NRCS SOILS

NATHAN JONES

STATE SOIL SCIENTIST SD NRCS

OVERVIEW

- K Factor
- Land Capability Class
- Parent Material
- Climate
- MLRA Boundaries
- UC Davis Soils App/website
- Web Soil Survey
- Salinity

K FACTOR

- What is the **K Factor**? The **K Factor** is an index which quantifies the relative susceptibility of the soil to sheet and rill erosion. **K Factor** is used in the RUSLE2 soil loss prediction equation. Values range from 0.02 for the least erodible soils to 0.64 for the most erodible.

K FACTOR

CALCULATED K

- 0.15-0.19
- Lower erosion rates
- Less soil loss
- False sense of security

LAB DERIVED K

- 0.42
- Very erosive
- Large amounts of soil loss
- Severely destructive to soils & production

Rill Erosion

https://www.geo.fu-berlin.de/en/v/iwm-network/learning_content/watershed-resources/ressource_soil/erosion/sheet.html

Gully Erosion

https://landdegradationinaustralia.weebly.com/water-erosion.html

PERKINS COUNTY, SD

HUGHES COUNTY, SD

LAND CAPABILITY CLASS

- 8 Classes
  - 1 Safest to use under intense cultivation
  - 2-4 Can be used for cultivation, increasing erosion and other hazards
  - 5 Grazing/Forest – NOT CULTIVATION!!!
  - 6-7 Increasing limitations for cultivation
  - 8 Not suitable for producing crops, grasses, trees
- 4 subclasses
  - E – erosion hazard
  - W – excessive water
  - S – shallow rooting, stones, low water holding capacity
  - C – climatic limitations

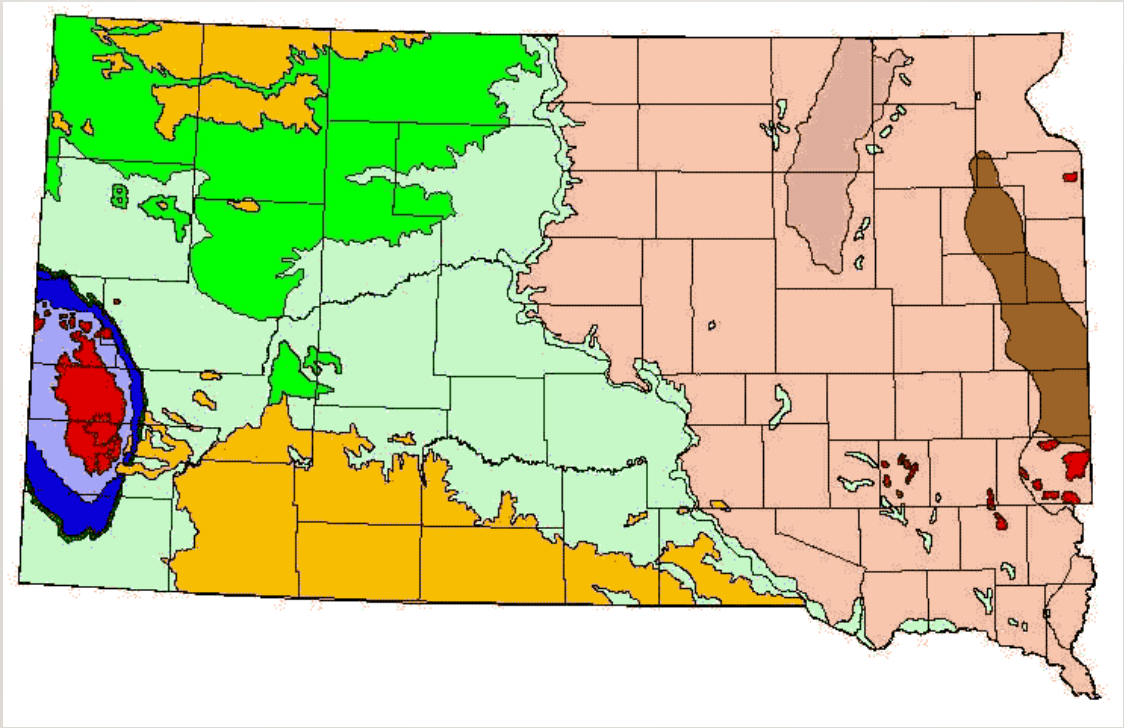
CLASSES

- 1 – Slight limitations that restrict
- 2 – Moderate Limitations with moderate conservation practices
- 3 – Severe Limitations with special conservation practices
- 4 – Very Severe Limitations very careful management
- 5 – Water
- 6 – Severe Limitations generally unsuitable
- 7 – Very severe limitations unsuitable
- 8 – Miscellaneous areas for recreation, wildlife, water supply or esthetic purposes

MAJOR LAND RESOURCE AREAS (MLRA)

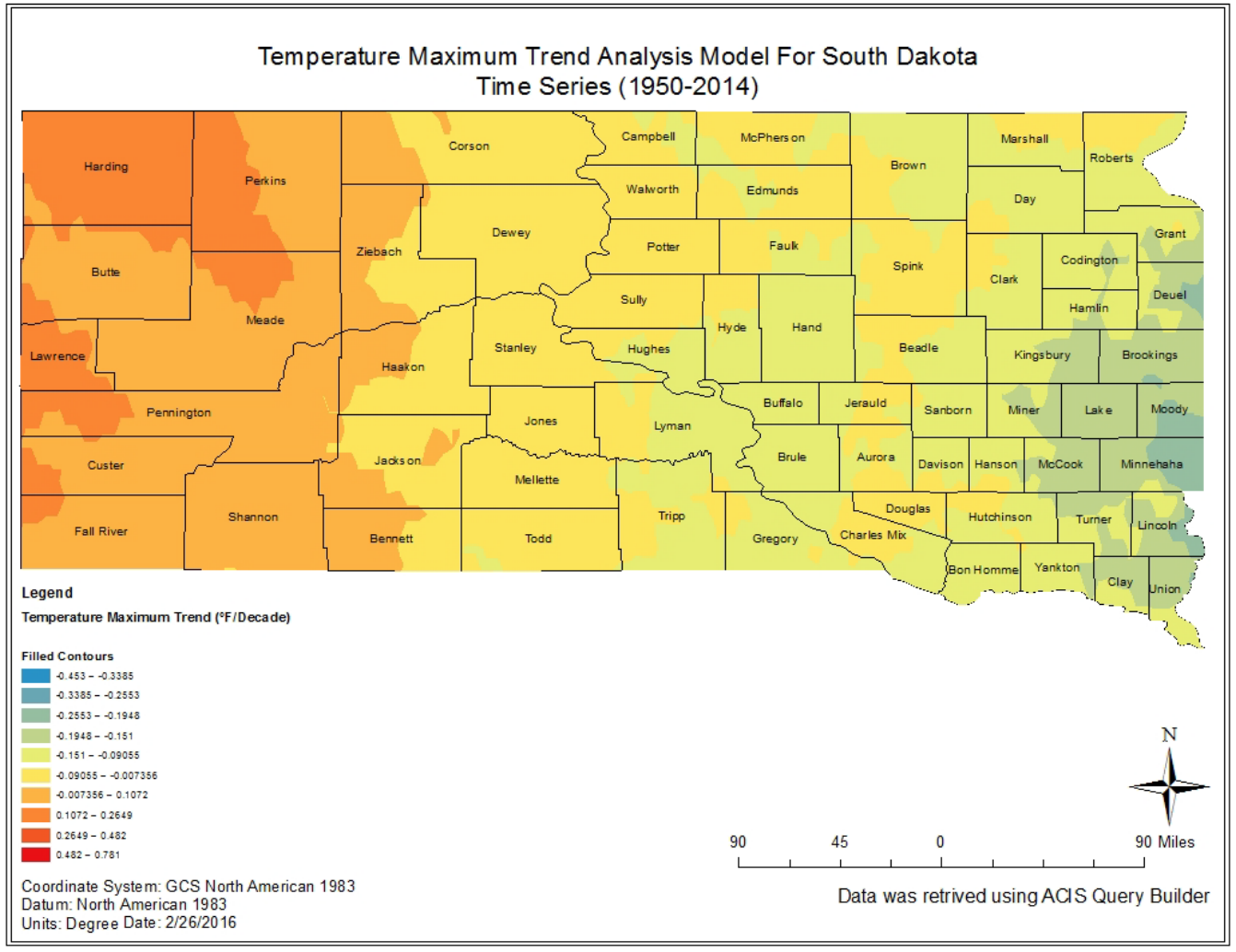
- Determined by
  - Physiography
  - Geology
  - Climate
  - Water
  - Soils
  - Biological resources
  - Land use

PARENT MATERIAL

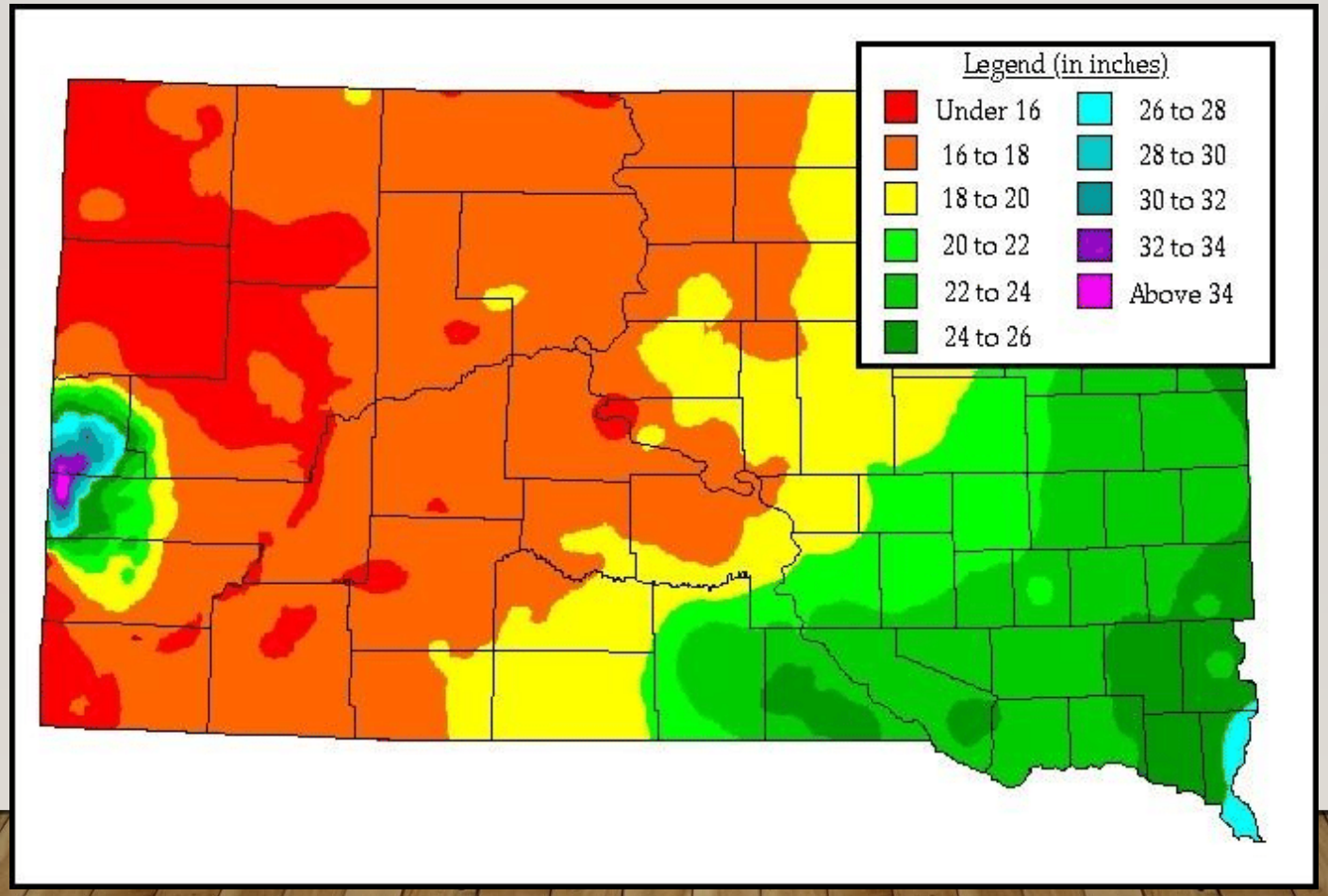


PARENT MATERIAL

CLIMATE - TEMPERATURE



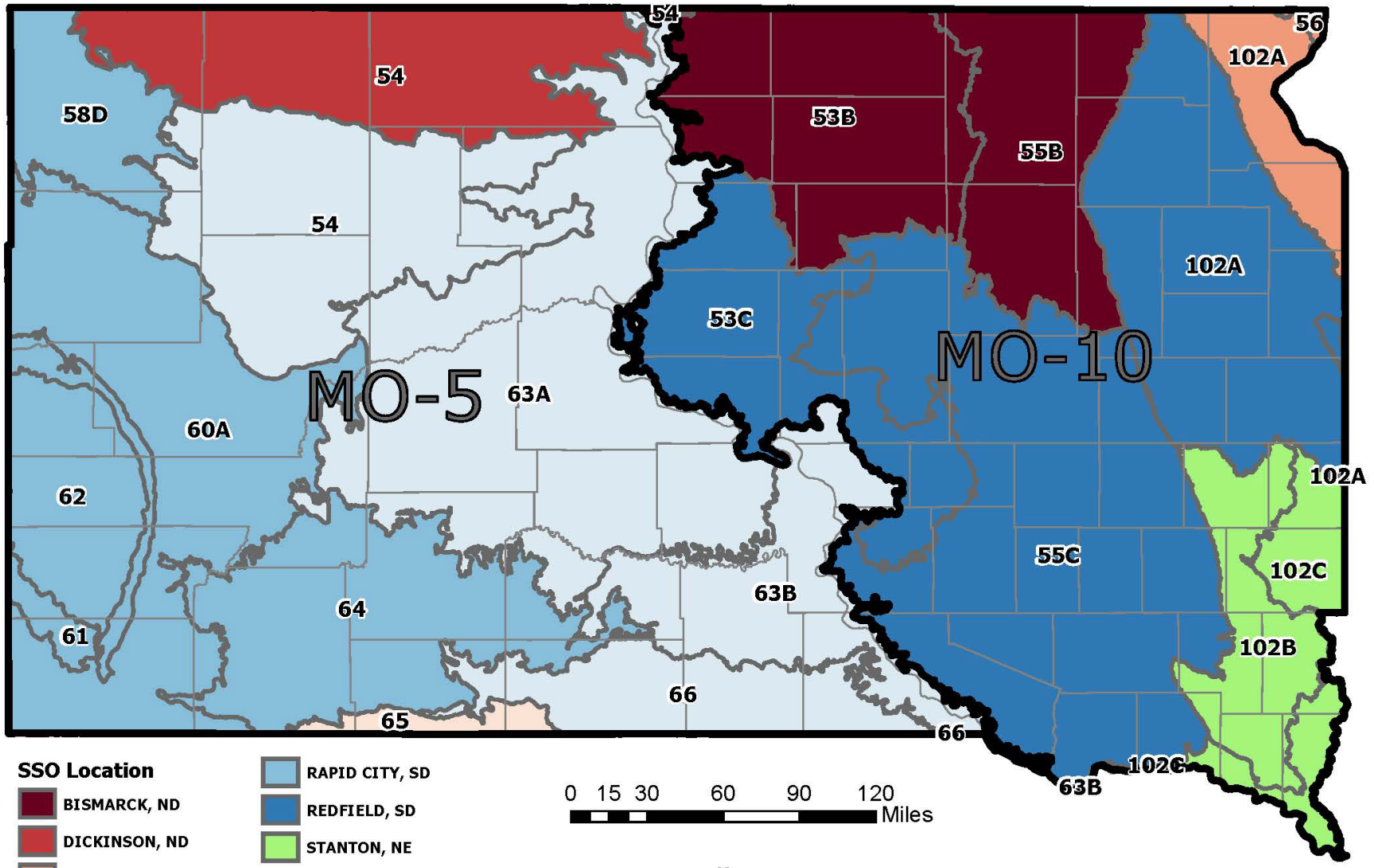
CLIMATE - PRECIPITATION



CLIMATE

- Water most limiting factor
- Corn 22-30” or rain a year
- Rapid City
  - 18” rain
  - 38” snow = 3” rain
- Pierre
  - 18” rain
  - 35” snow = 3” rain

SOUTH DAKOTA MLRA's



Source: Natural Resources Conservation Service
South Dakota State Office, GIS Department
Projection: WGS 1984 Web Mercator Auxiliary Sphere
Date: February 2019

CLIMATE

- Average Annual Precip
- Average Annual Air Temp
- Frost Free Days
- Colder North/ Warmer South
- Wetter East/Drier West

PHYSIOGRAPHY

GEOLOGY

WATER

- Total Amount
- Types of Water
- Dependence on Water

SOILS

- Soil Moister
- Temp Regime
- Mineralogy
- Textures within MLRA's
- Shale
- Sand
- Siltstone

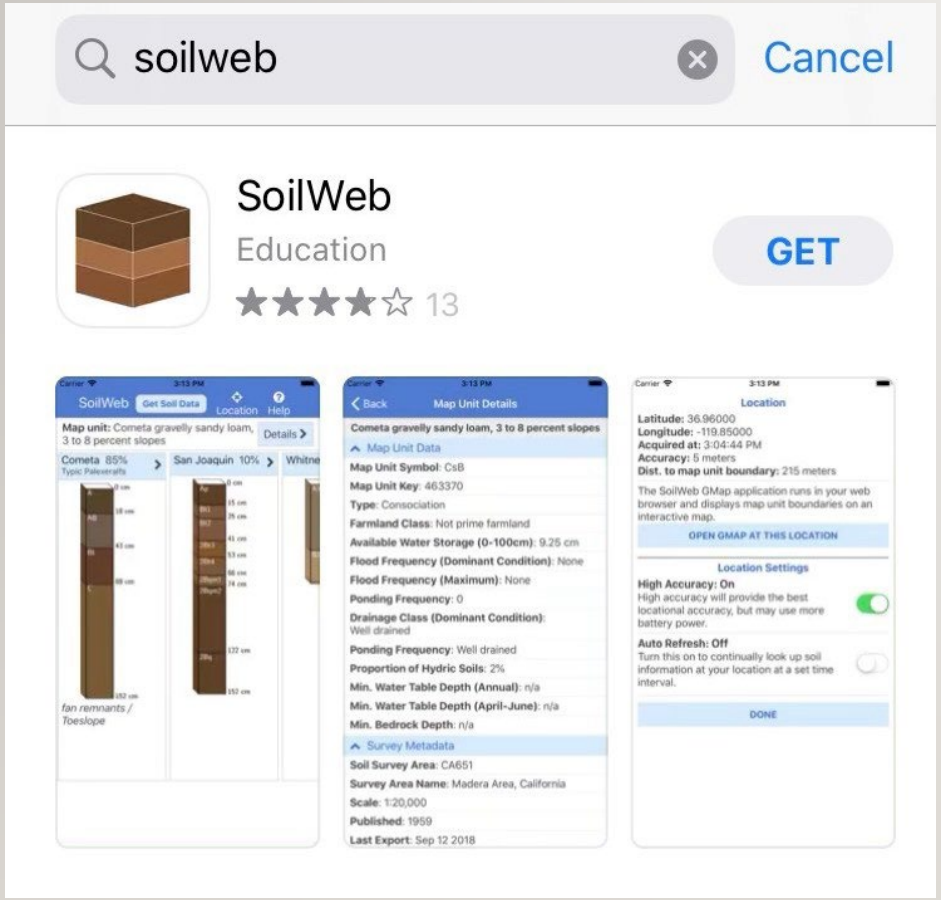
BIOLOGICAL RESOURCES

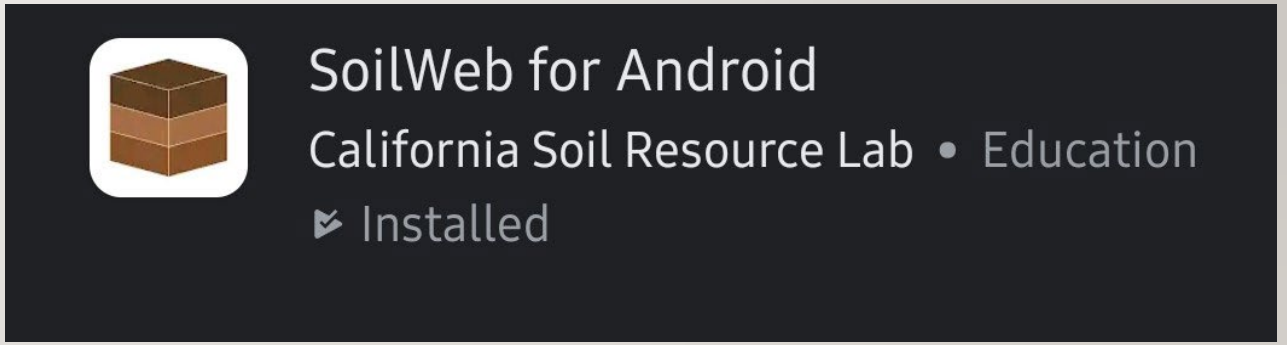
- Plant Species
- Significant Fish & Wildlife Species
- Sagebrush
- Tall Grass Prairie
- Short Grass Prairie
- Forest
- Sage Grouse

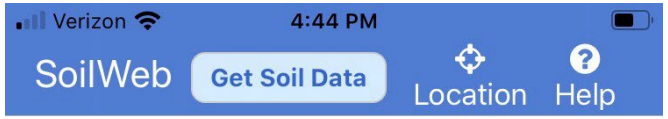
LAND USE

- Based on NRI data
- Cropland
- Rangeland
- Pastureland
- Hayland
- Forest
- Industrial
- Urban
- Water
- Other Special Purposes

UNIVERSITY OF CALIFORNIA – DAVIS APP







Welcome

The SoilWeb App simplifies the process of querying and exploring USDA-NRCS detailed soil survey data (SSURGO) at your current location.

Getting Started

Tap the "Get Soil Data" button to view the detailed soil survey data for your current location. If prompted, be sure to give SoilWeb permission to access your location.

About

This app was developed by the California Soil Resource Lab at UC Davis in collaboration with the USDA-NRCS.

Web Links

Description of the SSURGO database

USDA-NRCS soils home page

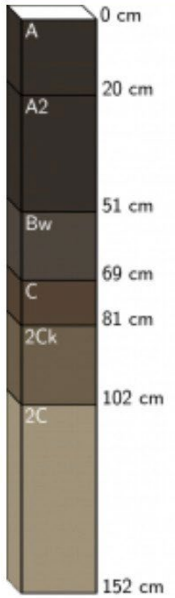
Other applications available from the California Soil Resource Lab

Verizon 4:44 PM

SoilWeb | Get Soil Data | Location | Help

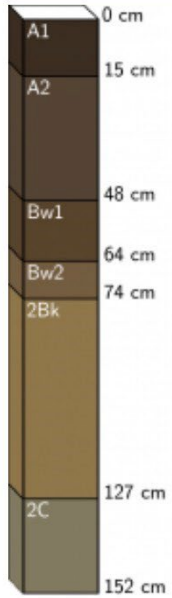
Map unit: Carthage fine sandy loam, 0 to 2 percent slopes | Details >

Carthage 85%
Pachic Haplustolls



outwash plains / Backslope

Forestburg 7%
Entic Haplustolls



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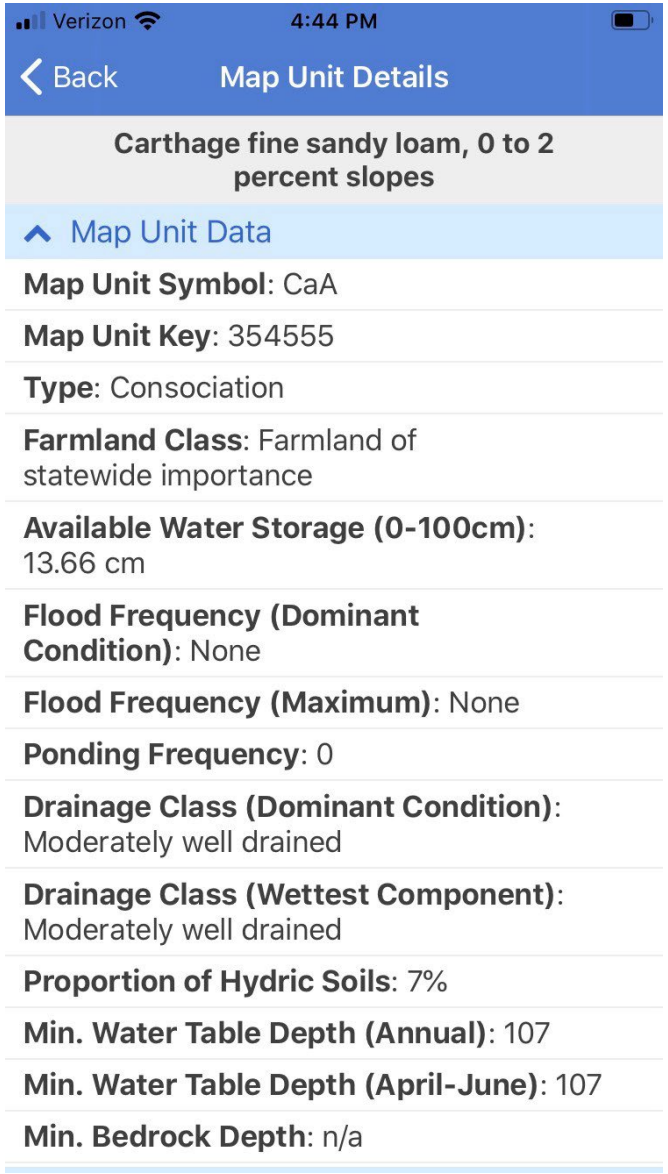
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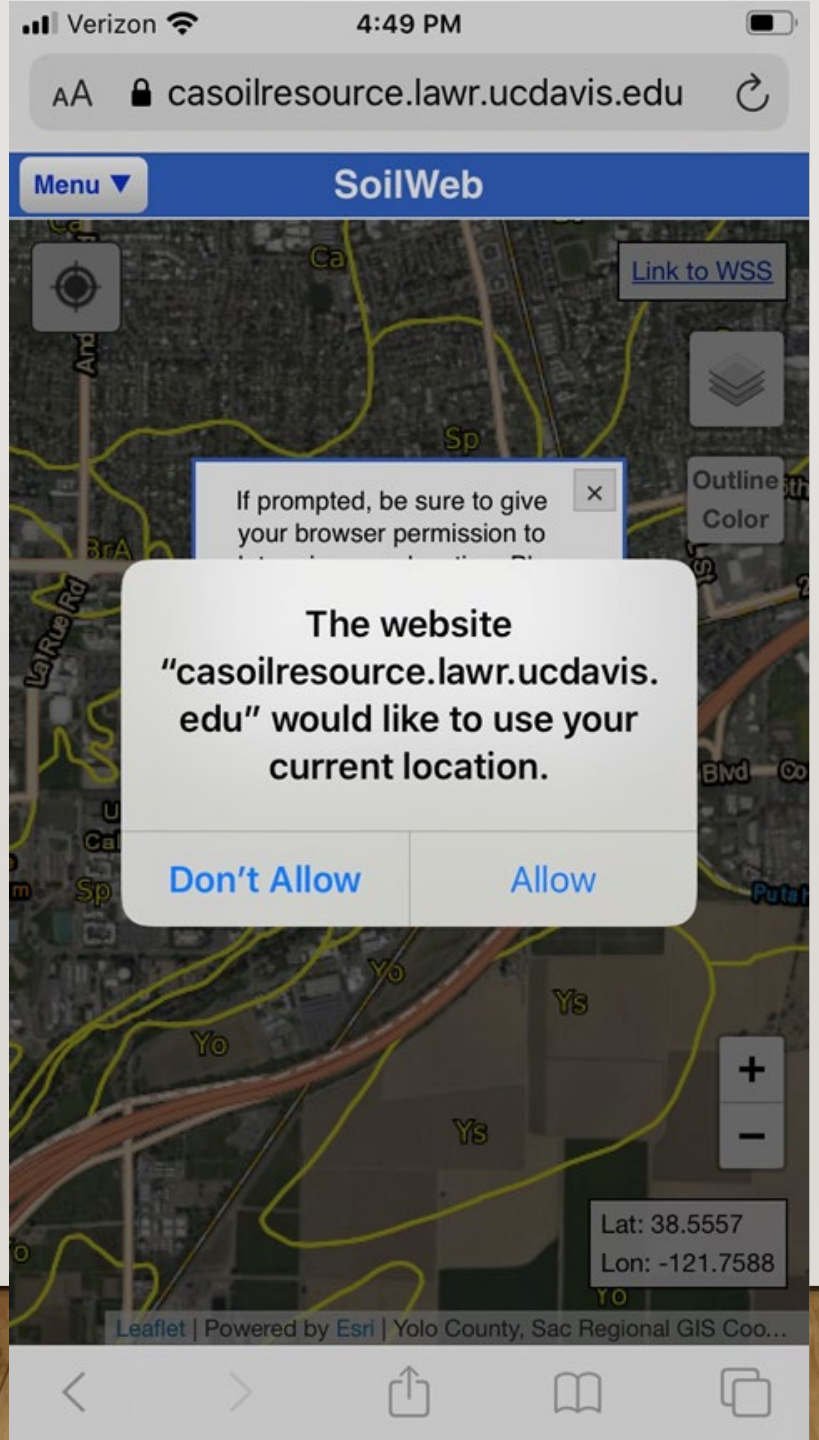
Map Unit Details
Carthage fine sandy loam, 0 to 2 percent slopes
Map Unit Data
Map Unit Symbol: CaA
Map Unit Key: 354555
Type: Consociation
Farmland Class: Farmland of statewide importance
Available Water Storage (0-100cm): 13.66 cm
Flood Frequency (Dominant Condition): None
Flood Frequency (Maximum): None
Ponding Frequency: 0
Drainage Class (Dominant Condition): Moderately well drained
Drainage Class (Wettest Component): Moderately well drained
Proportion of Hydric Soils: 7%
Min. Water Table Depth (Annual): 107
Min. Water Table Depth (April-June): 107
Min. Bedrock Depth: n/a

UNIVERSITY OF CALIFORNIA – DAVIS WEBSITE

- https://casoilresource.lawr.ucdavis.edu/gmap/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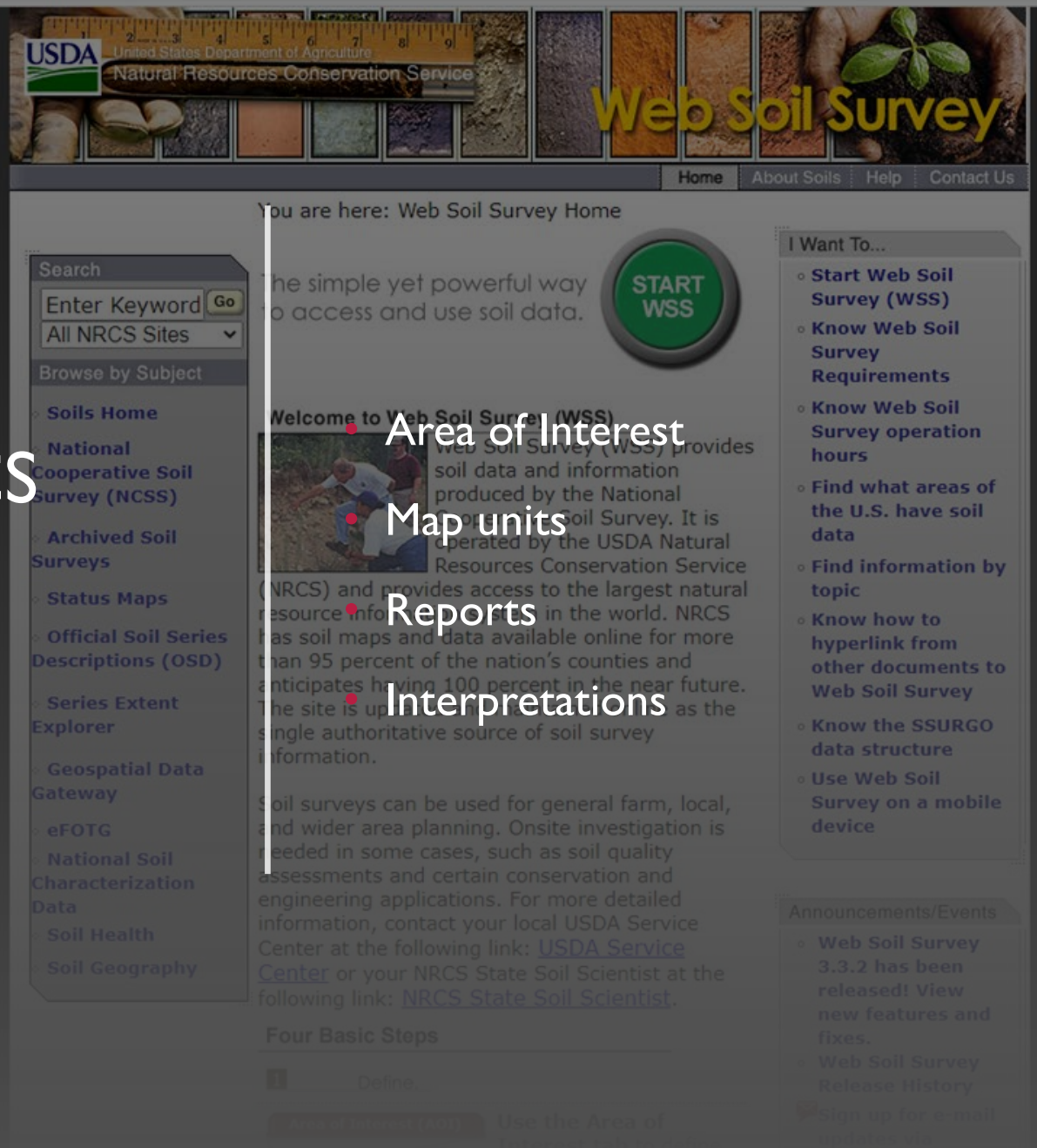
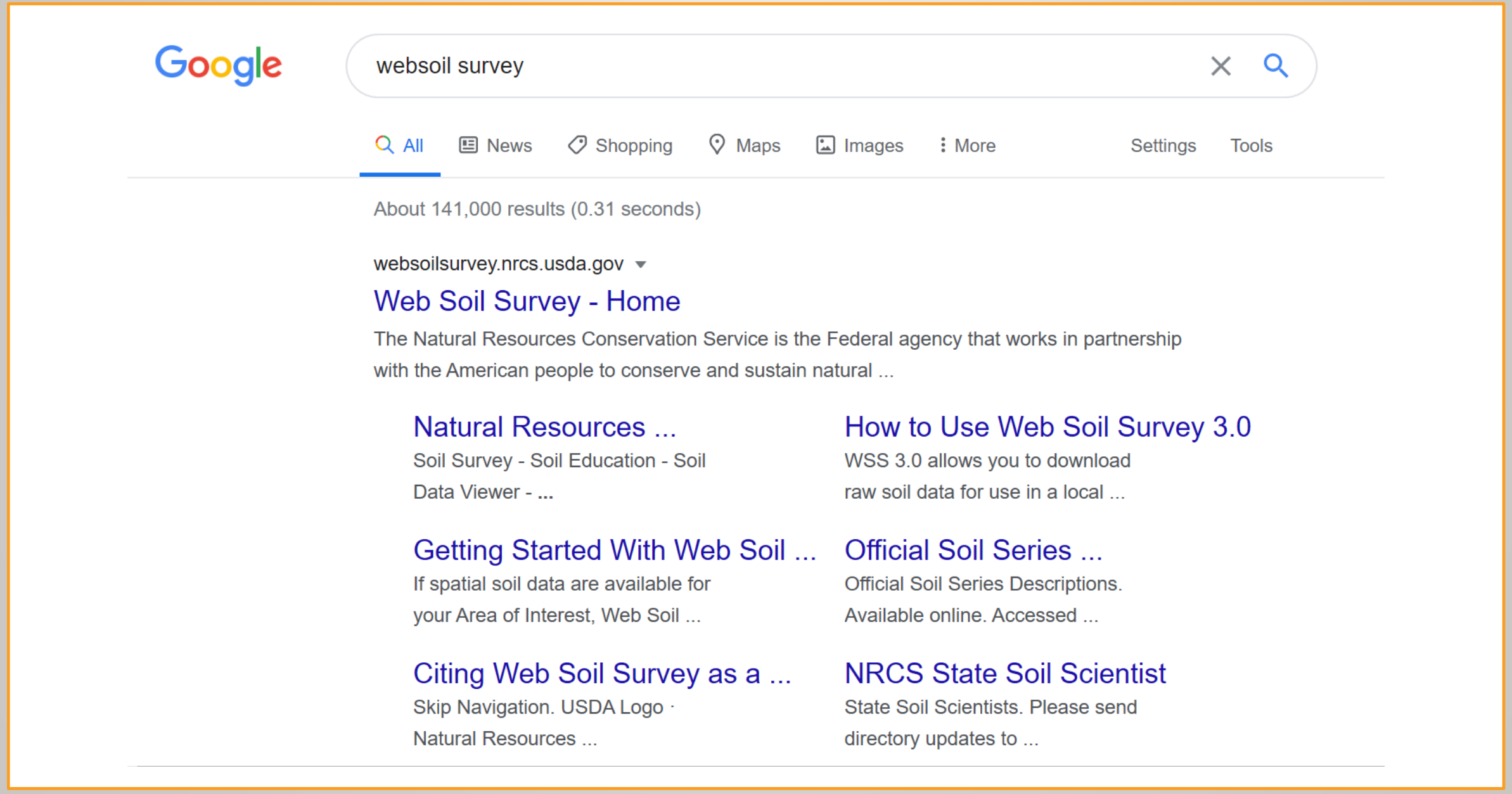
USDA/NRCS WEB SOIL SURVEY

- Area of Interest
- Map units
- Reports
- Interpretations

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- Series Extent Explorer
- Geospatial Data

The simple yet powerful way to access and use soil data.

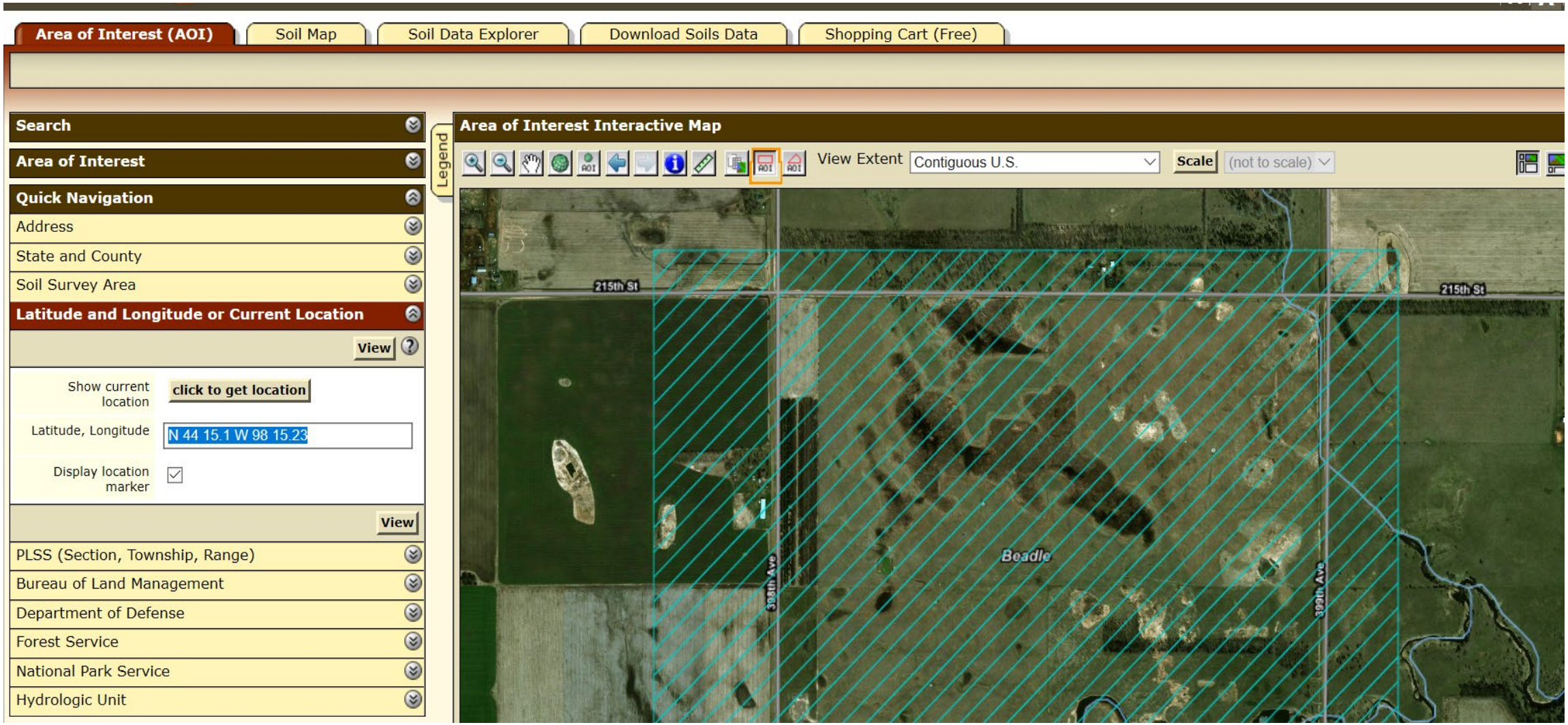
START WSS

Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

I Want To...

- Start Web Soil Survey (WSS)
- Know Web Soil Survey Requirements
- Know Web Soil Survey operation hours
- Find what areas of the U.S. have soil data
- Find information by topic
- Know how to hyperlink from other documents to Web Soil Survey
- Know the SSURGO data structure
- Use Web Soil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Map Unit Legend

Beadle County, South Dakota (SD005)

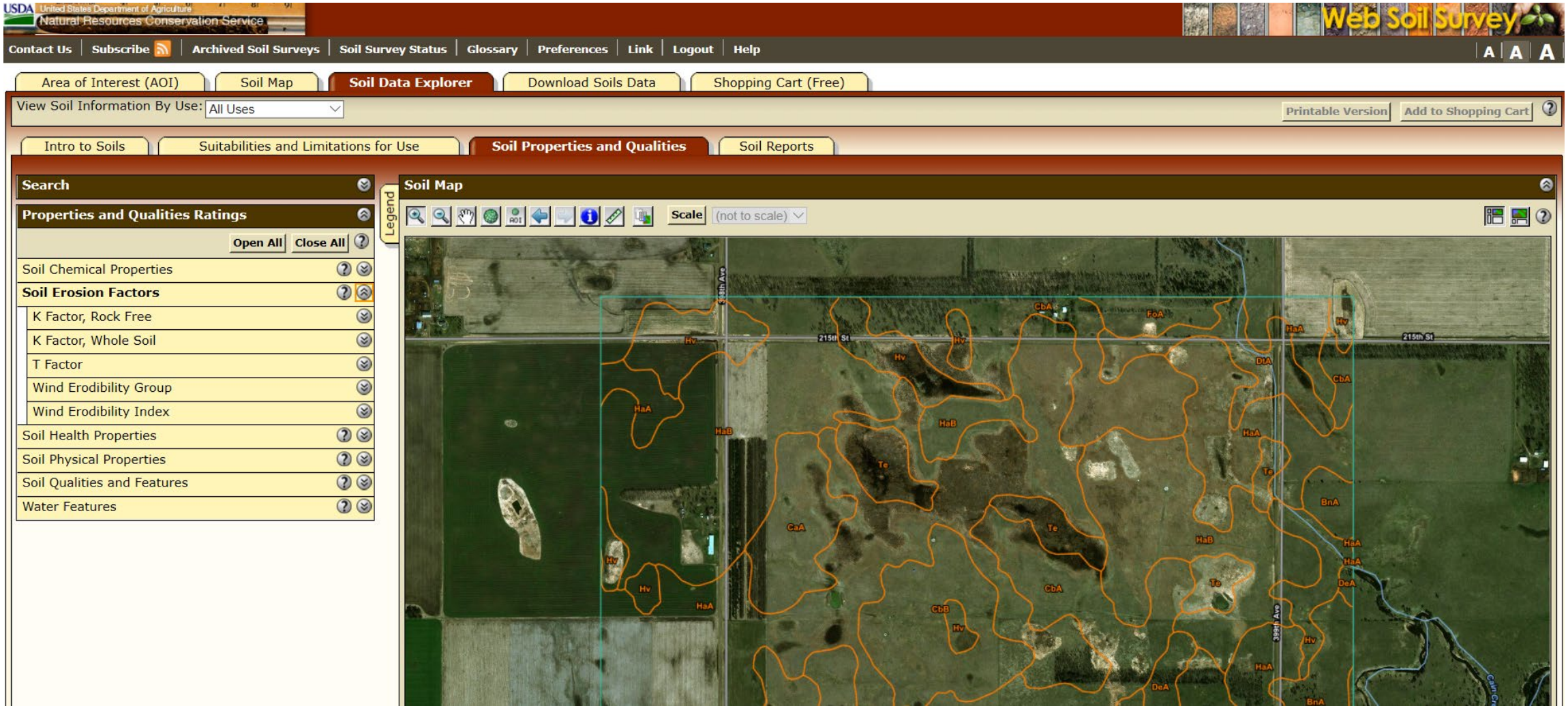
Beadle County, South Dakota (SD005)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BfD	Ethan-Betts loams, 9 to 15 percent slopes	43.9	4.7%
BnA	Blendon fine sandy loam, 0 to 2 percent slopes	52.4	5.7%
CaA	Carthage fine sandy loam, 0 to 2 percent slopes	24.2	2.6%
CaB	Carthage fine sandy loam, 2 to 6 percent slopes	2.4	0.3%
CbA	Carthage-Blendon fine	189.1	20.4%

Soil Map

Legend

Scale (not to scale)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K Factor, Whole Soil
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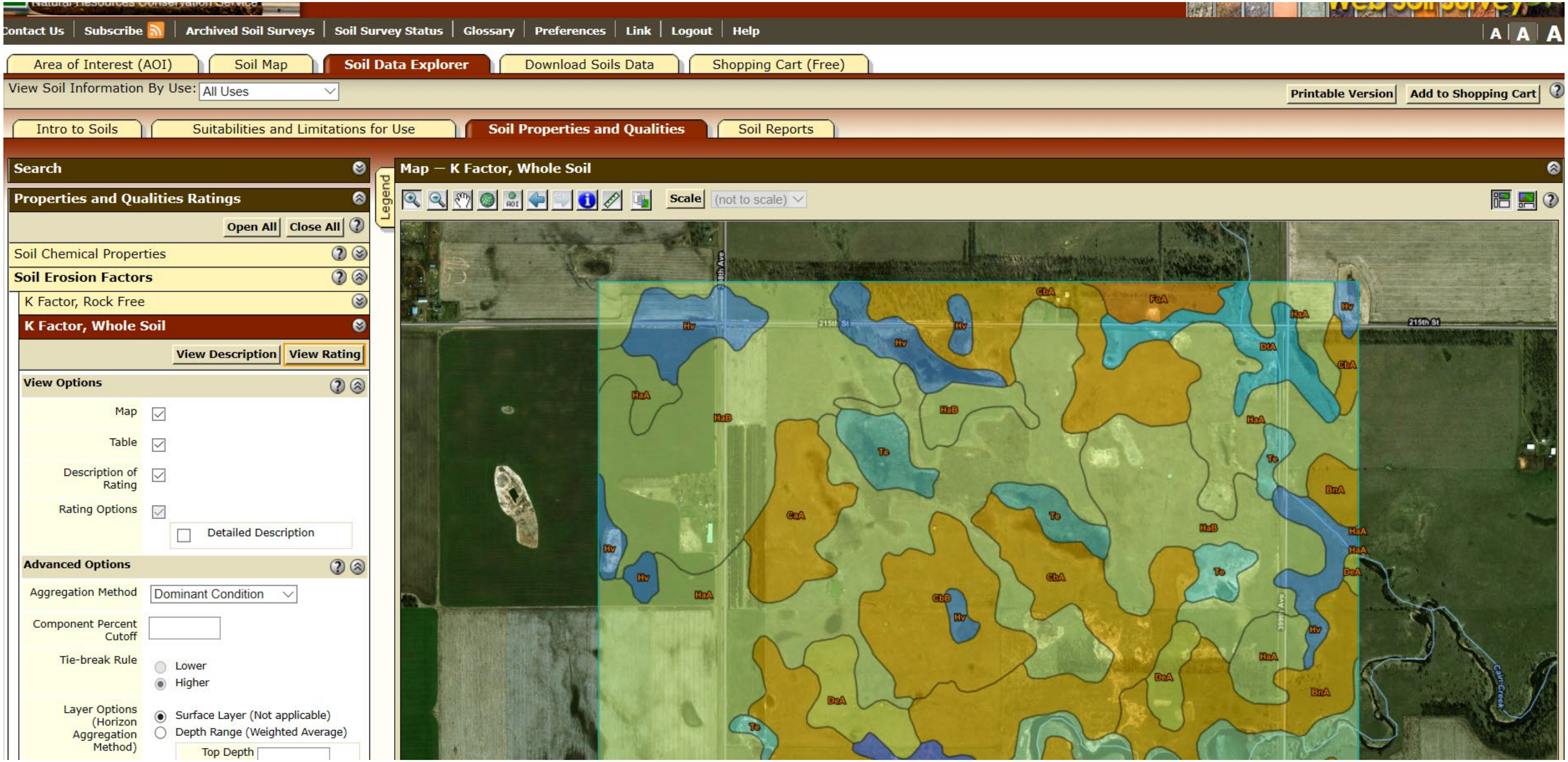
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Dominant Condition
Component Percent Cutoff
Tie-break Rule
Lower
Higher
Layer Options (Horizon Aggregation Method)
Surface Layer (Not applicable)
Depth Range (Weighted Average)
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DtA
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CaA
BnA
CbB
DeA

areas of contrasting soils that could have been shown at a more detailed scale.

Tables — K Factor, Whole Soil — Summary By Map Unit

Summary by Map Unit — Beadle County, South Dakota (SD005)

Summary by Map Unit — Beadle County, South Dakota (SD005)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BfD	Ethan-Betts loams, 9 to 15 percent slopes	.28	43.9	4.7%
BnA	Blendon fine sandy loam, 0 to 2 percent slopes	.15	52.4	5.7%
CaA	Carthage fine sandy loam, 0 to 2 percent slopes	.15	24.2	2.6%
CaB	Carthage fine sandy loam, 2 to 6 percent slopes	.15	2.4	0.3%
CbA	Carthage-Blendon fine sandy loams, 0 to 2 percent slopes	.15	189.1	20.4%
CbB	Carthage-Blendon fine sandy loams, 2 to 6 percent slopes	.15	37.5	4.0%
DeA	Delmont loam, 0 to 2 percent slopes	.20	21.3	2.3%
DtA	Dudley-Tetonka silt loams	.37	19.2	2.1%
Du	Durrstein silt loam	.49	35.3	3.8%
EnA	Enet loam, 0 to 2 percent slopes	.17	6.8	0.7%
FoA	Forestburg loamy fine sand, 0 to 3 percent slopes	.10	15.4	1.7%
HaA	Hand-Bonilla loams, 0 to 3 percent slopes	.24	233.2	25.2%
HaB	Hand-Bonilla loams, 3 to 6 percent slopes	.24	164.9	17.8%
Hv	Hoven silt loam, 0 to 1 percent slopes	.43	51.8	5.6%
Te	Tetonka-Hoven silt loams	.32	29.1	3.1%
Totals for Area of Interest			**926.4**	**100.0%**

Description — K Factor, Whole Soil

SALTY SOILS

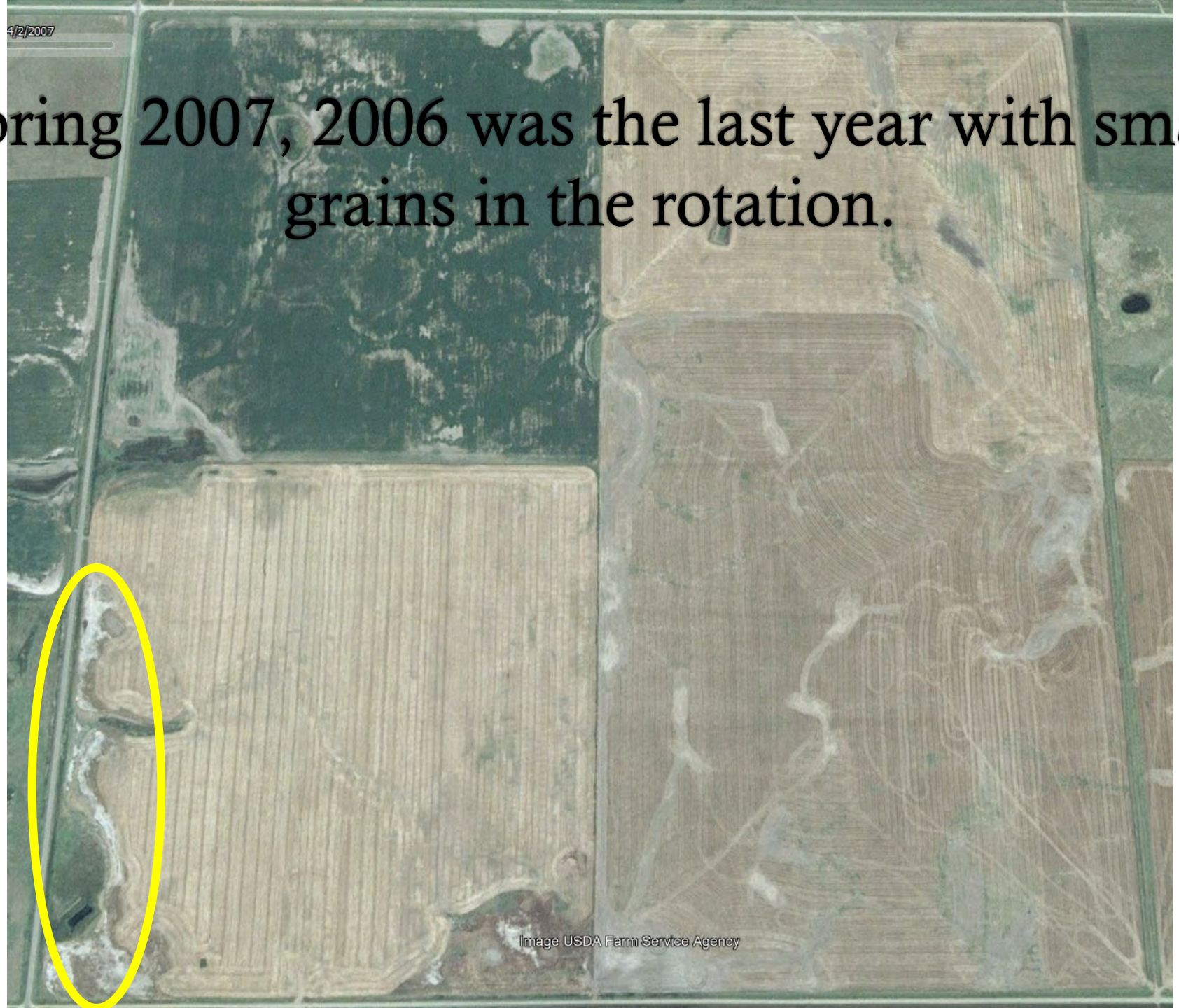
SALINE

- Total concentration of dissolved mineral solutes at levels high enough to negatively affect plant growth.
- Limit plant's ability to absorb water.
- Sulfates of calcium, magnesium and sodium common in SD soils.

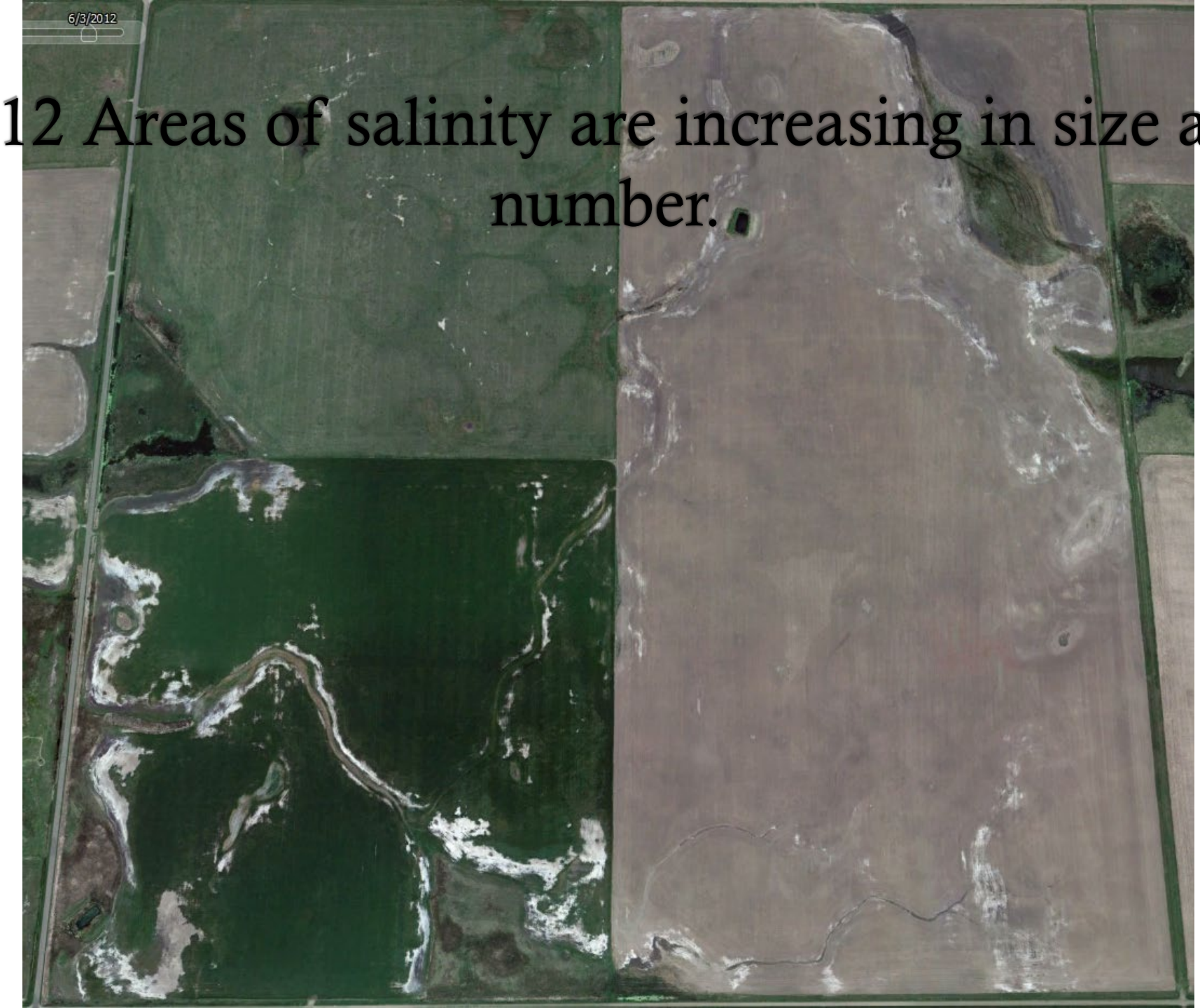
SODIC

- Excessive levels of sodium (Na+) absorbed at the cation exchange site.
- Soil Dispersion: causes poor physical structure severely limits water infiltration, restricts root growth and seed germination.

Spring 2007, 2006 was the last year with small grains in the rotation.



2012 Areas of salinity are increasing in size and number.



MAXIMIZE TRANSPIRATION, MINIMIZE EVAPORATION:

- Tillage increases evaporation…so don't do it!
- No bare ground: living plant or residue to shade the surface.
- Mixture of plants using water as much of the growing season as possible

QUESTIONS?

Nathan Jones

State Soil Scientist - NRCS

nathan.jones@usda.gov

Work cell (605)350-5639