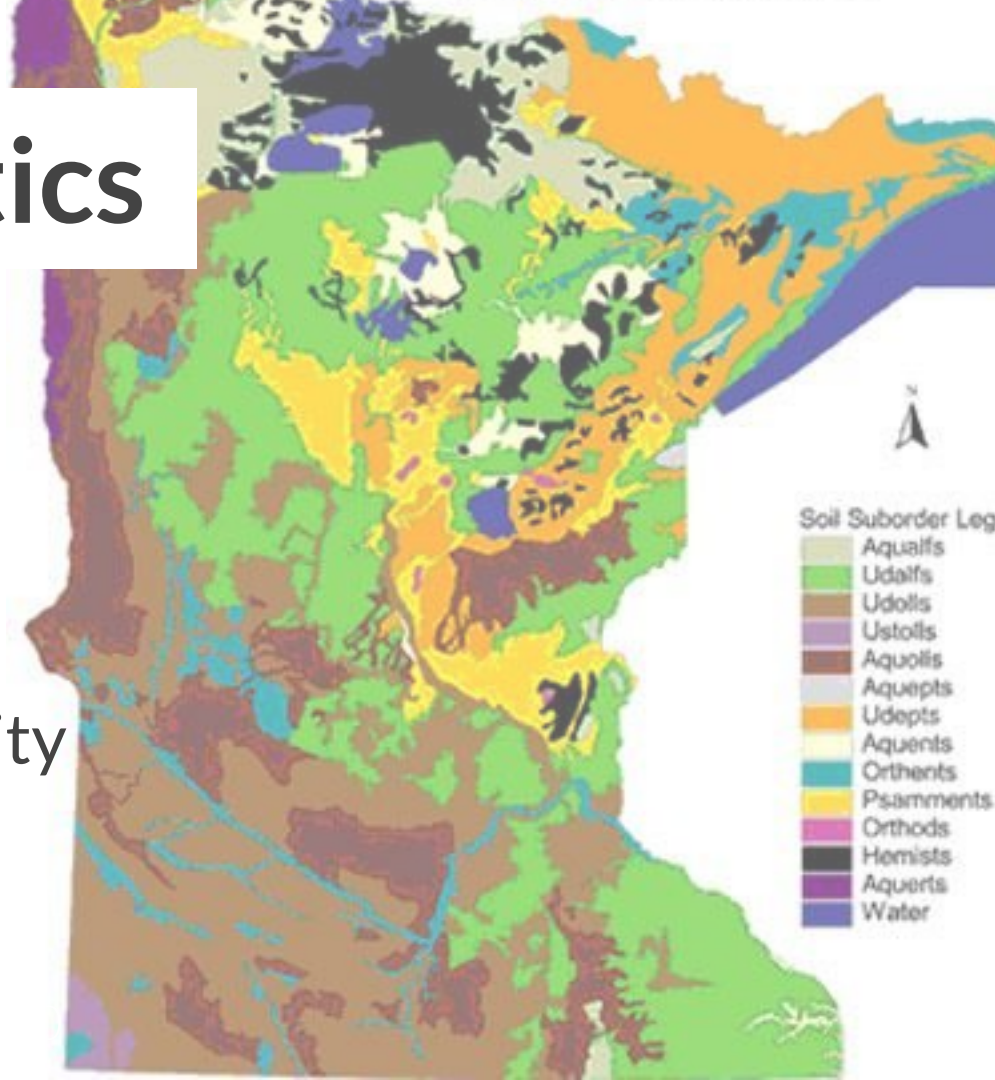


Soil Taxonomy

1) **Order-** determined by horizons and materials
2) **Suborder**- determined by factors that influence the vegetation, moisture
3) **Great group-** parent material, soil temperature, and moisture
4) **Family-** based on numerous chemical or physical properties
5) **Series -** color, texture, structure

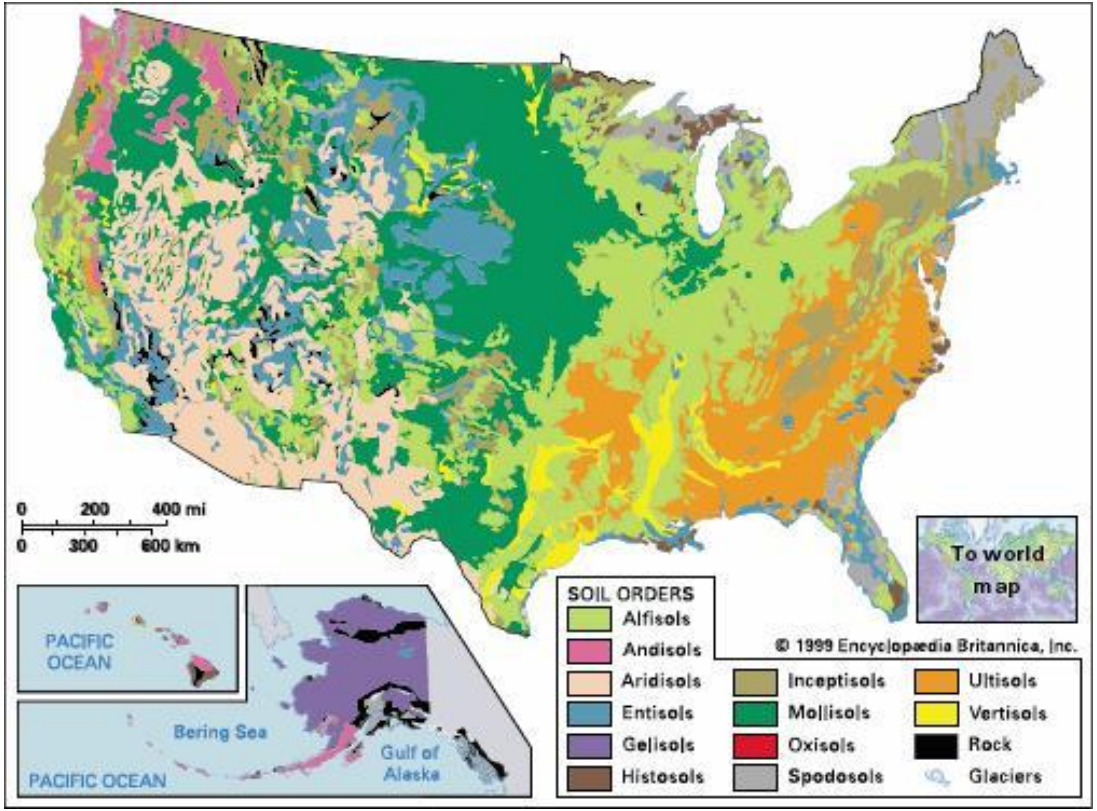
Soil Characteristics

- Soil Codes
- Horizons
- Organic Matter
- Cation Exchange Capacity
- Erosion



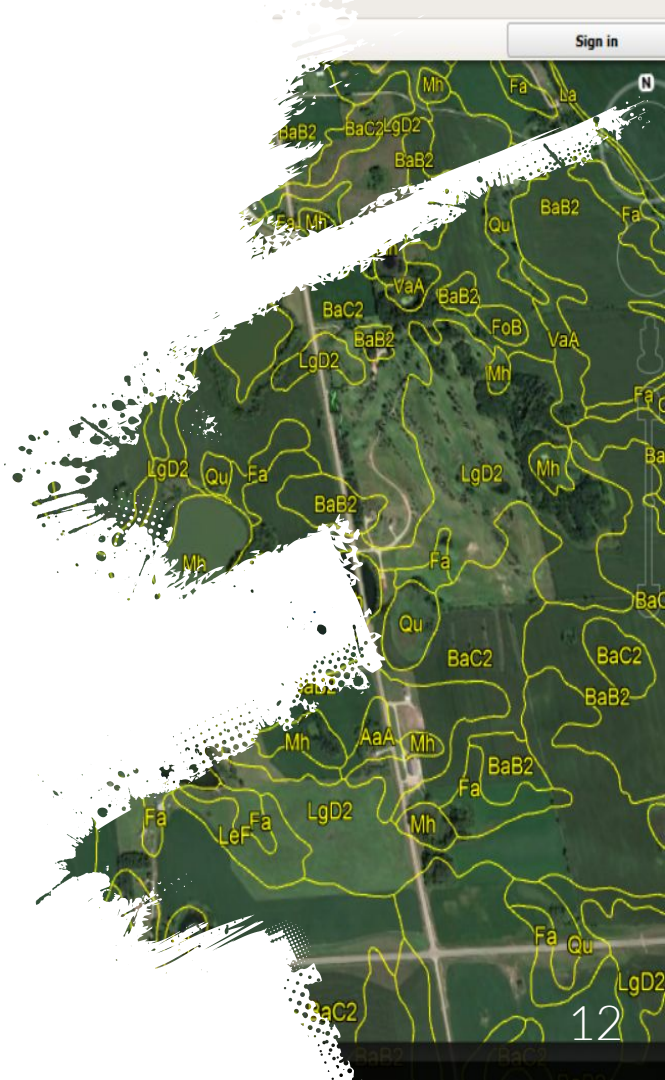
Minnesota Soil

- Minnesota has 7 of the 12 soil orders
- Mollisols is the order of prairie soil
- Dark colored, high nutrient, soft soil
    - Three Suborders
    1) Aquolls- wet (12.7%)
    2) Udolls- moist (12.7%)
    3) Ustolls- dry (0.04%)

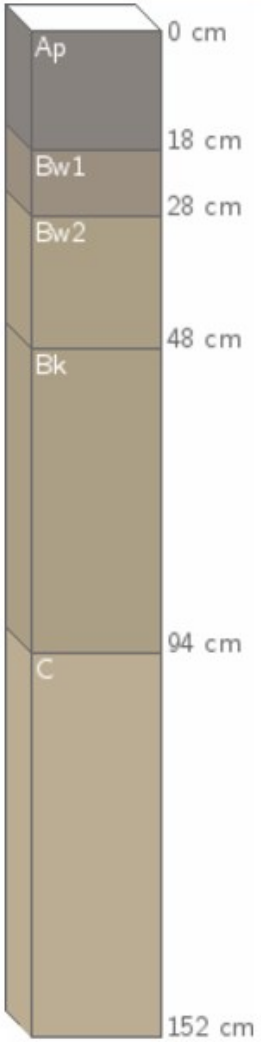


Types of Soil in Remnants:

- BaC2
- LeF
- BaB2
- LgD2
- 903B
- 942D2
- SoE
- 220E
- 942C2

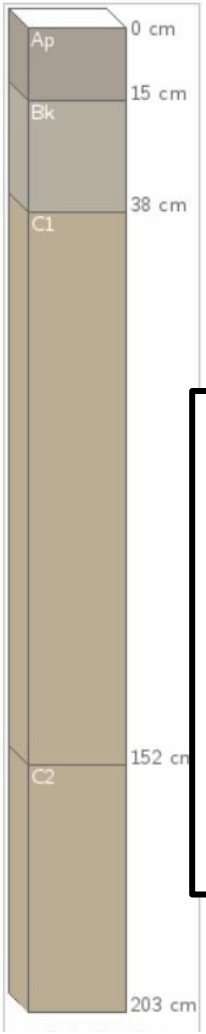


	Percentages										
	Soil types										
Site	**942D2**	**220E**	**LeF**	**903B**	**BaC2**	**942C2**	**LgD2**	**BaB2**	**SoE**	**totalPlas**	**Total % plas**
Around Landfill	0.08	0.03	0.42	0.47						66	0.21
North of Landfill					0.93	0.07				44	0.14
Steven's Approach					100					32	0.1
Staffanson Prairie			0.49		0.33		0.11		0.07	70	0.23
East Elk Lake Road					0.55		0.31	0.14		29	0.09
Nessman								100		7	0.02
Aaenson					0.87		0.13			54	0.21
Townhall								9		9	0.03
Total	5	2	62	31	159	3	24	11	5	311	
Total %plas in type	0.02	0.01	0.2	0.1	0.51	0.01	0.08	0.04	0.02		

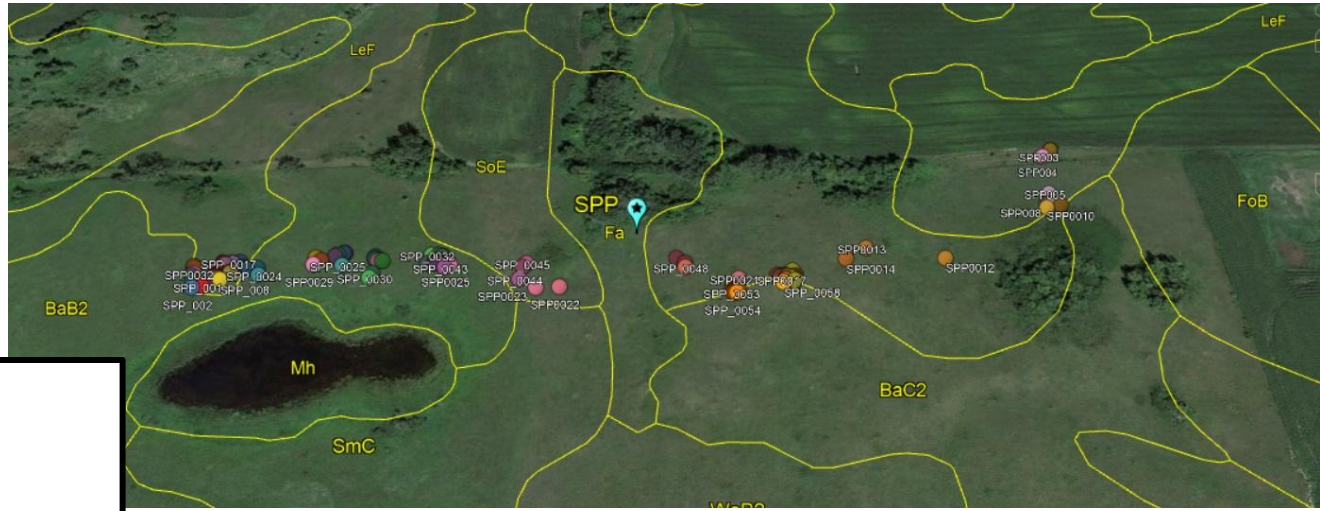


BaC2

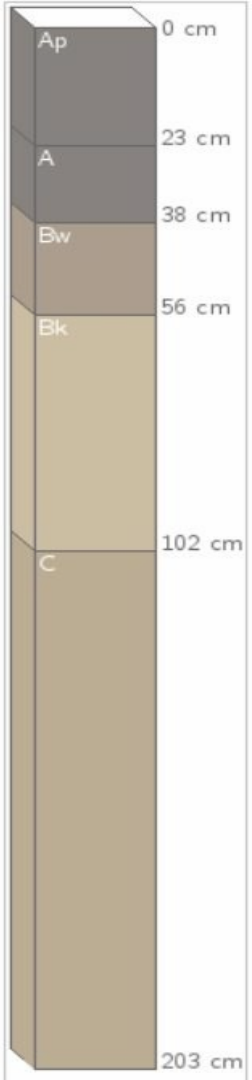
- 6-12% slopes
  - Gentle slopes-rolling hills
- Moderately eroded
- Well-drained
  - 50% Barnes
    - Fine-loamy
  - 31% Buse



LeF

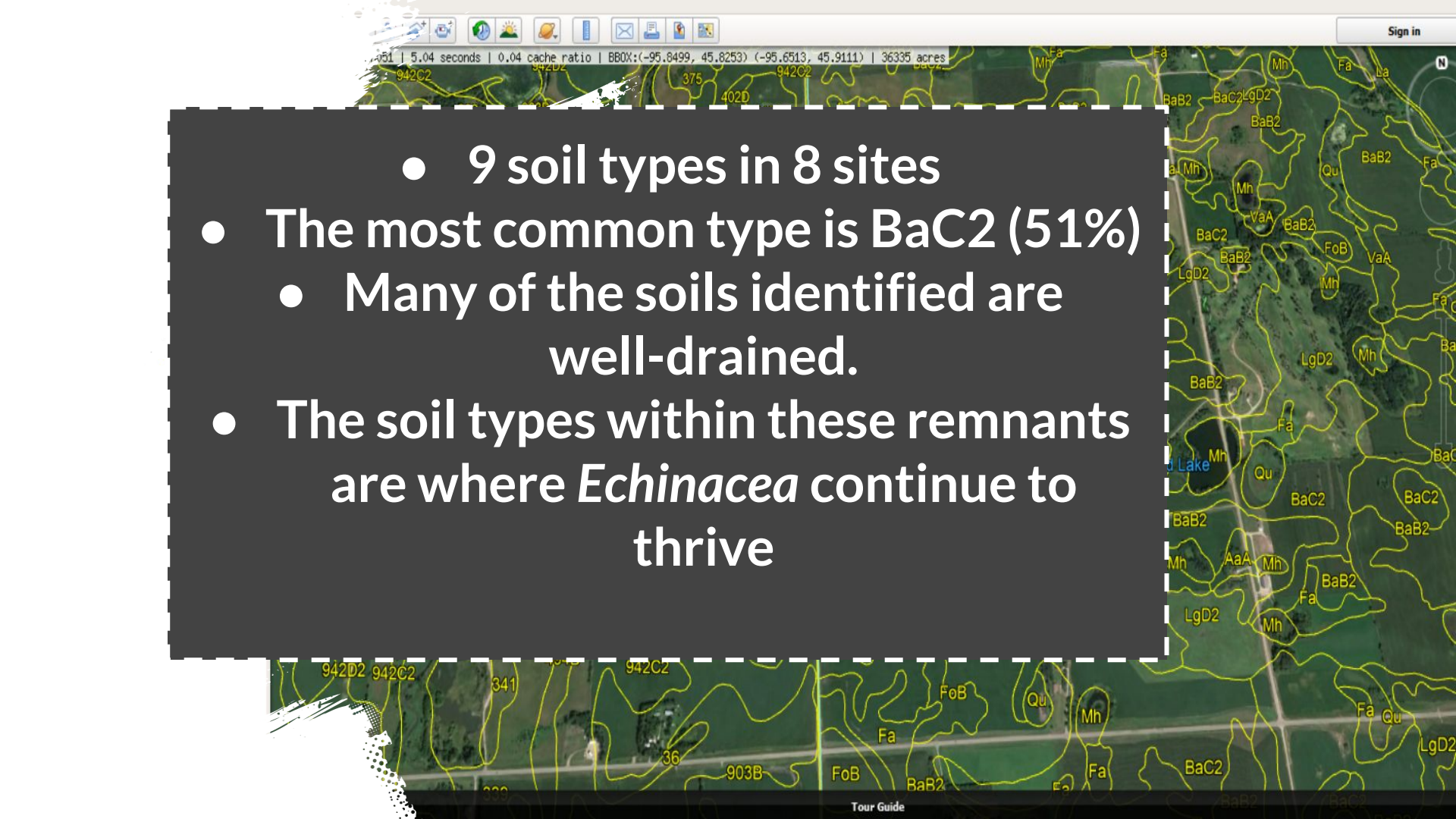


- 40% slopes
  - hilly
- Well-drained
  - 80% Langhei
    - Fine-loamy
  - 10% Barnes



903B

- 2 - 6% slopes
  - Gentle slopes
- Well-drained
  - 55% Hokans
    - Fine-loamy
  - 23% Buse



- 9 soil types in 8 sites
- The most common type is BaC2 (51%)
- Many of the soils identified are well-drained.
- The soil types within these remnants are where *Echinacea* continue to thrive

Questions?

References and Links

- Soil Web download and Information: California Soil Resource Lab, https://casoilresource.lawr.ucdavis.edu/soilweb-apps/
- Plot KML : http://gsif.isric.org/doku.php?id=wiki:tutorial_plotkml
- USDA Soil Survey Manual: https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/ref/?cid=nrcs142p2_054262
- Organic Matter and CEC: http://nmsp.cals.cornell.edu/publications/factsheets/factsheet22.pdf

Thank You!!!
the
echinacea
project
investigating ecology and evolution in fragmented prairie habitat since 1995