USDA
United States Department of Agriculture

Natural Resources Conservation Service

Soil Survey UPDATES "THE CHANGES"

January 2016 Crop Management Conference

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Wisconsin

www.wi.nrcs.usda.gov

Soil Data Join Recorrelation Initiative (SDJR)

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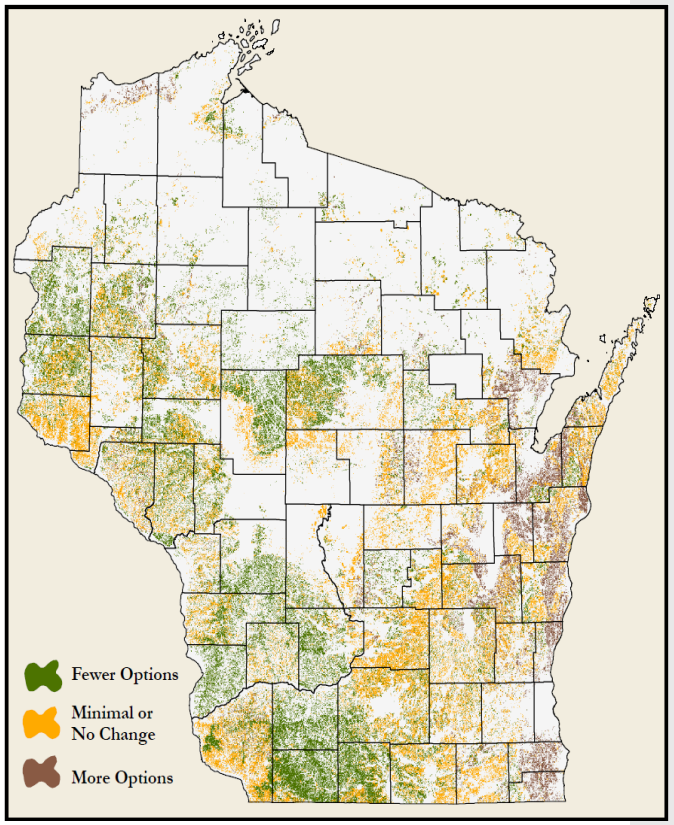
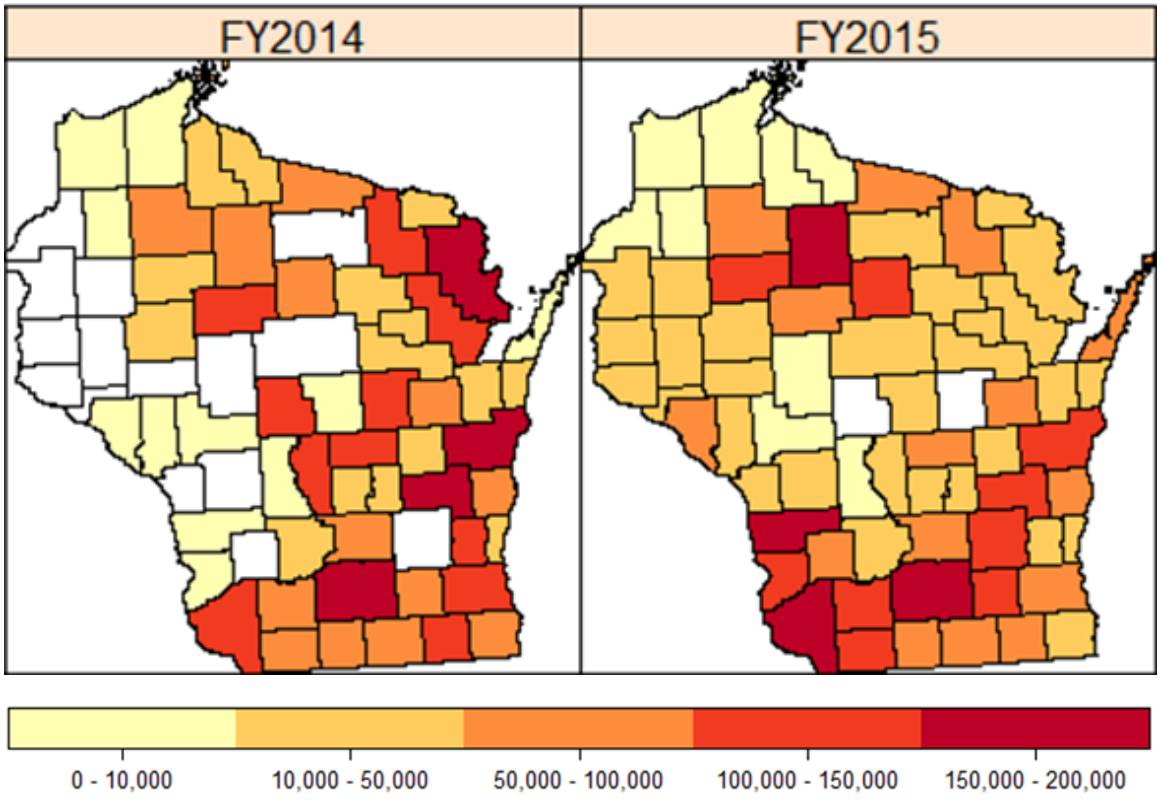
- The National Cooperative Soil Survey (NCSS) program under the leadership of the Natural Resources Conservation Service (NRCS) is charged by Congress to inventory the soils of the United States, interpret the soils for various uses, publish information to the public, and maintain the inventory to meet user needs.



Time Series of Updated Acres by County



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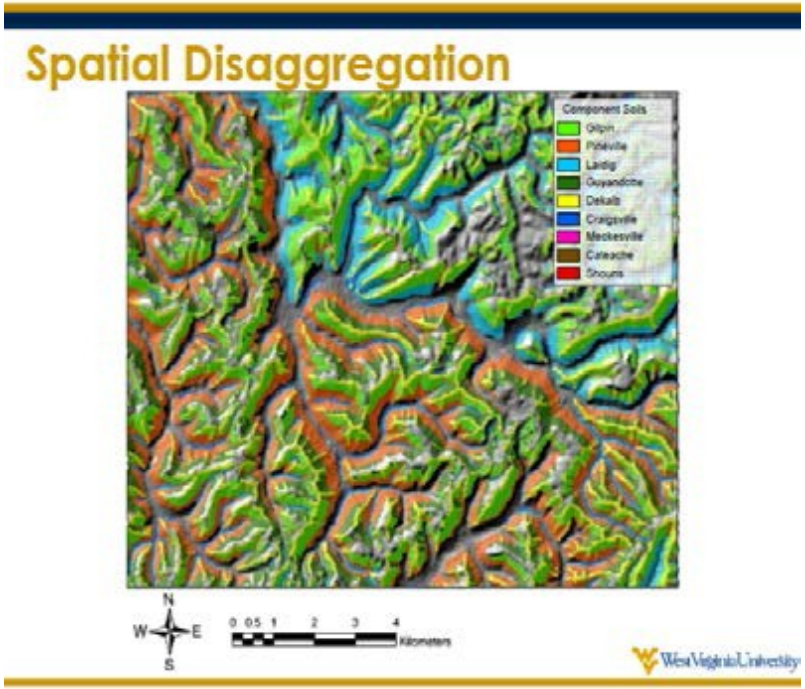
Soil Data Join Recorrelation Initiative (SDJR)

Why the Updates?

- Updates reflect the latest research findings
- New soil property data is collected
- Soils are mapped in greater detail
- More accurate estimates of T and K Factors are made
- Improved guidelines based on current research
- More accuracy across soil survey lines- detailed correlations
- More uniformity in the data bases which enhances reliability

Spatial Disaggregation

- Component Based "Prediction" Model which means this is what we expect to find based on what we know. What we really find can vary so we PLAN for it!
- (1:12000 photo yields a 1.5 acre accuracy)



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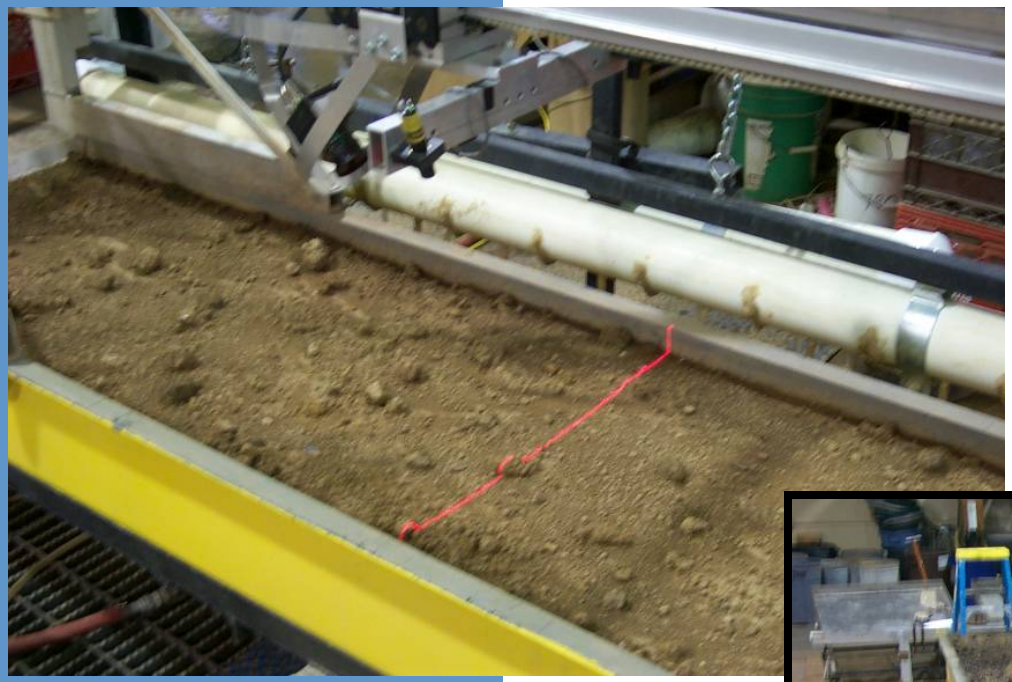

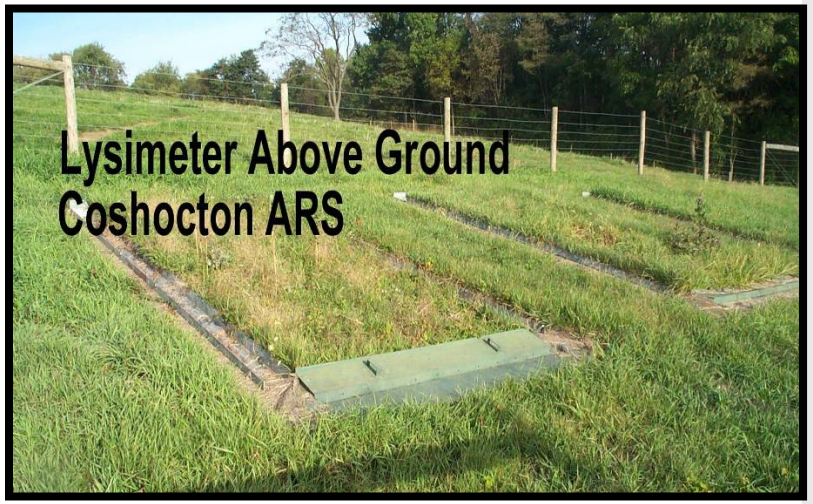

Research and studies

- Lab
- On site
- Partnership Studies

Soil Interpretations

Background

- Soil survey interpretations predict soil behavior for specified soil uses.
- Assist the planning of broad categories of land use

Purpose

- Soil interpretations provide users of soil survey information with predictions of soil behavior to help in the development of reasonable and effective alternatives for the use and management of soil, water, air, plant, and animal resources.

Prediction Basis

- Recorded observations validate predictive models.

Features Used for Interpretations

- (1) site features, such as slope gradient; (2) individual horizon features, such as particle size; and (3) characteristics that pertain to soil as a whole, such as depth to a restrictive layer.

How are Changes Determined?

What are soil scientists doing now to improve the data?

- Soil scientists identify patterns and natural breaks in soil property values, without concern for county boundaries. This process eliminates "no-joins" across county boundaries.
- **New technologies such as Ground Penetrating Radar, infrared photography, 3-D mapping software, and digital terrain models are used to validate and improve the soil mapping**.

Soil Scientists at work

1. Infiltration Study
2. Profiles
3. Texturing and Testing

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Data vs Interpretations

Data = soil properties & soil qualities

(objective)

Interpretation = prediction based upon a combination of data

(subjective)

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Interpretations

Texture

K Factor

Septic Tank Adsorption fields

Properties

Sand, silt and clay

Bedrock Depth

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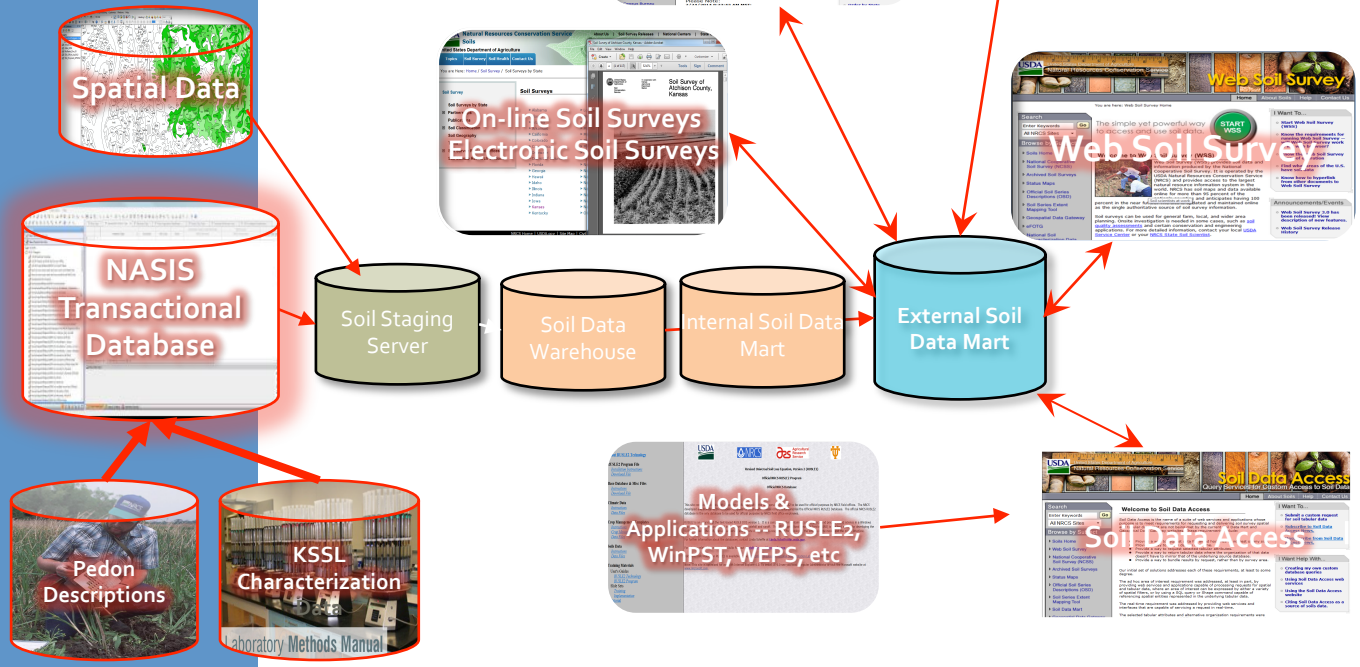
National Soil Information Database



Soil Updates impact uses

- **Series Name, yield potentials & other interpretations**
  Defines the soil properties found at the site examples: Depth to Bedrock, horizons, %s-si-cl

- **Tolerance "T" value**
  Maximum amount of annual sheet and rill erosion that allows the fertility and productive capacity of the soil to be maintained

- **"K" Factor**
  Quantifies susceptibility of the soil to sheet & rill erosion. Includes: texture, organic matter, structure, infiltration, permeability testing

Soil Interpretations

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1. Plant Growth.—Bulk density is an indicator of how well plant roots are able to extend into the soil. Root restriction initiation and root-limiting bulk densities are shown below for various particle-size classes.

Particle-Size Class	Bulk Density (g cm^{-3})	
	Restriction-Initiation	Root-Limiting
Sandy	1.69	>1.85
Loamy		
coarse-loamy	1.63	>1.80
fine-loamy	1.60	>1.78
coarse-silty	1.60	>1.79
fine-silty	1.54	>1.65
Clayey*		
35-45% clay content	1.49	>1.58
>45% clay content	1.39	>1.47

*Soils with high iron oxide content (e.g., sesquic mineralogy) or with andic soil properties can initiate restriction at lower bulk densities.

T and K Factor

How are the Factors calculated?

- T and K Factors are based on research by the NRCS, University partners, the Agricultural Research.
- T and K Factors will continue to be updated as new knowledge and research becomes available.

Why did the Factors sometimes change on the county line?

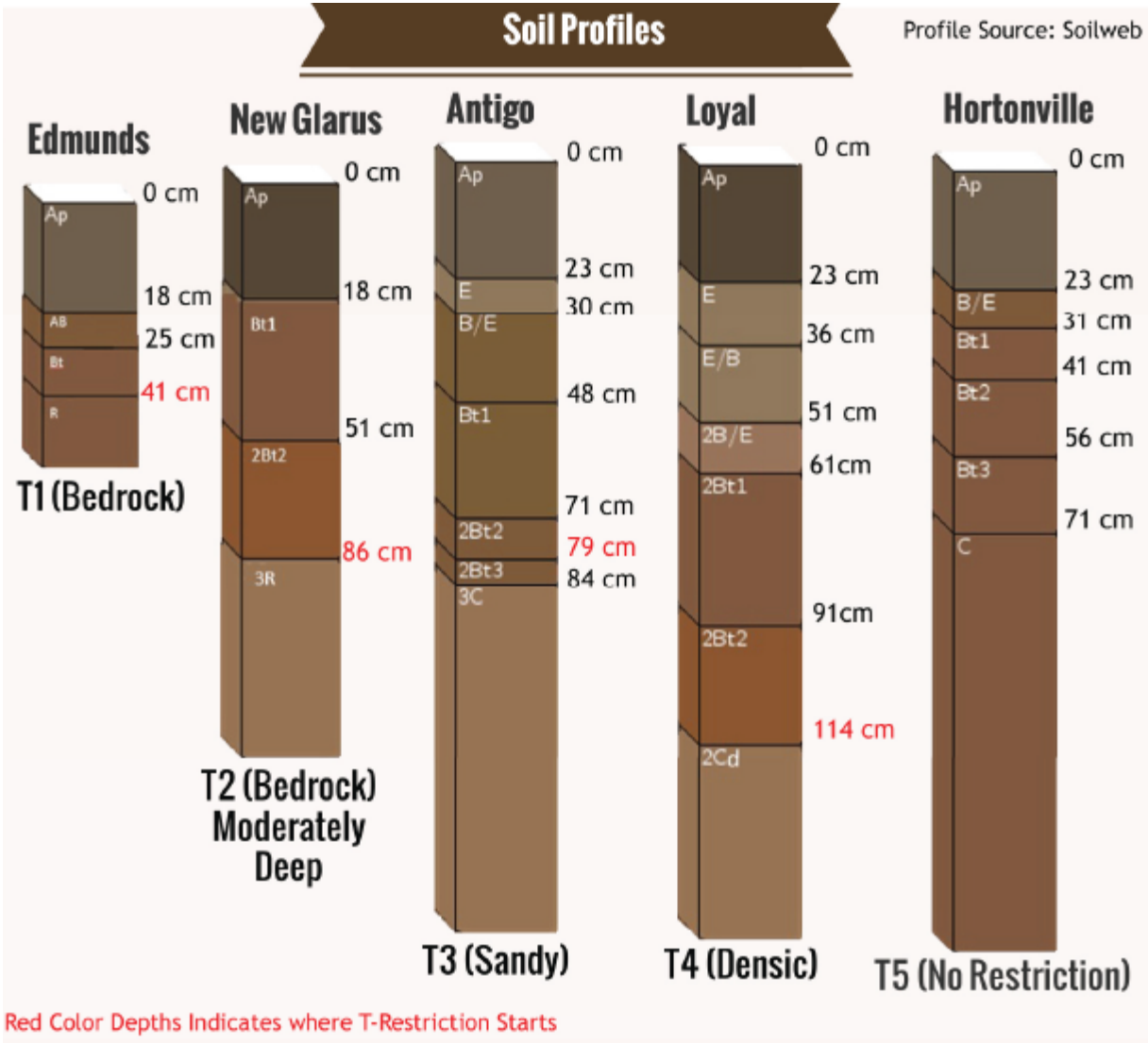
- Wisconsin identified representative values for the soil properties of each soil series in each county. Updates provide seamless transitions across county lines.
- » T and K Factors are calculated from the representative values for key soil properties, like percent sand or depth to rock. SDJR process is making uniform values for soil properties across county lines which can result in different T or K Factors.

T Factor

- *Soil Loss "T" (Tolerable Level) is a target of maximum annual sheet and rill erosion for that soil series that will allow fertility and production capacity to be maintained.*
- *T is expressed in Tons per acre per year. 5 "T" allows for 5 Tons of soil loss annually with a maximum deviation of 10%.*

» Soil properties affecting T Factor include texture, permeability, available water capacity, and depth to restrictive layers such as rock, clay or gravel.

T Factor
Soil Profiles



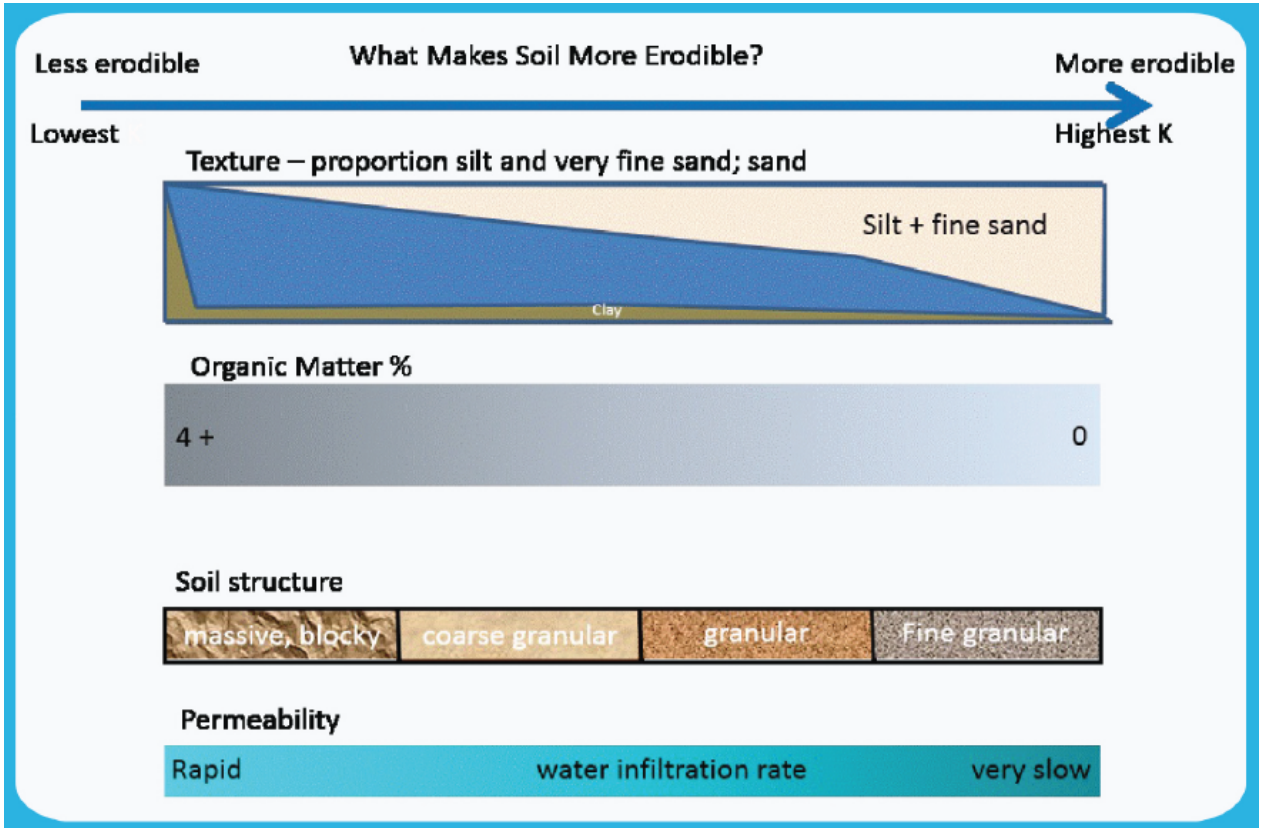
K Factor

» The K Factor is an index which quantifies the relative susceptibility of the soil to sheet and rill erosion.

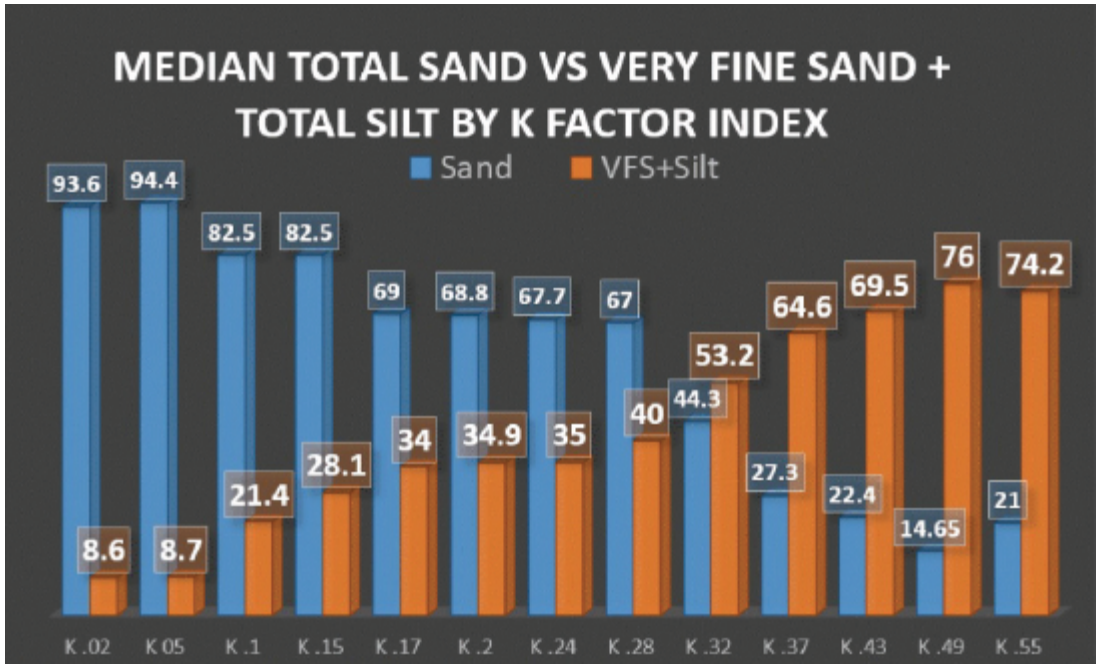
» K Factor is used in the RUSLE2 soil loss prediction equation. Values range from .02 for the least erodible soils to .64 for the most erodible.

» Soil properties affecting K Factor include texture, organic matter content, structure, infiltration, and permeability.

K Factor Soil Erodibility



K Factor Silt Index



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Planner onsite decisions

Planners need to read the SITE and make decisions

Planners responsibility is ON SITE data collection and decision making

"One T Soil"

- **Planning Options are tough:**
- Isolate the most restrictive unit
- HELI or continuous CRP options
- No Tillage, covers & continuous hay
- CBS, CSC

Policy:

We transition folks into compliance when management changes occur. Start working on the changes to tillage/rotation/practices. Variances over time to get them back into compliance…(one year +)

Area Resource Soil Scientists

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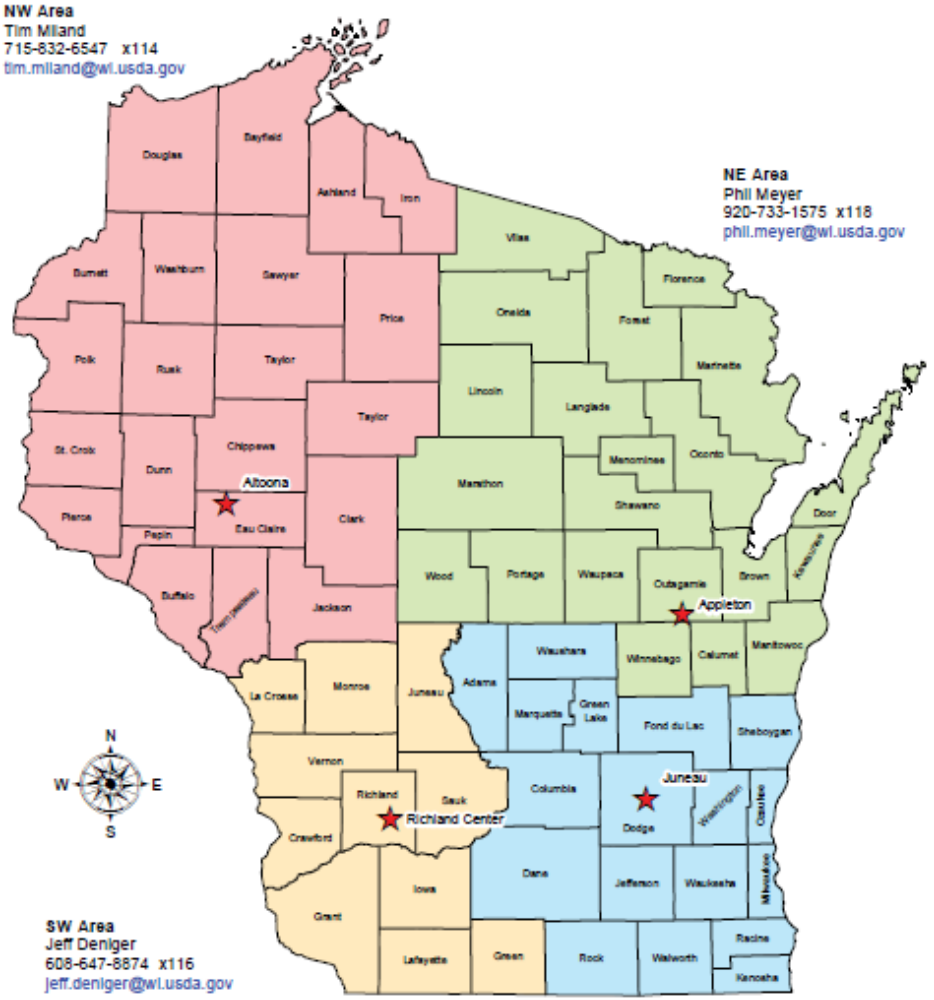
Wisconsin Area Resource Soil Scientists



Major Land Resource Area Boundaries

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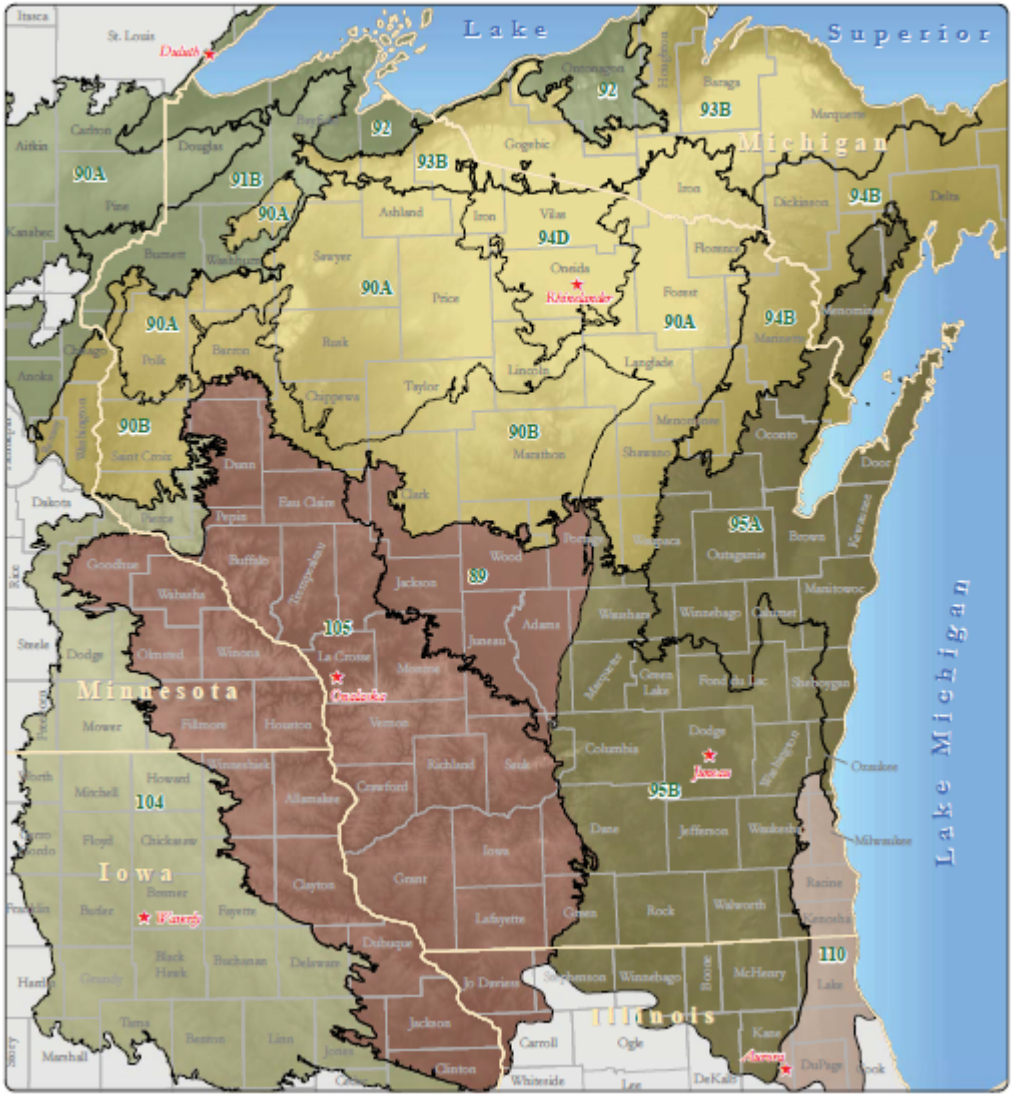
NRCS divides the Unites States into Major Land Resource Areas (MLRAs). An MLRA consists of a set of geographically associated land resource units featuring a particular pattern of soils, water, climate, vegetation, land use and type of farming.




NRCS - Helping People Help the Land
Productive Lands, Healthy Environment