USDA

United States Department of Agriculture

Natural Resources Conservation Service

November 2015

2015 Cooperative Soil Survey
Planning Workshop
Madison, Wisconsin

Helping People Help the Land

Ken Lubich, NRCS–Wisconsin Former State Soil Scientist

John Langton, NRCS–Wisconsin Former Soil Scientist

History of Wisconsin Soil Survey

The year 2006 marked the completion of the initial field mapping for the National Cooperative Soil Survey in Wisconsin. Wisconsin has had a rich and productive soil survey program. It was not until the latter part of the 1800's that agricultural land use interest by the public and the United States Department of Agriculture (USDA) convinced the United States Congress to make an inventory of the nation's soils and their production potential. This interest in 1899 created the soil survey program under the USDA Division of Soils, directed by Milton Whitney. Thereafter, soil survey became a cooperative effort between the U.S. Department of Agriculture and state agencies. The Wisconsin Geologic and Natural History Survey, the Soil Department at the University of Wisconsin, and the U.S. Bureau of Soils did much of the early survey work.

Welcome Partners!




Workbook Contents

Workshop Agenda

Monday, November 9, 2015

1:00 pm — Opening Remarks

Welcome and Workshop Purpose

The Wisconsin Cooperative Soil Survey is partnership of federal, regional, state, and local agencies and institutions. This partnership works together to cooperatively investigate, inventory, document, classify, and interpret soils and to disseminate, publish, and promote the use of information about the soils. The purpose of the workshop is to bring our cooperators and other soil survey supporters up-to-date on soil survey activities in the state and to prioritize, plan and coordinate soil survey and technical soil services for future soil data use.

Workbook Discussion

Soil Updates, Technical Soil Services, Web Soil Survey

1:30 pm — Reports By Cooperators

Each presentation will be 15 minutes with 5 minutes in between to switch presenters.

1:30 pm **Chris Baxter,** University of Wisconsin–Platteville
University Report

1:50 pm **Tim Gerber,** University of Wisconsin–La Crosse
Wetland Delineation Workshops

2:10 pm **Peter Jacobs,** University of Wisconsin–Whitewater
University Report

2:30 pm **Sara Walling,** Department of Agriculture, Trade and Consumer Protection
590 Fall N, Slope Restrictions, L&W Bureau Programs

2:50 pm **Laura Good,** University of Wisconsin–Madison
Nutrient Management Planning, SnapPlus, P Index

3:10 pm **Carrie Laboski,** University of Wisconsin–Madison
A2809 Soil Groups and Yield Potential

3:30 pm — Break

3:40 pm — Reports By Cooperators Continued

3:40 pm **Joe Baeten,** Wisconsin Department of Natural Resources
Nutrient Management Planning/SnapPlus/P Index

4:00 pm **Bryant Scharenbroch,** University of Wisconsin–Stevens Point
University Report

4:30 pm — Adjourn

Tuesday, November 10, 2015

8:00 am *Reports By Cooperators Continued*

8:00 am **Francisco Arriaga,** University of Wisconsin–Madison
Soil Health

8:20 am **Dustin Bronson,** Wisconsin Department of Natural Resources
Biomass Harvesting

8:40 am **Kent Peña,** Natural Resource Conservation Service
ArcGIS/Soil Tools

9:00 am **Karla Petges,** Wisconsin Society of Professional Soil Scientists
Organization Update

9:20 am **TBD,** Wisconsin Association of Agriculture Consultants
Organization Update

9:40 am *Break*

9:50 am *NRCS Soil Divison Priorities*

MLRA Regional Offices

9:50 am **Chris Miller,** Juneau, Wisconsin

10:10 am **Kevin Traastad,** Onalaska, Wisconsin

10:30 am **Scott Eversoll,** Rhinelander, Wisconsin

10:50 am **Ryan Dermody,** Waverly, Iowa

11:10 am *NRCS–Wisconsin Soil Priorities*

Phil Meyer, Area Resource Scientist (NE)

Jeremy Ziegler, Area Resource Scientist (SE)

Tim Miland, Area Resource Scientist (NW)

Jeff Deniger, Area Resource Scientist (SW)

11:40 am *Developing Recommendations for Future Collaboration*

12:15 pm *Closing Remarks and Questions*

12:30 pm *Adjourn*

Soil Data Join Recorrelation

NRCS Soil Science Division: The Future

Phase 1 - Soil Data Join Recorrelation Initiative (SDJR)

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.

Background

In the first 100 years of the National Cooperative Soil Survey (NCSS) Program, soil surveys were conducted county by county on the basis of State priorities and applied statewide and regional guidance documents in survey development. The application of soil survey data and maps was primarily at a local level for planning management. Material that was originally developed as information pertinent to a specific county is now being used on a broader scale, and data differences related to the product's vintage, design and completeness present challenges.

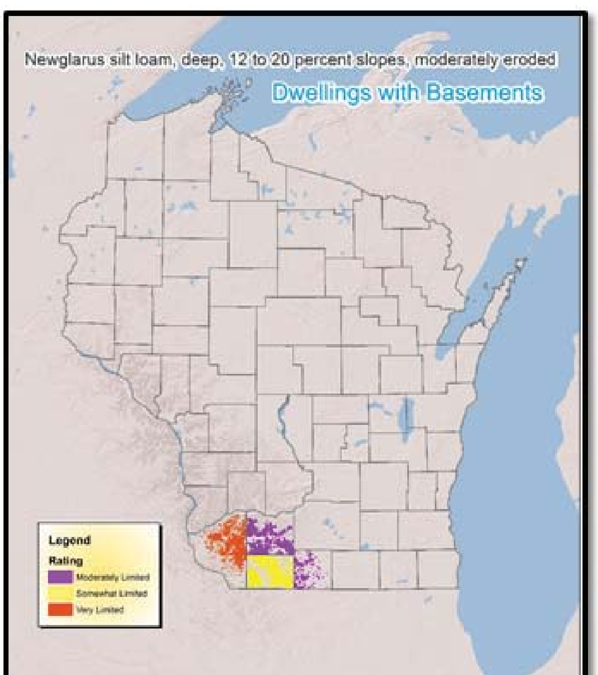
The Soil Science Division has positioned its future program by establishing MLRA soil survey regional offices and MLRA soil survey offices. The organization of these offices fosters the update of soils information in a manner that minimizes historical political or regional bias. Update of soils information will be based on typical conditions within the MLRA.

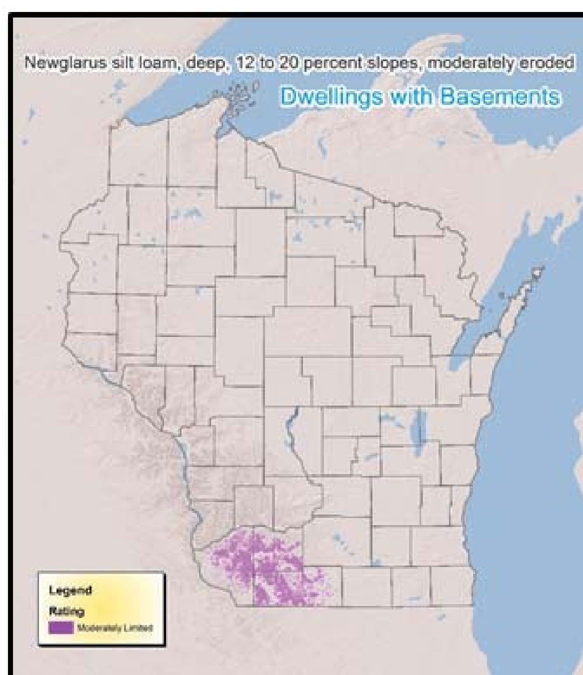
The Soil Data Join Recorrelation (SDJR) initiative accelerates the soil database improvement phase of the MLRA approach to soil survey within the National Cooperative Soil Survey (NCSS) program. This initiative will focus on creating a continuous and joined coverage within the attribute database through a process of data harmonization.

The Soil Data Join Recorrelation Initiative

Advances in computer technologies allow for sophisticated analysis and modeling of natural resource data across very large areas. The coverage of attribute and spatial data of the nation's soil resources available to the public is considered the 'first generation' of soil mapping. The next major effort is the Soil Data Join Recorrelation (SDJR) initiative. The SDJR Initiative begins the process of bringing attribute data to a common standard through "harmonization" and identifies future projects that require additional fieldwork.

Below on the left is a depiction of soil suitability for "Dwellings with Basements" as the SSURGO product currently would display. Abrupt straight boundaries from one color (suitability rating) to another represents a county line and vintage of survey and data values selected. The map on the right shows the rating after the SDJR "harmonization" is completed:





Basic Objectives

Basic objectives of the Soil Data Join Recorrelation Initiative include the following:

- Support the development of seamless soils data for use with Conservation Delivery Streamlining Initiative, USDA Farm Bill Programs, and value added Soil Survey products
- A process resulting in correlation of similar map units taking into account existing field and laboratory data, and expert knowledge
- Improve and complete the population of the soil properties database
- Reduce the number of map units for same and similarly named soil map units
- Identify priority additional update needs based on SDJR activities (Phases 2→X)
- Rectify the perceived interpretation discrepancies visible in geospatial presentation of soil survey information, and
- Build the foundation for next generation of soil survey – disaggregation and new farm and environmental interpretations (Phases 2→X)

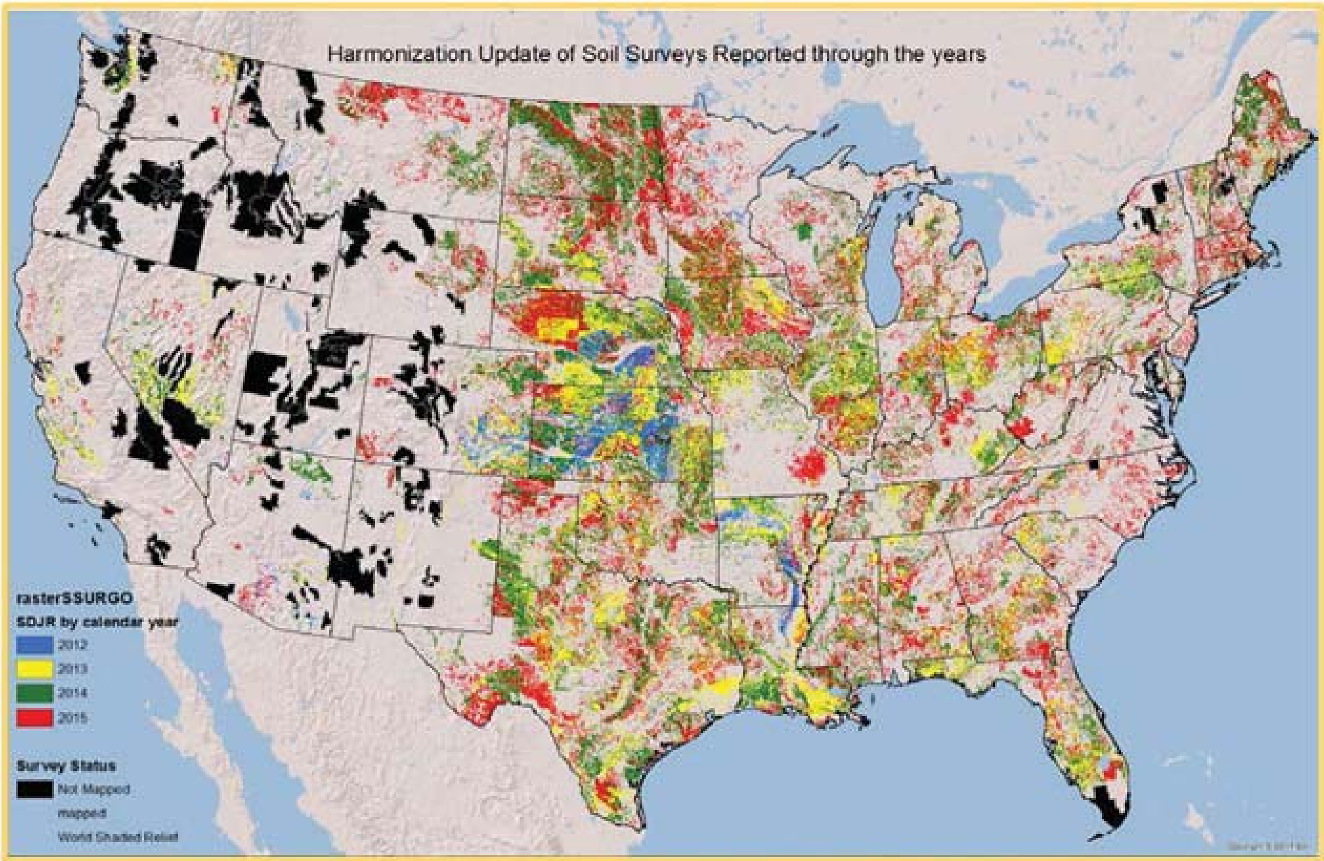
Preview of Phase 2

What would the "disaggregated" soil map look like?

The **current** soils information and data (SSURGO) is a very useful product; however, additional products will be necessary to continue to serve the public needs. In regards to soil maps, a transition from the current vector depiction (polygons) of soil distribution to raster (pixel based) databases of soil and soil property distribution is desired because of its usability with other GIS data layers.

To achieve this **future** desired product, a process of disaggregating the existing spatial product to represent the probable location of individual soil components based on soil-landscape characteristics is needed.

The foundation for the disaggregation step is a harmonized soils data base representing landscape specific, consistent map unit composition and improved soil scientific data through the SDJR activities.



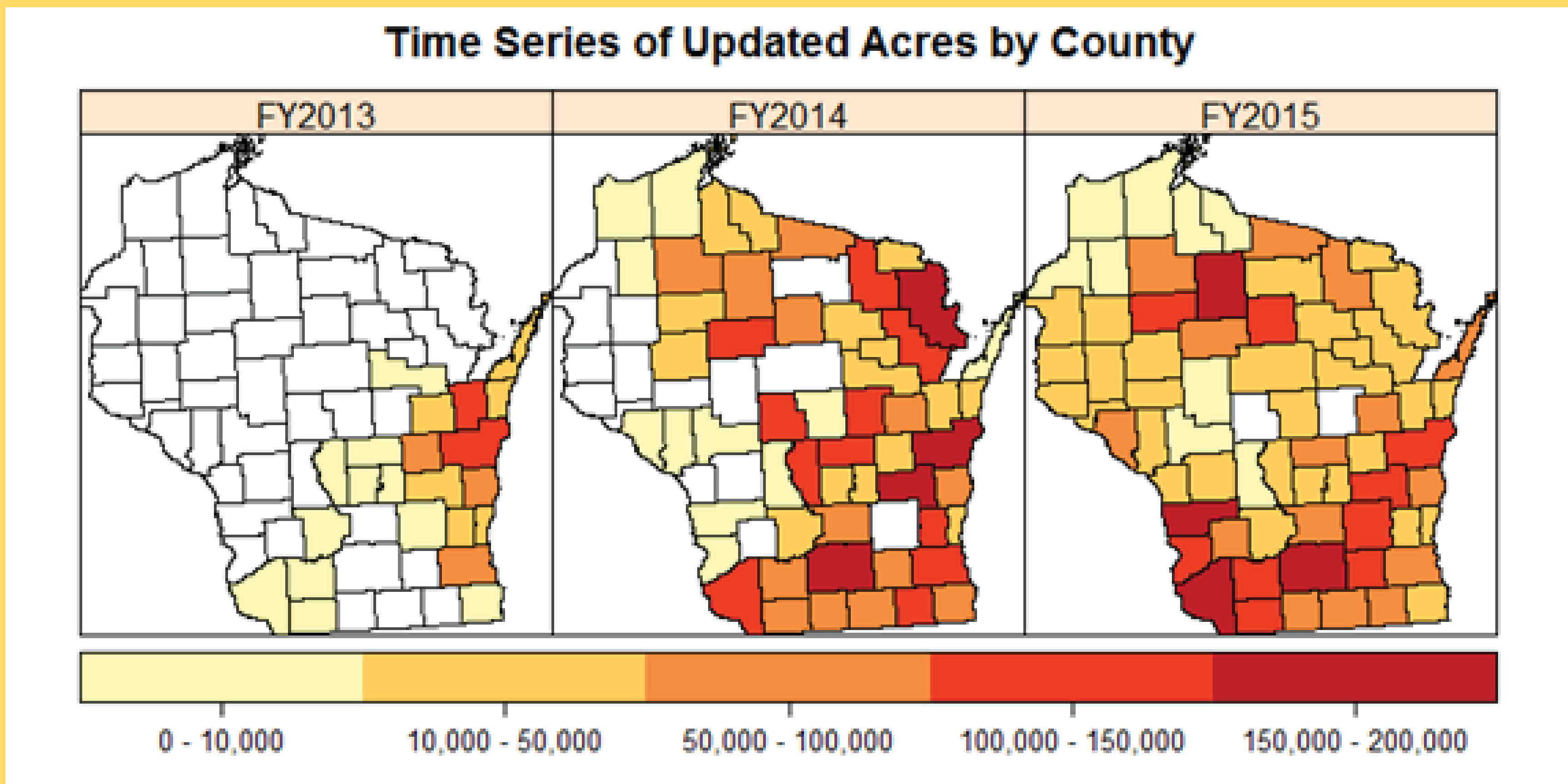
SDJR Time Frame

In Fiscal Year 2012, the Soil Science Division began a 5-year initiative designed to review the soil survey data and thereby develop a current and common standard. Analysis in 2011 identified over 700 million acres, or roughly 30% of the 2.3 billion acres in the U.S., that included same-named or similarly named map units used in multiple counties. The identified map units were those that would affect the greatest number of the agency customers. The 5-year initiative was coined as "Soil Data Join Recorrelation" (SDJR). SDJR focused on selecting a soil series and harmonizing those county-based map units that had the same map unit concept into a single MLRA map unit concept. This instruction dates back to November 21, 1967, when Soils Memorandum 67 directed the Division to focus on interstate coordination of properties and interpretations across MLRAs. As FY (Fiscal Year) 2015 ends, 470 million acres of the 700 million acre goal have been harmonized.

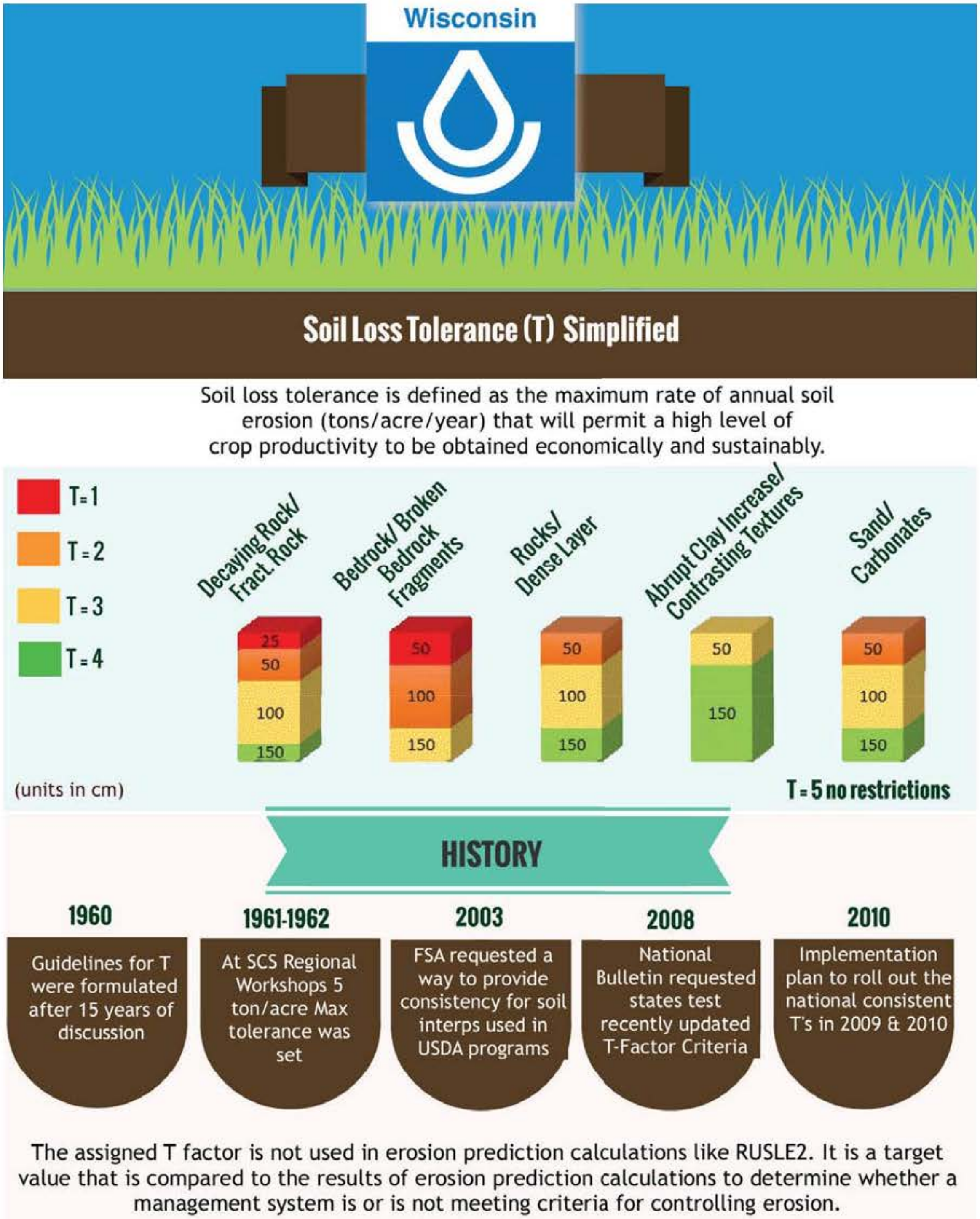
What SDJR Means to Wisconsin

For the past several years Soil Survey Offices in the East Central Glaciated Region (11) & West Central Glaciated Soil Survey Region (10) have focused their work on the Soil Data Join and Recorrelation (SDJR) National Initiative. The goal of this Initiative has been to increase the consistency of the Soil Survey Geographic database (SSURGO) across political boundaries. A summary of the affected areas in Wisconsin are presented below. FY2016 will be the last official year of the SDJR Initiative. After FY2016, MLRA projects will become the main focus of Soil Survey Offices.

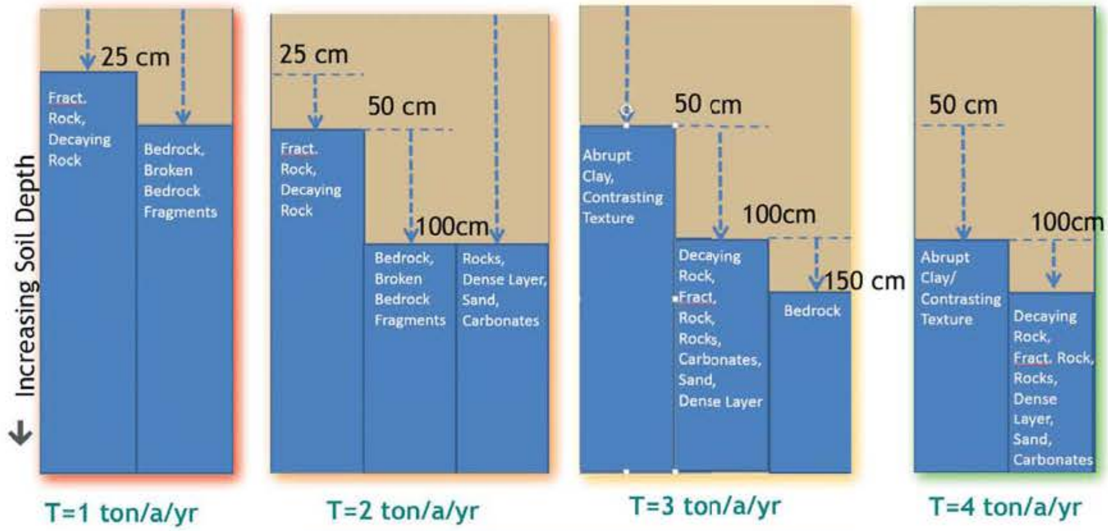
Fiscal Year	Updated Acres	Top 5 Soil Series Updated in Wisconsin
2013	753,896	Kewaunee, Manawa, Hochheim, Poygan, Chaseburg
2014	4,270,173	Lupton, Plainfield, Newglarus, Withee, Loyal
2015	3,799,486	Magnor, Dorerton, Houghton, Newglarus, Palsgrove



(Time Series Source: Steven Roecker, Soil Data Quality & GIS Specialist, Indianapolis, Indiana; NRCS)

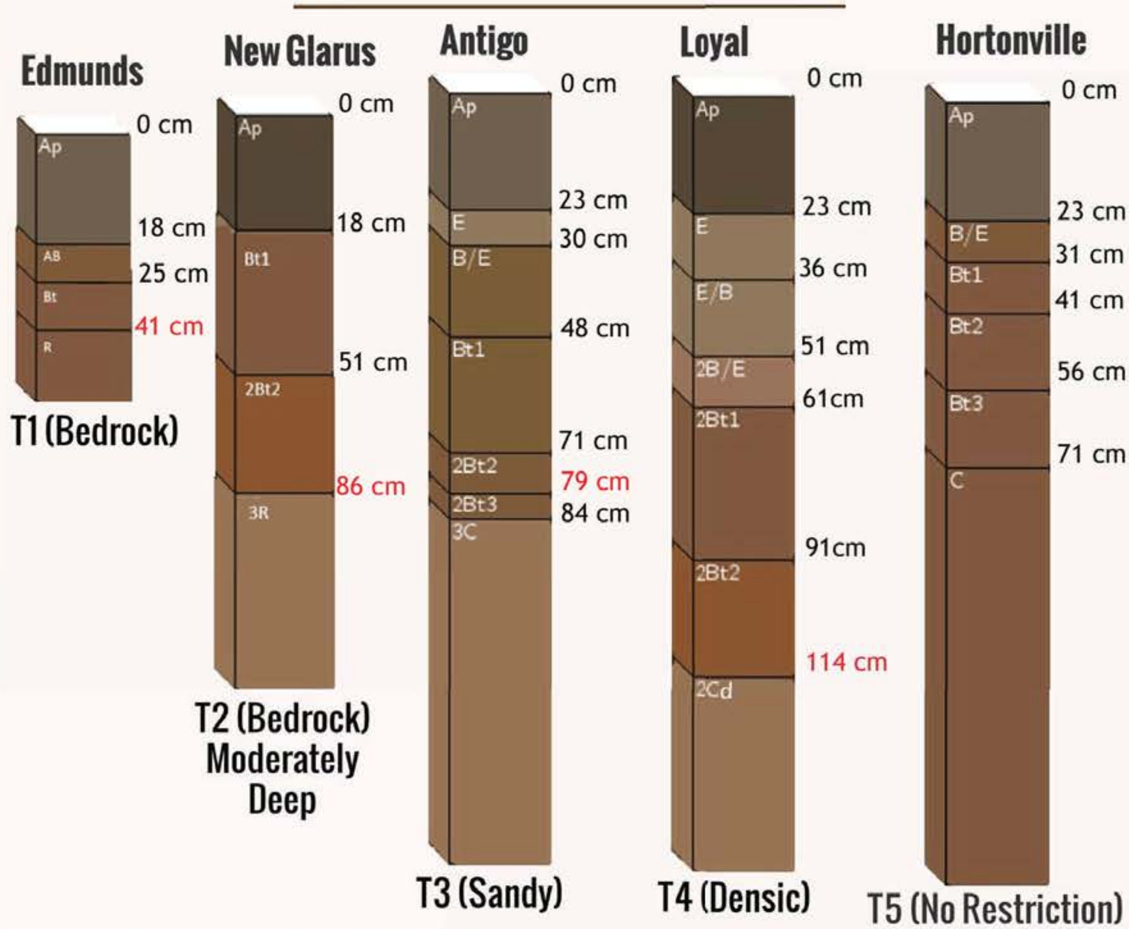

Wisconsin
Soil Loss Tolerance (T) Simplified
Soil loss tolerance is defined as the maximum rate of annual soil erosion (tons/acre/year) that will permit a high level of crop productivity to be obtained economically and sustainably.
T=1
T=2
T=3
T=4
Decaying Rock/ Fract. Rock
25
50
100
150
Bedrock/ Broken Bedrock Fragments
50
100
150
Rocks/ Dense Layer
50
100
150
Abrupt Clay Increase/ Contrasting Textures
50
150
Sand/ Carbonates
50
100
150
(units in cm)
T=5 no restrictions
HISTORY
1960
Guidelines for T were formulated after 15 years of discussion
1961-1962
At SCS Regional Workshops 5 ton/acre Max tolerance was set
2003
FSA requested a way to provide consistency for soil interps used in USDA programs
2008
National Bulletin requested states test recently updated T-Factor Criteria
2010
Implementation plan to roll out the national consistent T's in 2009 & 2010
The assigned T factor is not used in erosion prediction calculations like RUSLE2. It is a target value that is compared to the results of erosion prediction calculations to determine whether a management system is or is not meeting criteria for controlling erosion.

Criteria



Soil Profiles

Profile Source: Soilweb



Red Color Depths Indicates where T-Restriction Starts

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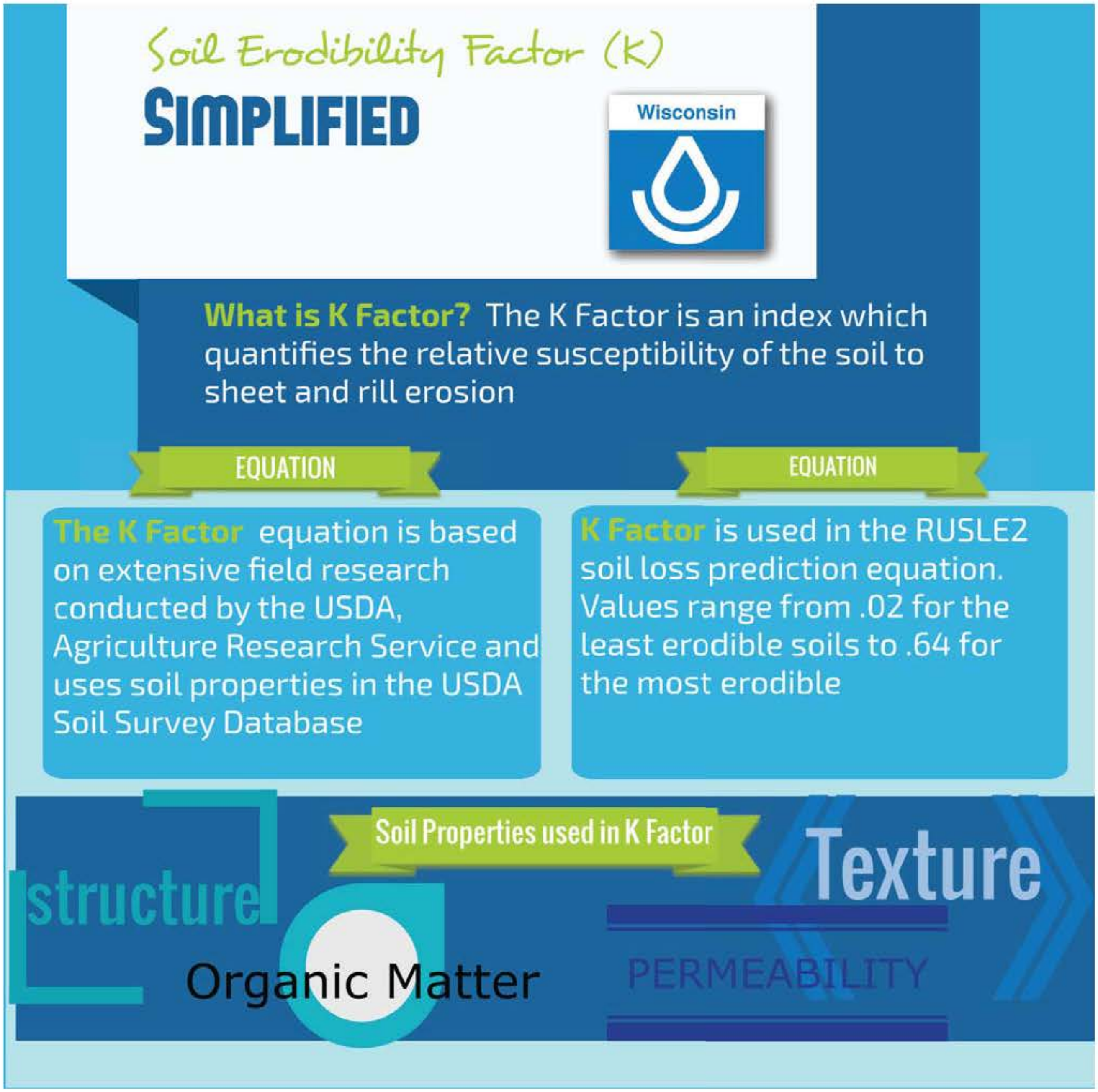
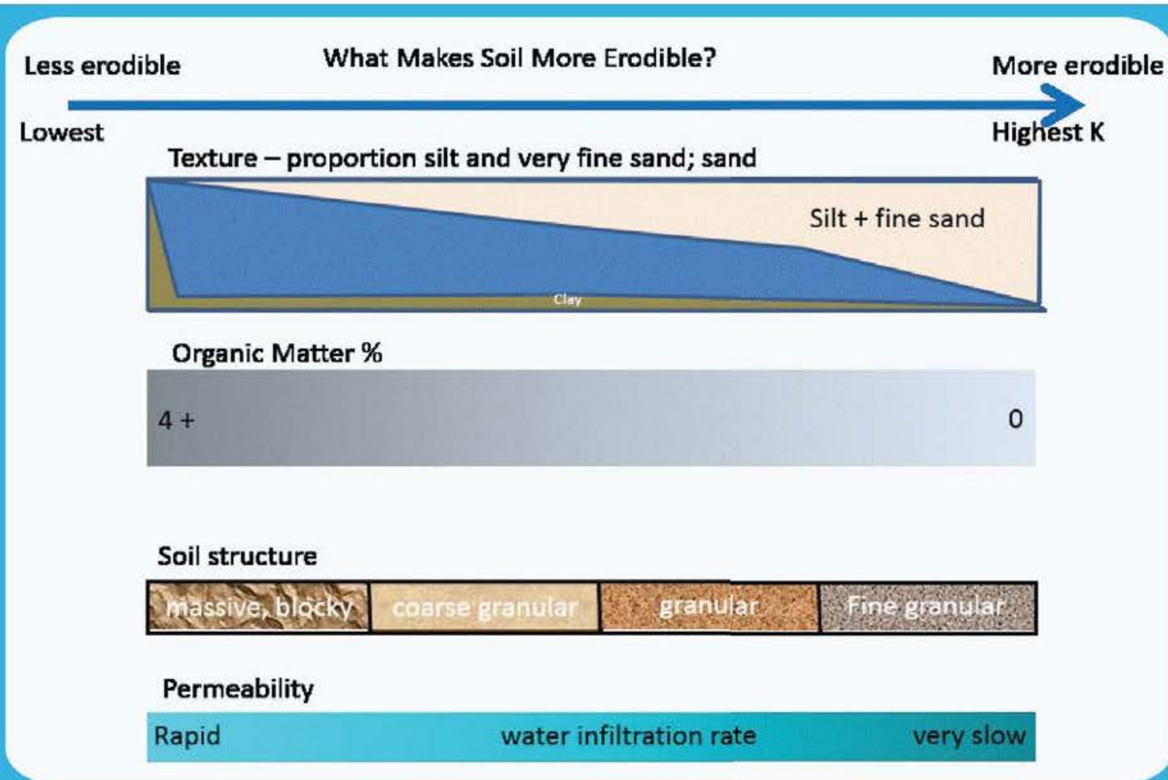
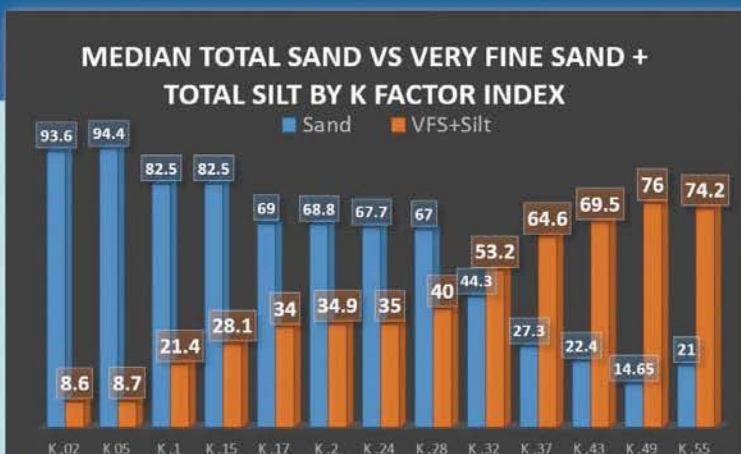
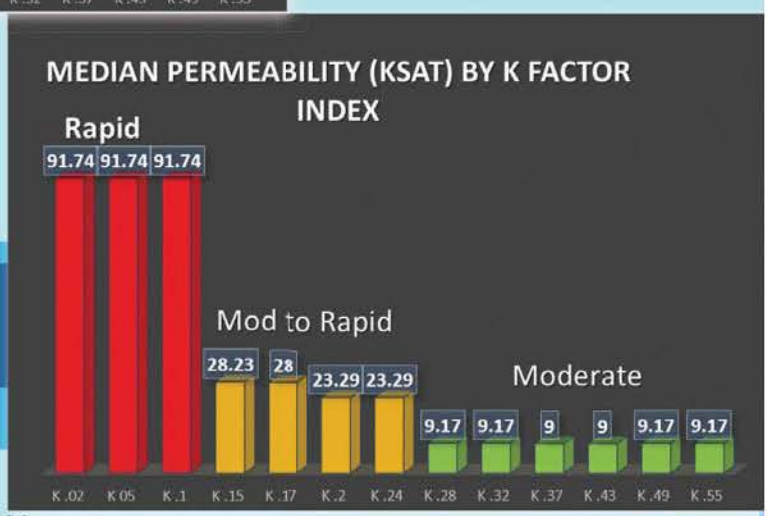

Soil Erodibility Factor (K)
SIMPLIFIED
Wisconsin
What is K Factor? The K Factor is an index which quantifies the relative susceptibility of the soil to sheet and rill erosion
EQUATION
EQUATION
The K Factor equation is based on extensive field research conducted by the USDA, Agriculture Research Service and uses soil properties in the USDA Soil Survey Database
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 used in K Factor
structure
Texture
Organic Matter
PERMEABILITY





Wisconsin mineral soils with the lowest erodibility have greater than 90% sand and those with the highest erodibility are primary silt and very fine sand

Structure & Organic Matter, while important in the K factor equation, do not have consistent trends across K factors in Wisconsin



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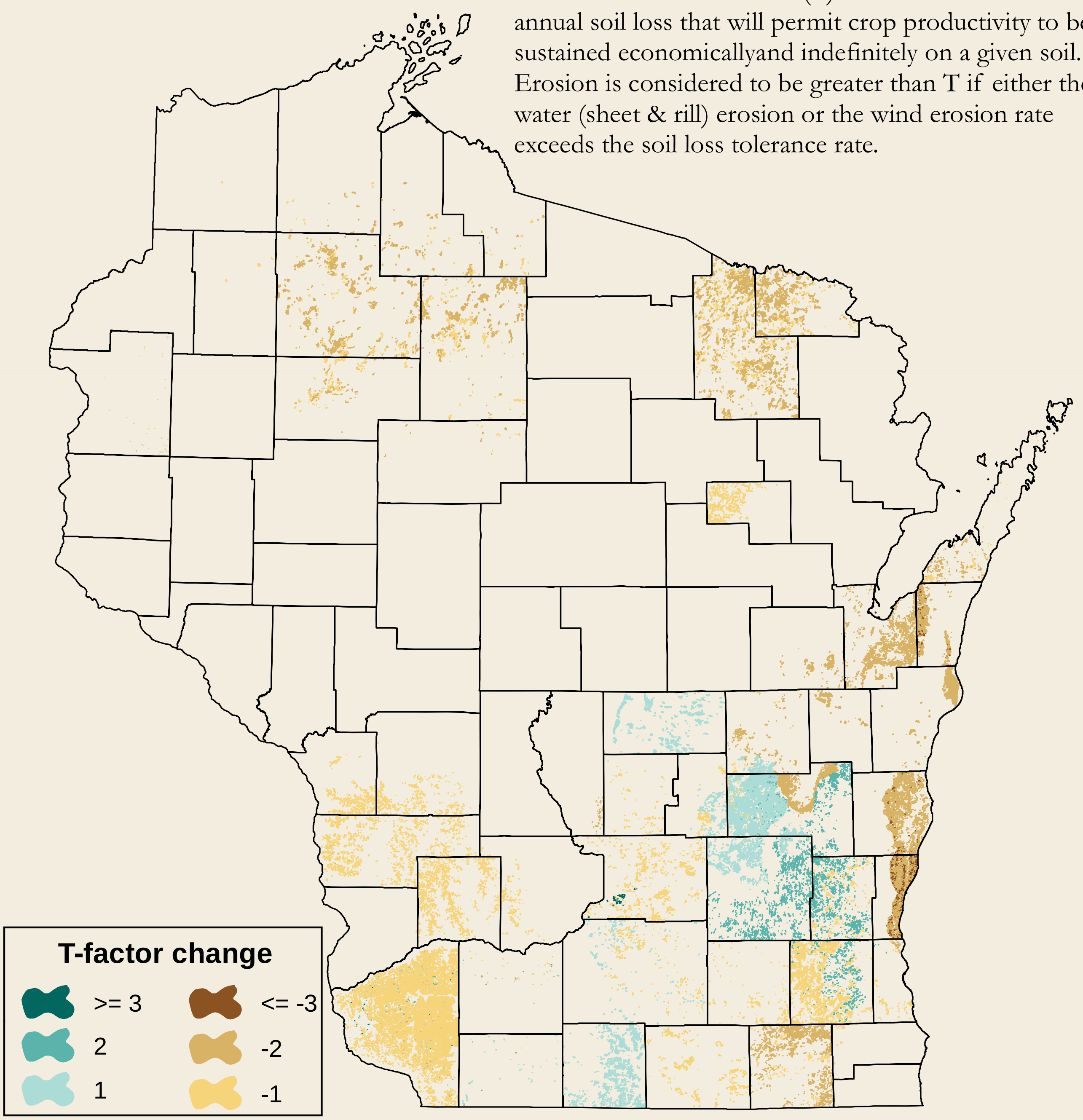
Wisconsin Soil T-factor Changes

October 2015

SSURGO 2014 to 2015 Update

The soil loss tolerance rate (T) is the maximum rate of annual soil loss that will permit crop productivity to be sustained economicallyand indefinitely on a given soil. Erosion is considered to be greater than T if either the water (sheet & rill) erosion or the wind erosion rate exceeds the soil loss tolerance rate.



Visit the WI NRCS homepage at: www.wi.nrcs.usda.gov for more information on T and K Factors.

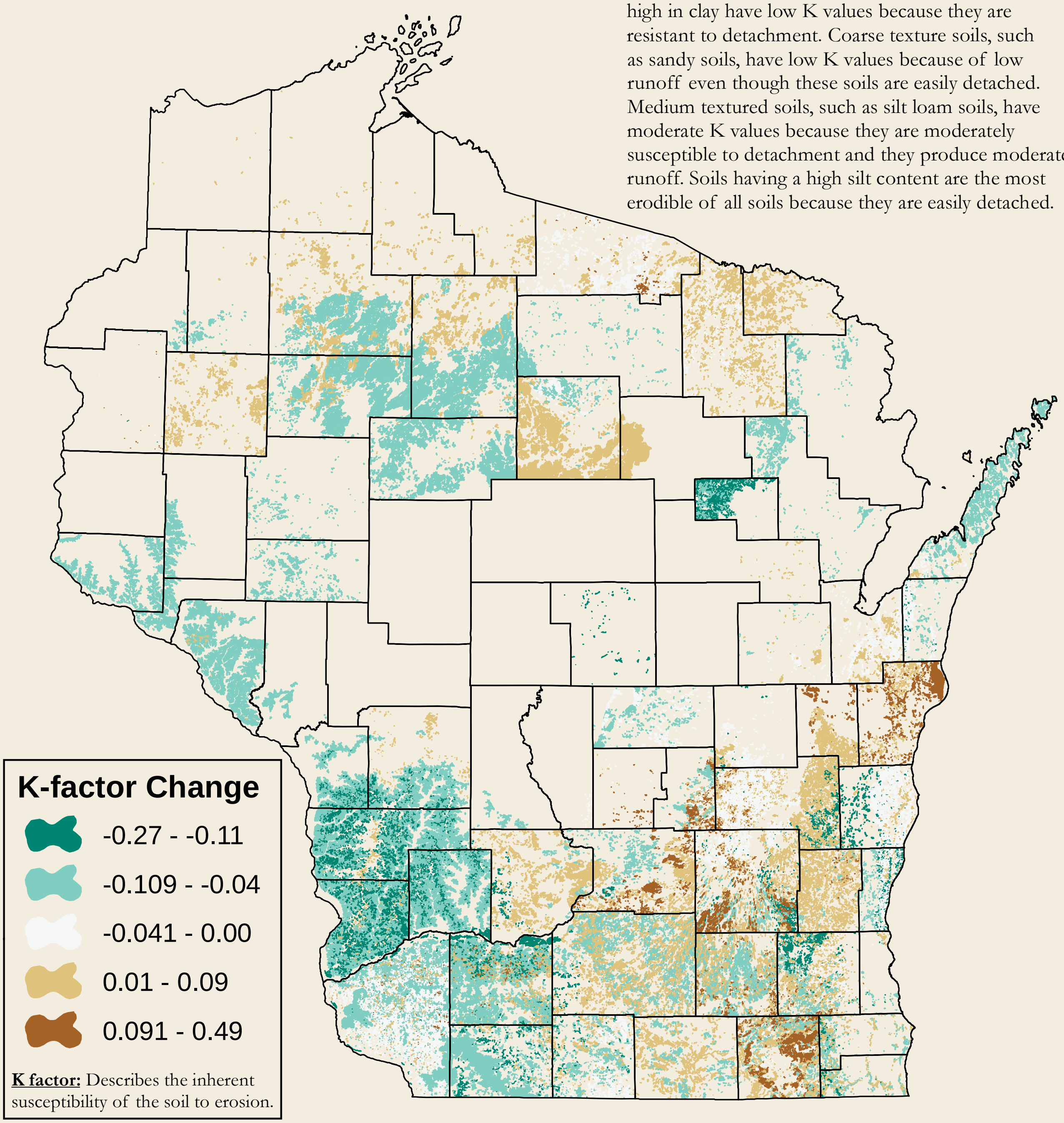
Map only reflects soils where the T-factor changed during the 2014 to 2015 SSURGO update

Wisconsin Soil K-factor Changes

October 2015

SSURGO 2014 to 2015 Update

Soils vary in their susceptibility to erosion. The soil erodibility factor K is a measure of erodibility for a standard condition. The soil erodibility factor K represents both susceptibility of soil to erosion and the amount and rate of runoff, as measured under the standard unit plot condition. Fine textured soils high in clay have low K values because they are resistant to detachment. Coarse texture soils, such as sandy soils, have low K values because of low runoff even though these soils are easily detached. Medium textured soils, such as silt loam soils, have moderate K values because they are moderately susceptible to detachment and they produce moderate runoff. Soils having a high silt content are the most erodible of all soils because they are easily detached.



K factor: Describes the inherent susceptibility of the soil to erosion.

Visit the WI NRCS homepage at: www.wi.nrcs.usda.gov for more information on T and K Factors.

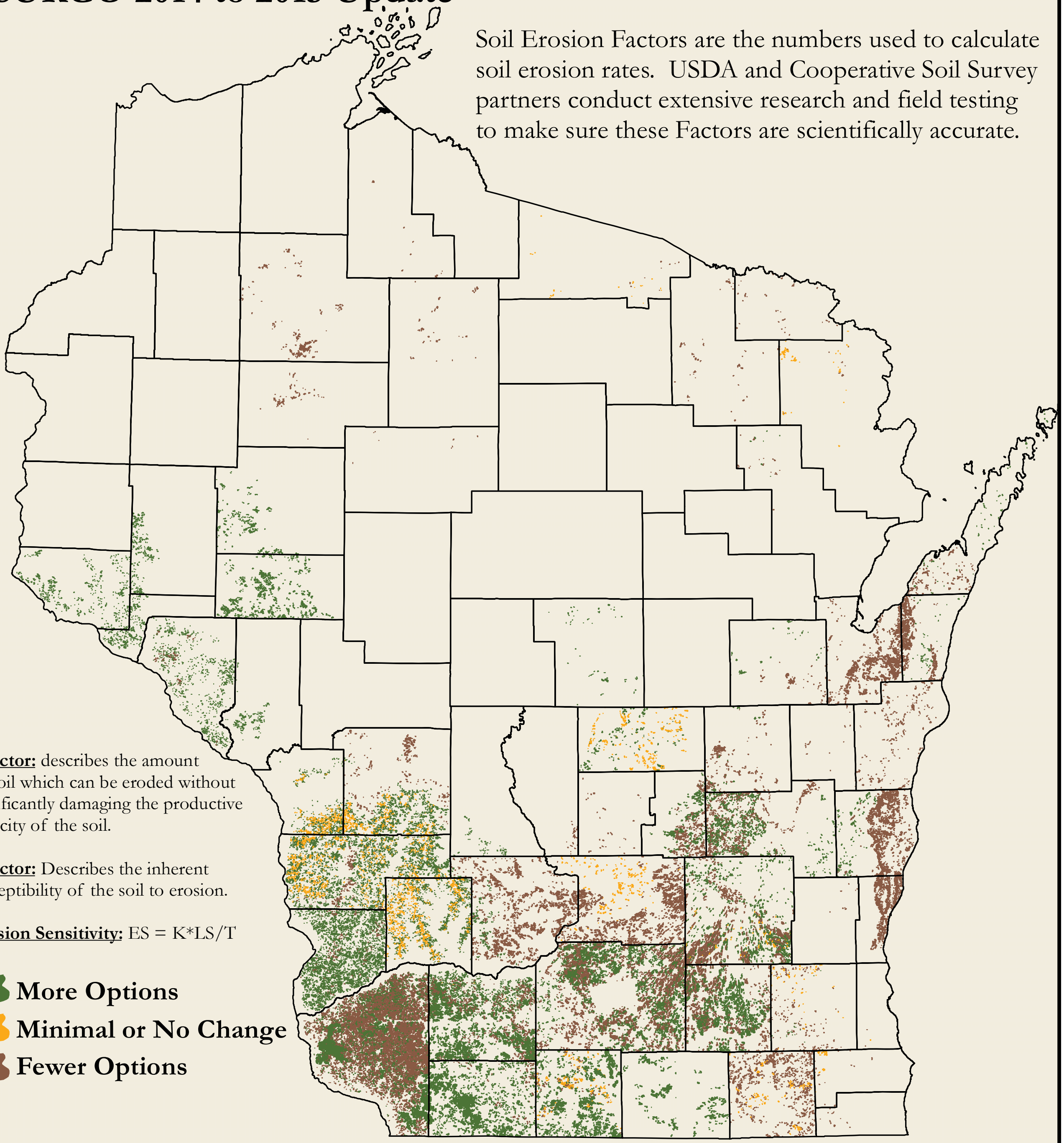
Map only reflects soils where the K-factor changed during the 2014 to 2015 SSURGO update

NRCS Natural Resources Conservation Service

Wisconsin Soil Erosion Sensitivity

SSURGO 2014 to 2015 Update

Soil Erosion Factors are the numbers used to calculate soil erosion rates. USDA and Cooperative Soil Survey partners conduct extensive research and field testing to make sure these Factors are scientifically accurate.



T factor: describes the amount of soil which can be eroded without significantly damaging the productive capacity of the soil.

K factor: Describes the inherent susceptibility of the soil to erosion.

Erosion Sensitivity: ES = K*LS/T

More Options

Minimal or No Change

Fewer Options

Map reflects only soils with a slope greater than 6% and found on cropland

For more information:
Contact NRCS at your local USDA Service Center.

Visit the WI NRCS homepage at: www.wi.nrcs.usda.gov for more information on T and K Factor.

NRCS Natural Resources Conservation Service

T and K Factor Explanations

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 .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 Factors are based on extensive field research conducted by the USDA, Agricultural Research Service.

What is the T Factor?

» The T Factor is the maximum amount of annual sheet and rill erosion that permits the fertility and productive capacity of the soil to be maintained indefinitely.

» T Factor values range from 1 ton per acre per year for the most fragile soils, to 5 tons per acre per year for soils that can sustain more erosion without losing significant productive potential.

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

» T Factors are based on over 80 years of research establishing rates of soil formation and the effects of erosion on soil productivity.

Why are updates to the Factors needed?

» Updates are needed to reflect the latest research findings.

» As new soil property data is collected and soils are mapped in greater detail, more accurate estimates of T and K Factors can be made.

» Improved guidelines for estimating T and K Factors have been developed based on current research. Updated Factors, using these guidelines, will be more accurate and consistent nationwide.

How will the changes affect compliance?

» The T and K Factors in effect when an NRCS approved Conservation Plan was developed will continue to be used until the Plan is significantly revised.

» When an existing NRCS approved Conservation Plan is significantly revised, or when a new Plan is developed, the updated T and K Factors will be used.

» Compliance with a Self-Certified Conservation System will be determined by using the T and K Factors in effect at the time of the review.

» The T and K Factors in RUSLE2 will be updated as new versions are released.

For more information contact your local USDA, NRCS Service Center or visit the Wisconsin NRCS website: www.wi.nrcs.usda.gov

What is changing?

» Some T and K Factors are changing now because the technical criteria used to calculate the Factors have been updated. The new Factors have a solid research and scientific grounding and will facilitate more effective conservation planning and resource protection.

NRCS is working with state and local partners to assess the policy and planning impacts of T and K Factor changes. Release of the updated Factors in Wisconsin is ongoing as data is updated.

What is the impact?

» A decrease in T Factor or an increase in K Factor may result in more limited conservation system options.

» T and K Factor changes have the most impact on sloping cropland. In Wisconsin, the changes may result in more limited conservation system options on about 4.9 million acres of sloping cropland.

» Large changes in T and K Factors have more impact than smaller changes.

» The most change will occur in the western Wisconsin counties, but significant impacts are expected on individual farms throughout Wisconsin. In some areas the changes will permit more conservation system options, rather than fewer.

How are the Factors calculated?

» T and K Factors are based on research by the NRCS, University partners, the Agricultural Research Service and others, which establishes how soil properties affect erosion. Factors are updated in response to improved soil property data and new research.

» T and K Factors will continue to be updated as new knowledge and research becomes available.

Why do the Factors sometimes change on the county line?

» Soil properties, even within the same soil series, usually vary somewhat from place to place. To summarize this variability in a practical way, past soil survey work in

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. Different representative values for soil properties in adjacent counties sometimes results in different T or K Factors.

» Our knowledge is based on county level research and data, so it is not known precisely where on the landscape a change in representative soil property values occurs.

When the original data supported different T or K Factors in adjacent counties, the updates will adjust for the series so that things are uniform.

What are soil scientists doing now to improve the data?

» In Wisconsin, more than 15 NRCS soil scientists, and many Cooperative Soil Survey partners are working now to conduct new research and improve the soil mapping and property data to better meet user needs.

» Current soil survey work characterizes soil properties across broad natural landforms. Soil scientists identify patterns and natural breaks in soil property values, without concern for county boundaries. This process eliminates “no-joins” across county boundaries. Because work to improve the mapping and data requires significant time and resources, soil scientists are working with data users to ensure they efficiently address the highest priority needs first.

» Soil investigations concentrate on more fully and accurately characterizing soil properties to meet current needs. 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. New interpretations are developed to meet current needs.

For more information contact your local USDA, NRCS Service Center or visit the Wisconsin NRCS website www.wi.nrcs.usda.gov

Background

In accordance with [Title 7 Code of Federal Regulations, Chapter VI, Subchapter B]— Conservation Operations, Part 610.4—Technical Assistance Furnished, the Natural Resources Conservation Service (NRCS) provides technical assistance to those who are responsible for making decisions and setting policies that influence land use, conservation treatment, and resource management. This technical assistance consists of assistance with programs, planning, application of conservation practices, and in the technical phases of USDA cost-share programs.

These authorities define the Soil Science Division mission as:

1. Make an inventory of the soil resources of the United States
2. Keep the inventory current to meet contemporary needs
3. Interpret the information and make it available in a useful form
4. Provide technical assistance and promote the use of soil survey for a wide range of community planning and resource development issues to both non-farm and farm uses.

The emphasis of this business plan is Mission Objective 4.

Major TSS Task Areas

The performance of TSS requires skills in a variety of activities. In alignment with the mission objectives of the SSD, the primary TSS task goals fall into four basic categories, listed below. Knowledge and skill levels for each task can easily be assessed for training needs and also listed in performance plans for each provider by his/her supervisor:

1. Providing TSS consultations
2. Development and execution of TSS plans/projects with cooperator community
3. Outreach and education
4. Improvement of existing data for TSS and planning needs

Numerous TSS tasks are related to each category and can be enumerated and accounted for during the course of the fiscal year, allowing for more accurate and timely allocation of funding from various financial pools. Using the model of alignment of tasks with major responsibility areas also allows for delegation of various tasks to specialty team member who have suitable skills and experience for the tasks. Mid- to long-term cross-training plans can then be more readily developed with SMART goals to incorporate into individual performance plans. The following tasks fall within the assigned categories, following guidance from the National Soil Survey Center and National Headquarters.

Providing TSS Consultations

1. Wetland delineations/determinations/compliance/appeals
2. Highly Erodible Lands (HEL) determinations/compliance/appeals
3. Important Agricultural Lands (IAL) and Farmlands evaluations
4. Site specific soil investigations
5. Farmland Protection Policy Act (FPPA)
6. Provide guidance on Web Soil Survey / SoilWeb for external customers
7. Provide Geographic Information System (GIS) support materials (maps, analyses)

Development and Execution of TSS Plans/Projects with Cooperator Community

1. Lead/organize or participate in annual meeting of cooperator community to identify TSS needs for region
2. Develop or carry out assigned activities in annual work plan for TSS tasks
3. Lead or participate in writing up annual report on TSS activities to be provided to cooperator community at the annual meeting

Outreach and Education

1. Provide training for conservation planners on soils information and TSS activities
2. Provide support for local school conservation and environmental activities (Envirothon, Land Judging contests, etc.)
3. Receive/provide training on relevant subject matter related to TSS activities, e.g., hydric soils, wetland delineation, FPPA, NRI (National Resource Inventory)

Outreach and Education (continued)

4. Interact with other Federal, State, Local, and/or non-governmental agencies to inform about NRCS TSS activities and materials
5. Lead development of / provide current materials for technical publications released by state and local offices, in accordance with review standards of the agency

Improvement of Existing Data for TSS and Planning Needs

1. Lead/participate in NRI data collection and analyses
2. Assist with ecological sites data collection and analyses; review and critique of descriptions
3. Review conservation practices and providing input on job sheet development
4. Help with maintenance of eFOTG as requested
5. Assist with updates for local surveys, as requested by MLRA Regional Office
6. Develop/improve existing soil interpretations to include Wisconsin criteria
7. Lead/participate in special studies of soil characteristics that augment information for soil health and qualities for TSS consultation
8. Annual refresh of all soil survey data from Wisconsin to the Soil Data Warehouse, including transfer of appropriate access database to all field offices
9. Develop/improve soil criteria used in ranking applications for Farm Bill programs
10. Inform MLRA update projects through on-site investigation findings showing discrepancies with current soil survey information

Technical Assistance
CTA-GENRL: Conservation Technical Assistance – General
Wetland delineations/determinations/compliance/appeals
HEL/determinations/compliance/appeals
Resource inventories for conservation planning
Site-specific soil investigations
Outreach (preparing/presenting informational or technical materials, Envirothon, Land Judging)
Farmland Policy Protection Act, LESA
GIS (creating maps, performing analyses)
Hydric soils list
Important Farmlands list
Ecological Sites – data collection and analyses; review descriptions
Soil technology development/maintenance
Quality Assurance Reviews (Area/Field Offices)
Developing workload analysis and business plans
Providing soils information to internal and external customers
Reviewing conservation practice standards
Receiving and presenting training
Maintain eFOTG
Liaison to other Federal, State, Local, or non-governmental agencies
Program Management and Support (preparing reports, drafting bulletins, supervision, performance plans and reviews, recruiting/hiring)

CTA-NRI: Conservation Technical Assistance – National Resources Inventory
Data collection and analyses
Product publications (fact sheets, summary reports)
Program Management and Support
SOIL: Soil Survey
Soil survey – initial (mapping, database, compilation, field reviews)
Soil survey – update and maintenance (transects, database, spatial data edits, reviews)
Special studies (carbon, soil quality, other characterization studies)
Soil interpretations development
Maintaining soil databases for Planning and Programs (RUSLE2, initiatives)
GIS (creating maps, performing analyses
Program Mgt and Support (organizing annual work planning conference, developing business plan, reviewing/ approving MLRA Soil Survey Office projects)

Farm Bill Programs
EQIP: Environmental Quality Incentive Program; WHIP: Wildlife Habitat Incentive Program; CSP: Conservation Security/Stewardship Program; CRP: Conservation Reserve Program
Site-specific soil investigations
Developing soil criteria to use in ranking applications
GIS (creating maps, performing analyses)
Ecological Sites – data collection and analyses; review descriptions
Review and update soil rental rates

Easement Programs
FRPP: Farm and Ranch Lands Protection Program; WRP: Wetlands Reserve Program GRP: Grasslands Reserve Program; HFRP: Healthy Forests Reserve Program
Important farmlands identification
HEL and wetland compliance
GIS/GPS (creating maps, performing analyses, verifying easement boundaries)

(Source: PIA_TSS_FY2014_business_plan.pdf)

Wisconsin

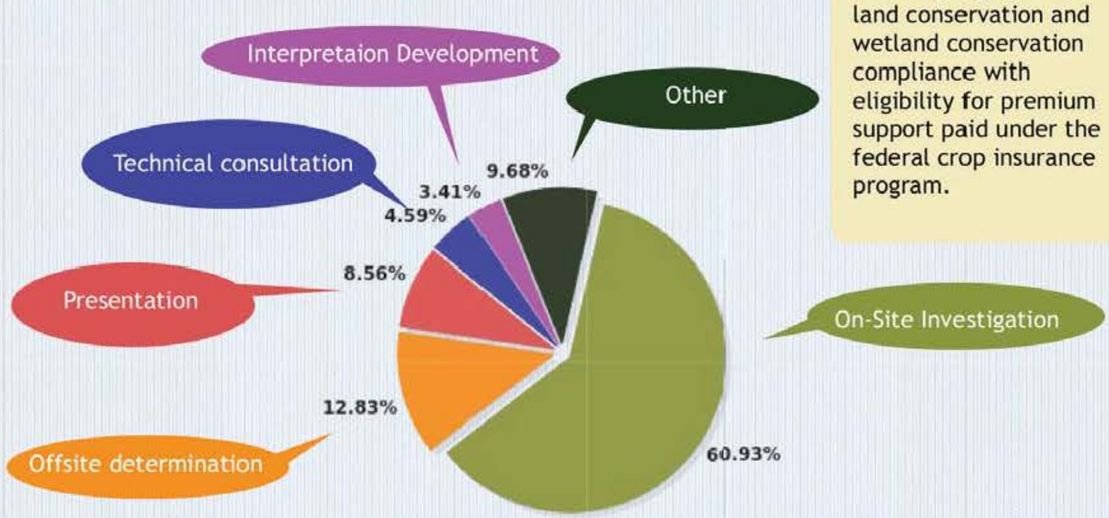
Fact Sheet

Technical Soil Services

2015

Wisconsin continues to improve soils data and products to meet the current and emerging resource concerns.

Request Type



Explanation

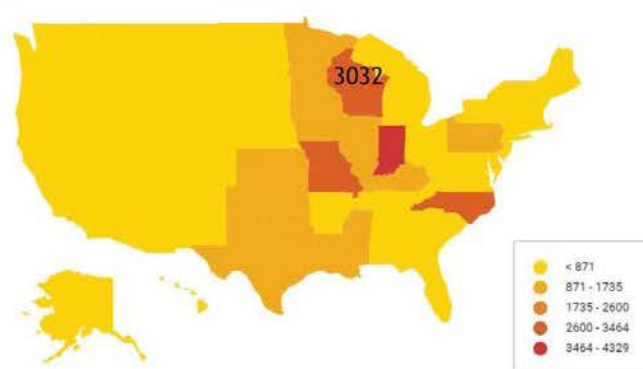
A surge in onsite wetland determinations was due to the the Farm Bill relinking highly erodible land conservation and wetland conservation compliance with eligibility for premium support paid under the federal crop insurance program.

Soil Scientist Service

23,910+ people served

Number of Technical Soil Services Incidences

In 2015, Wisconsin also ranked 4th in the Nation for the number of Technical Soil Services Requests

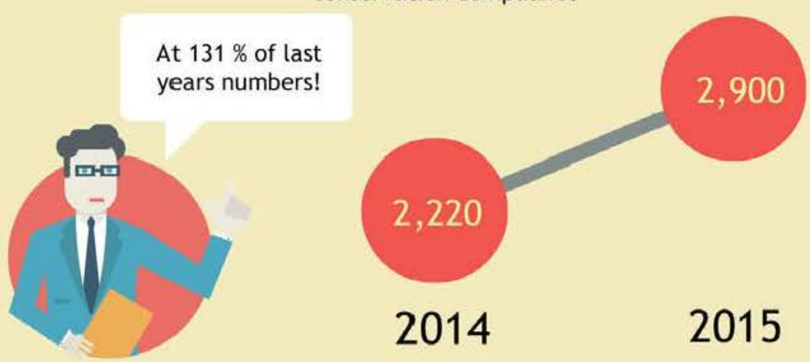


Word Cloud

Within NRCS, Technical Soil Services provided by the soil scientists span and assist the agency's operations from national headquarters to the county-based conservation field office. A key role of the soil scientist is to provide tailored, accurate information for site-specific planning.

Wetland Determinations

Wisconsin had the 4th highest workload in the Nation related to conservation compliance



nrcs.usda.gov jason.nemecek@wi.usda.gov @NRCS_WI

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"Reliable interpretations can result only from a synthesis of basic data about the soils themselves, obtained from field and laboratory research, data from field experiments, and the experience of users of soils, especially farmers, ranchers, foresters, and engineers." – Charles Kellogg.

Background

Soil survey interpretations predict soil behavior for specified soil uses and under specified soil management practices. They help implement laws, programs, and regulations at local, State, and national levels. They assist the planning of broad categories of land use such as cropland, rangeland, pastureland, forestland, or urban development. They are also used to assist in pre- and post-planning activities for national emergencies. Soil survey interpretations also help plan specific management practices that are applied to soils, such as irrigation of cropland or equipment 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

Prediction of soil behavior results from the observation and record of soil responses to specific uses and management practices, such as seasonal wet soil moisture status and the resultant effect in a basement. Recorded observations validate predictive models. The models project the expected behavior of similar soils from the behavior of observed soils.

Features Used for Interpretations

Soil interpretations use soil properties or qualities that directly influence a specified use or management of the soil. Soil properties and qualities that characterize the soil are criteria for interpretation models. These properties and qualities include: (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. Soil interpretation criteria may change with technology.

Basis for Features

Laboratory and field measurements, models and inferences from soil properties, morphology, and geomorphic characteristics provide the values used for estimating soil properties. Sources of laboratory data commonly are the NSSC Kellogg Soil Survey Laboratory, Agricultural Experiment Station laboratories, and State Highway Department testing laboratories. Pedon descriptions record field measurements, field observations, and descriptions of soil morphology. Develop lab sampling plans to fill data gaps. Changes to soil features in the database change soil interpretive results. Soil scientists prepare entries and change entries with interdisciplinary assistance of engineers, agronomists, foresters, biologists, resource conservationists, range conservationists, and others.

Why do we interpret soils?

"Few people besides soil scientists know enough about soils, and about the interactions among the many soil characteristics that define each kind of soil, to do the job by themselves."

"Experience shows that the soil scientist must take leadership in developing the interpretations."

"The soil scientist must have help and guidance from competent people in the related fields."

"Finally, his/her results should be tested in practical application. In fact, the soil scientist always lives in an atmosphere of criticism." --Charles Kellogg

Core Mission of the Soil Survey Program

- Make an inventory of the soil resources of the United States;
- Keep the soil survey relevant to ever-changing needs;
- interpret the information and make it available in a useful form; and

- Promote the soil survey and provide technical assistance in its use for a wide range of community planning and resource development issues related to non-farm and farm uses.

Why do we do these things called "Soil Survey Interpretations"?

How are they related to the soil survey program as a whole? Soil interpretation began to be recognized as an integral part of soil survey about 1930. Soil scientists had varying abilities in capturing and transferring the experience of land users. Early soil surveys were thematic maps "where will tobacco grow", for example. Later it was decided that mapping soils as suites of properties is a better deal, because that allows us to make new interpretations form the same data.

Define a "Soil Property"

- Attributes of soils or sites that are or can be directly measured
- They may be dynamic (temporal or changeable) conditions.
- Attributes such as reaction, cation exchange capacity, content of clay, shape of the landform, parent material and so on

Soil Property vs Soil Interpretation

- **Soil Interpretations** are Texture, K-Factor, Septic Tank Adsorption fields
- **Soil Properties** are Sand, Silt, Clay, KSAT

(Source: Bob Dobos, National Soil Survey Center)

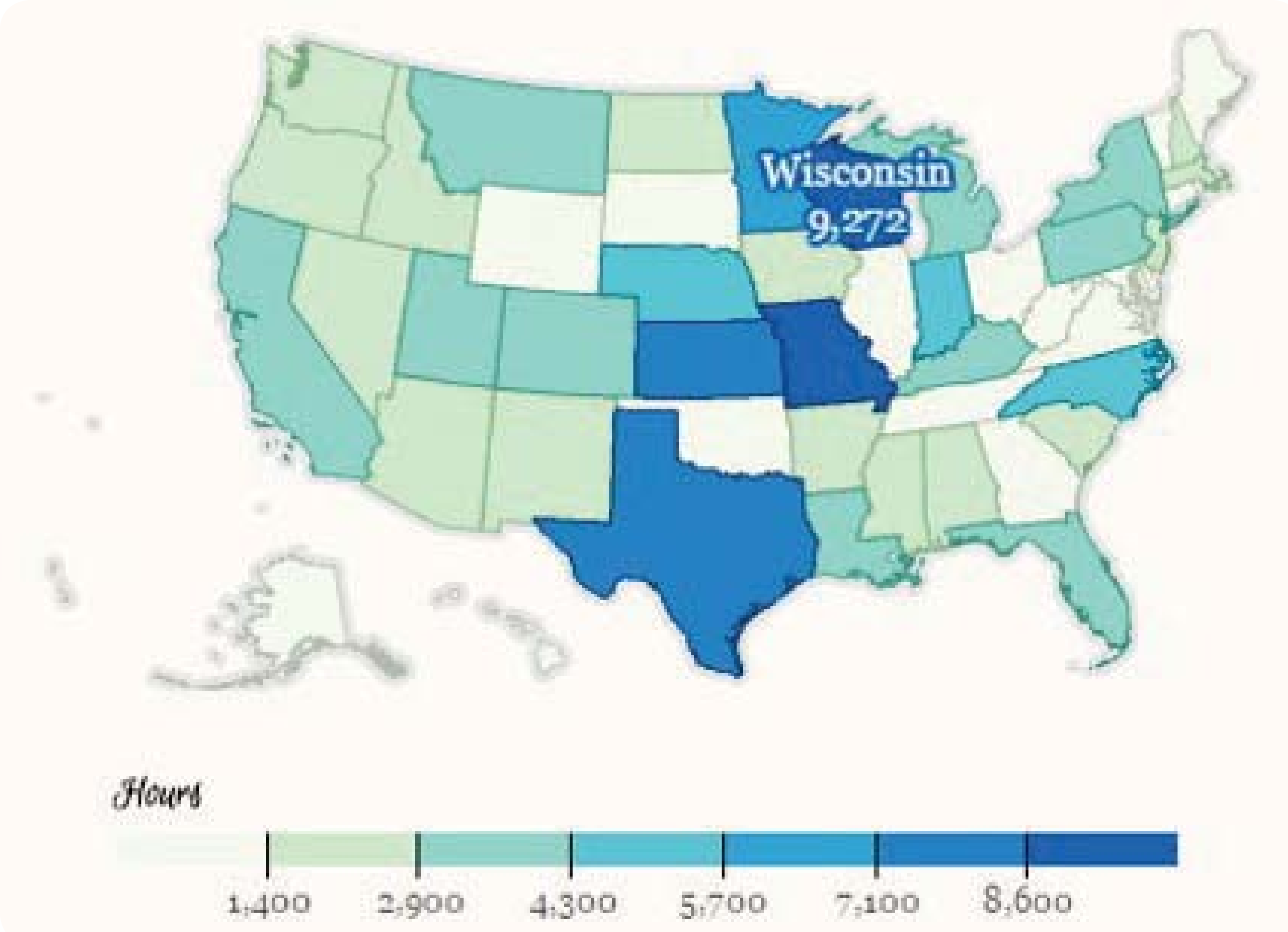
Needed Wisconsin Interpretations from Partners

- Wisconsin Commodity Crop Index for Corn
- Forage Suitability Groups
- Forested Biomass Harvesting
- Biomass Waste Application Interpretations
- Industrial Waste Water and By-Product Solids
- Industrial Sludge
- Municipal Bio-solids
- Seepage, Holding Tank and Grease Traps
- Conventional On-Site Septic Systems
- Geothermal Installation
- Potential Ginseng Production
- Potential Hop Production – Commercial Soil and Site Suitability – (Non-irrigated)

Some Requested Wisconsin Interpretations from Partners

SPECIALIZED SOIL DATA ACCESS SCRIPTS			
Count	**Lookup from County, Soil Map Unit Symbol**	**How it is used**	**Source of information for 2014 update**
1	Soil series name, texture	Displayed for general information	Extracted from RUSLE2 soils databases, downloaded from the RUSLE2 web site
2	Default slope, slope length	Used for erosion and P Index calculations, winter manure application restrictions	RUSLE2 soils databases, same as above
3	T (Tolerable soil loss)	Check against calculated soil loss	RUSLE2 soils databases, same as above
4	Soil based restrictions for 590 (r,w,p, +)	Checking applications to make sure they are within 590.	Soil Data Access
5	Soil group (sandy, loamy, organic)	Crop nutrient recommendations	A2809 Soil Group lists (defined by Carrie Laboski from SSURGO data)
6	Corn yield potential (sandy, medium, high)	Corn N recommendations	A2809 Yield Potential Lists (defined by C. Laboski as above)
7	Drainage class, Available water Capacity, Bedrock depth, Soil Temp Regime	Checking limitations on corn yield potential that may be overcome by irrigation or drainage	SSURGO
8	Subsoil Fertility Group Factors (A,B, C, D, E,)	P Index	Old A2809 (by soil series), new series are assigned to a group by Laura Good (note; these factors will no longer be used within about 2 years)
9	NR243 w soils	Listed with restrictions for CAFO plans	CAFO restriction map layer data
10	NRCS soil-based yield potential for key crops	Assign yields for RUSLE2 erosion calculations	NRCS
11	Erodibility Index	To select most erodible soil map unit in field	Calculated by from K (erodibility), Slope, slope length, T
12	Lateral Effects	The lateral effect distance is the distance on either side of a ditch or tile over which the water in the soil is affected by the presence of the ditch or tile within a given period of time and is effectively drained	NRCS/DNR (SSURGO)

Estimated Technical Soil Service Hours by State (Wisconsin is one of the top two)



NEW Soil Data Viewer Alternative!

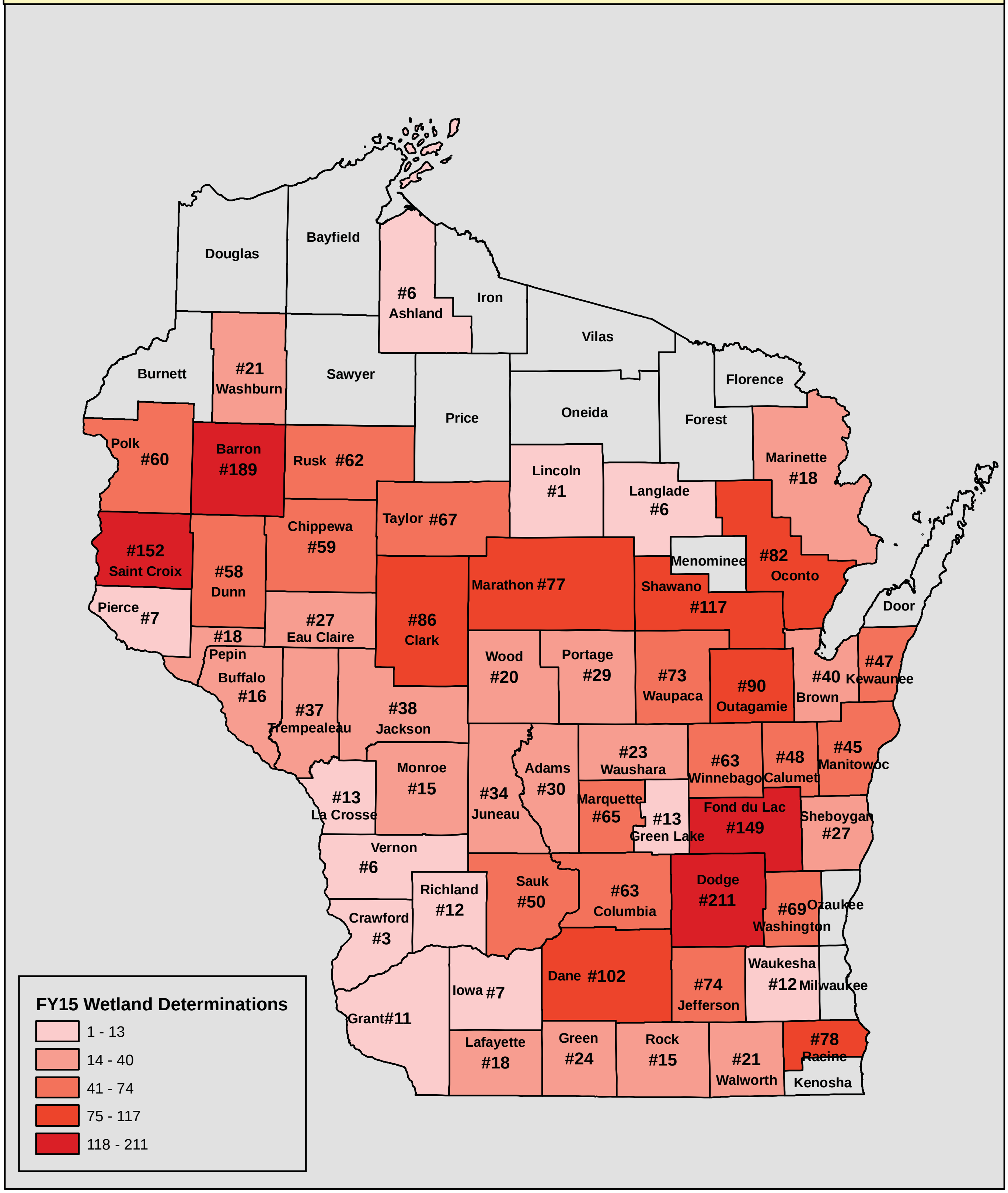
The SSURGO OnDemand Dynamic Spatial Interpretations Tool can process soils data from large geographic areas rapidly and is a one-stop shop for any number of soil survey areas at once for any and all interpretations or properties. It accesses authoritative soils data without the need for downloading external tabular data sets. Please direct questions and comments to Chad Ferguson at charles.ferguson@nc.usda.gov or Jason Nemecek at jason.nemecek@wi.usda.gov.

Two attachments are available online at www.nrcs.usda.gov/wps/portal/nrcs/main/wi/soils/

- Python scripts and ArcGIS SSURGO OnDemand toolbox (48 KB ZIP)
- SSURGO OnDemand Dynamic Spatial Interpretations Tool (documentation and instructions) (215 KB)

WI NRCS

Number of Wetland Determinations by County FY 15



The Web Soil Survey (WSS) provides agricultural producers, agencies, Technical Service Providers, and others electronic access to relevant soil and related information needed to make land-use and land management decisions.

Web Soil Survey provides a simple yet powerful way to analyze soil data in three basic steps.

Starting Web Soil Survey

- Open the NCSS WSS site at http://websoilsurvey.nrcs.usda.gov
- Click the "Start WSS" button to begin

Step 1
Define Your Area of Interest (AOI)

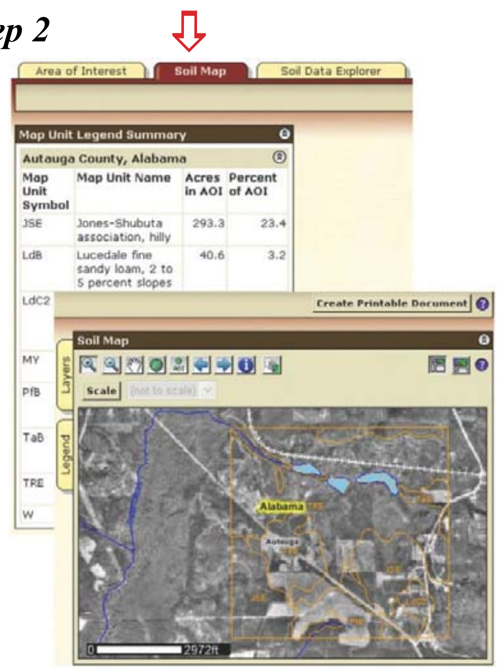
- Under "Navigate By...," click on "Address" or "County" to view your area of interest (other navigation options are also available).
- Click the Zoom tool (plus sign) and drag a box to zoom in on a specific area. Repeat as necessary.
- Click the rectangular AOI tool to drag a box or use the polygon AOI tool to click around your specific area of interest

Step 1

Step 2
View and Explore Your Soil Map

- Click on the "Soil Map" tab
- View your soil map by clicking "View All" button
- To redefine the soil map location, click on the "Area of Interest" tab and click the "Clear AOI" button and redraw area of interest.
- Click the "View" button
- Click on Soil Data Explorer for checking soil suitabilities and limitations or soil properties.
- Interpretive maps will be produced with your specific Inquiry.
- The items that you want saved can be added to a customized report in your shopping cart. Add a custom report of soils information in your AOI by Clicking on the "Add to Shopping Cart" button

Step 2



http://websoilsurvey.nrcs.usda.gov

Web Soil Survey
Usage of Ratings

Report Created:	10/7/2015 2:30:28 PM
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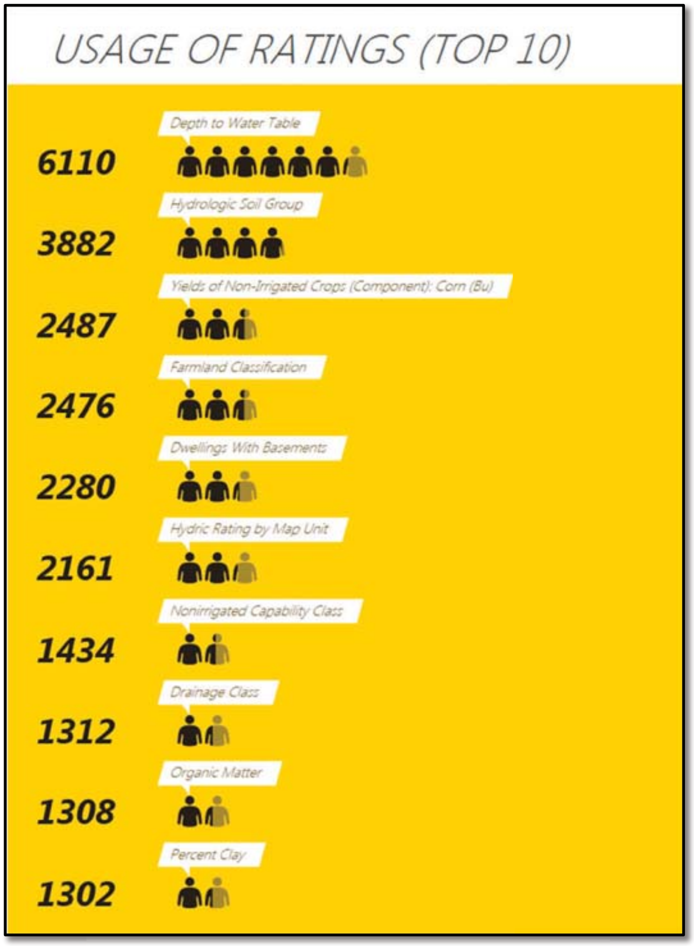
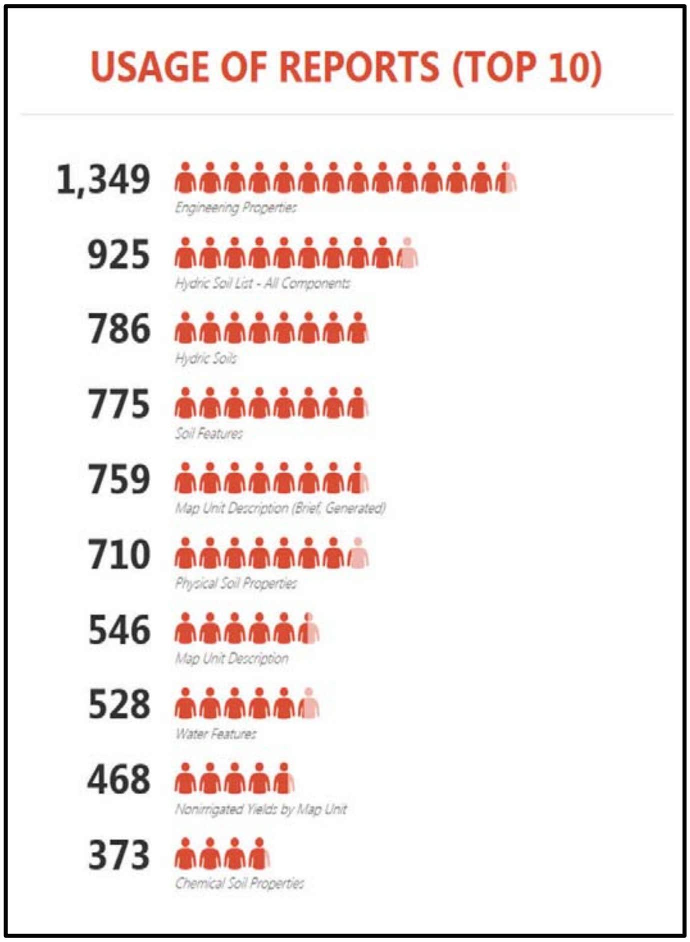
End Date:	9/30/2015
State/Territory:	Wisconsin
Limit Number of Results to:	1,000,000
Total	60,637





Web Soil Survey
Usage of Reports

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Start Date:	10/1/2014
End Date:	9/30/2015
State/Territory:	Wisconsin
Limit Number of Results to:	1,000,000
Total	12,267

Wisconsin Area GIS Specialists

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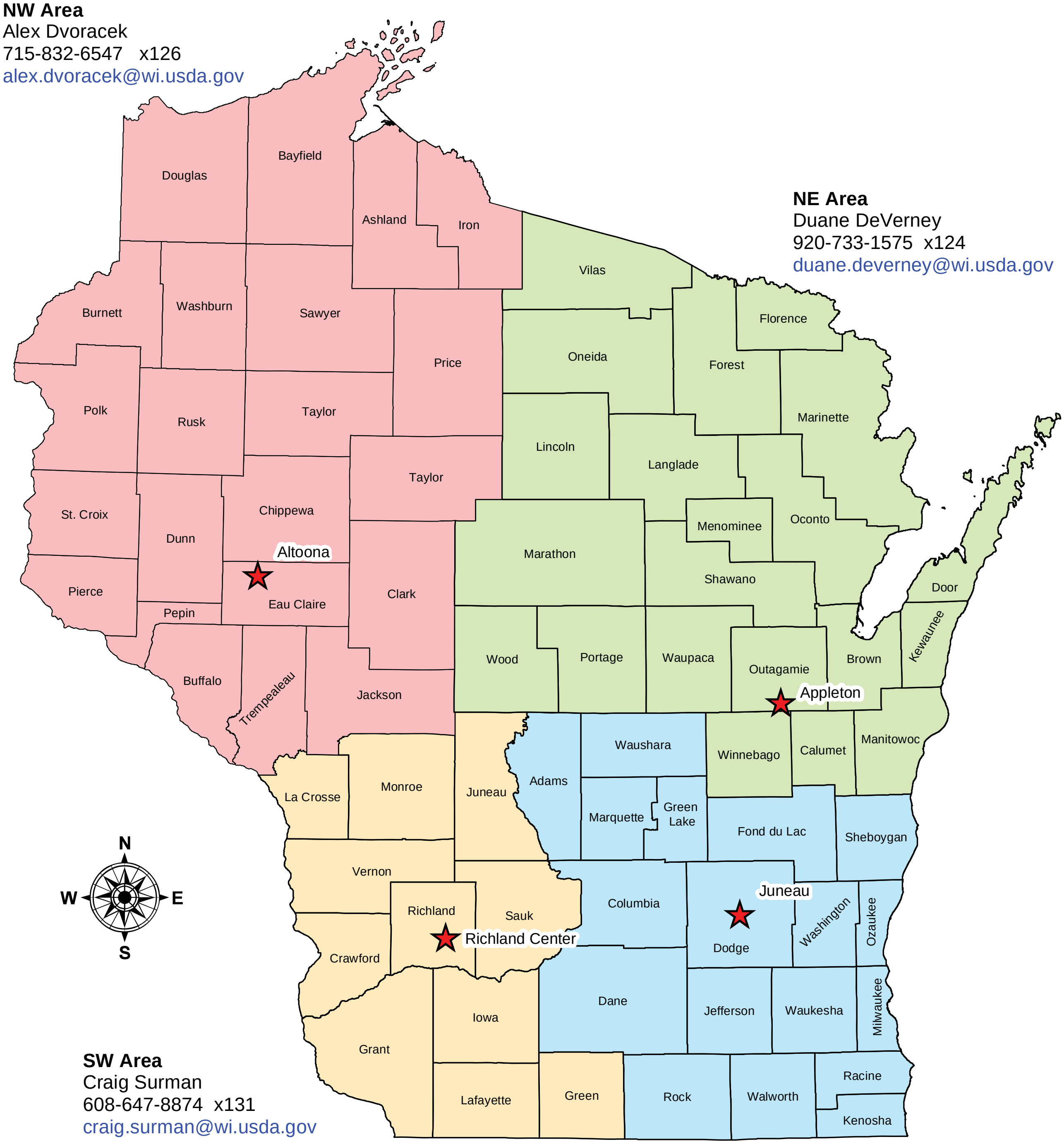

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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

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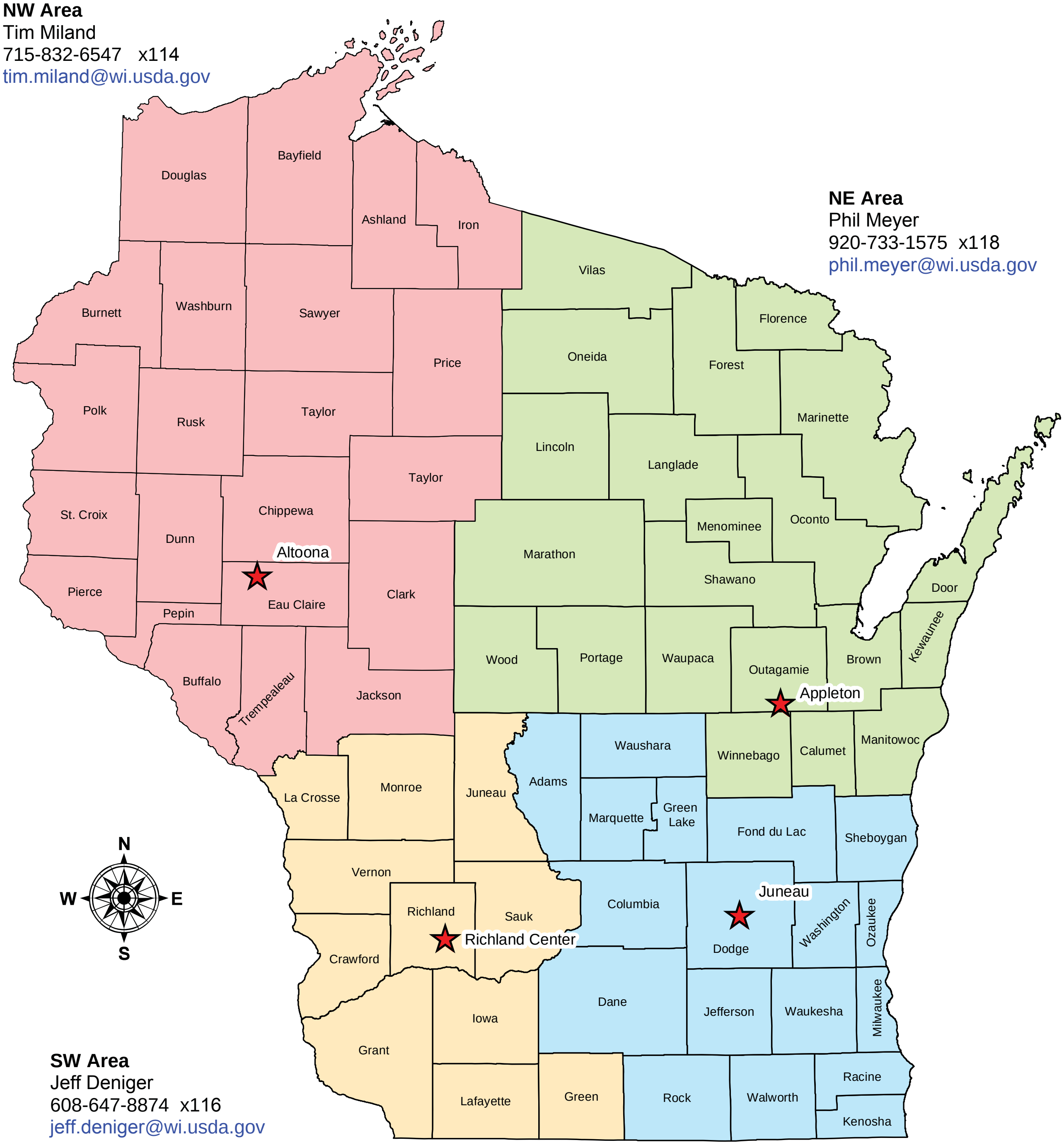

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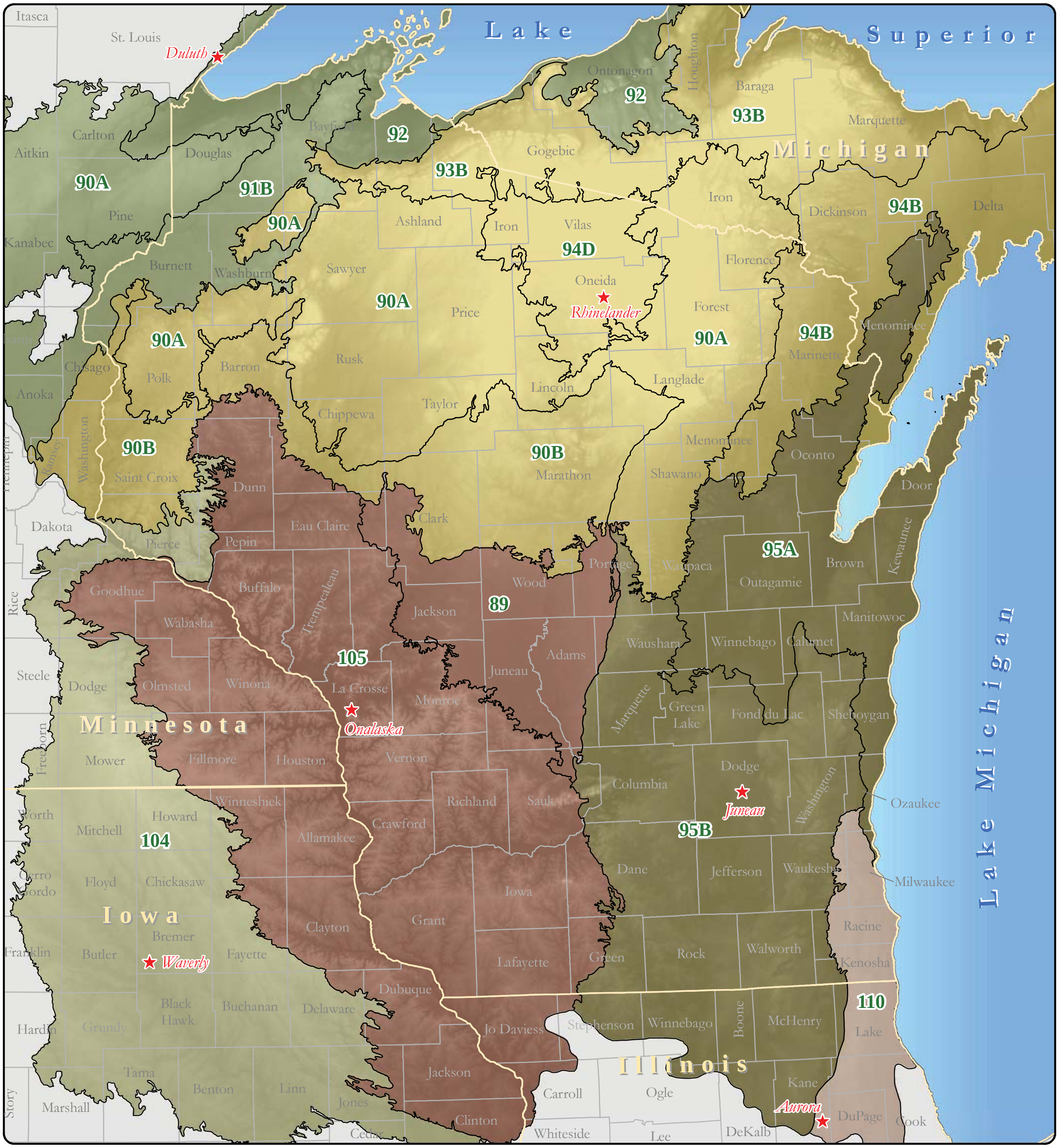
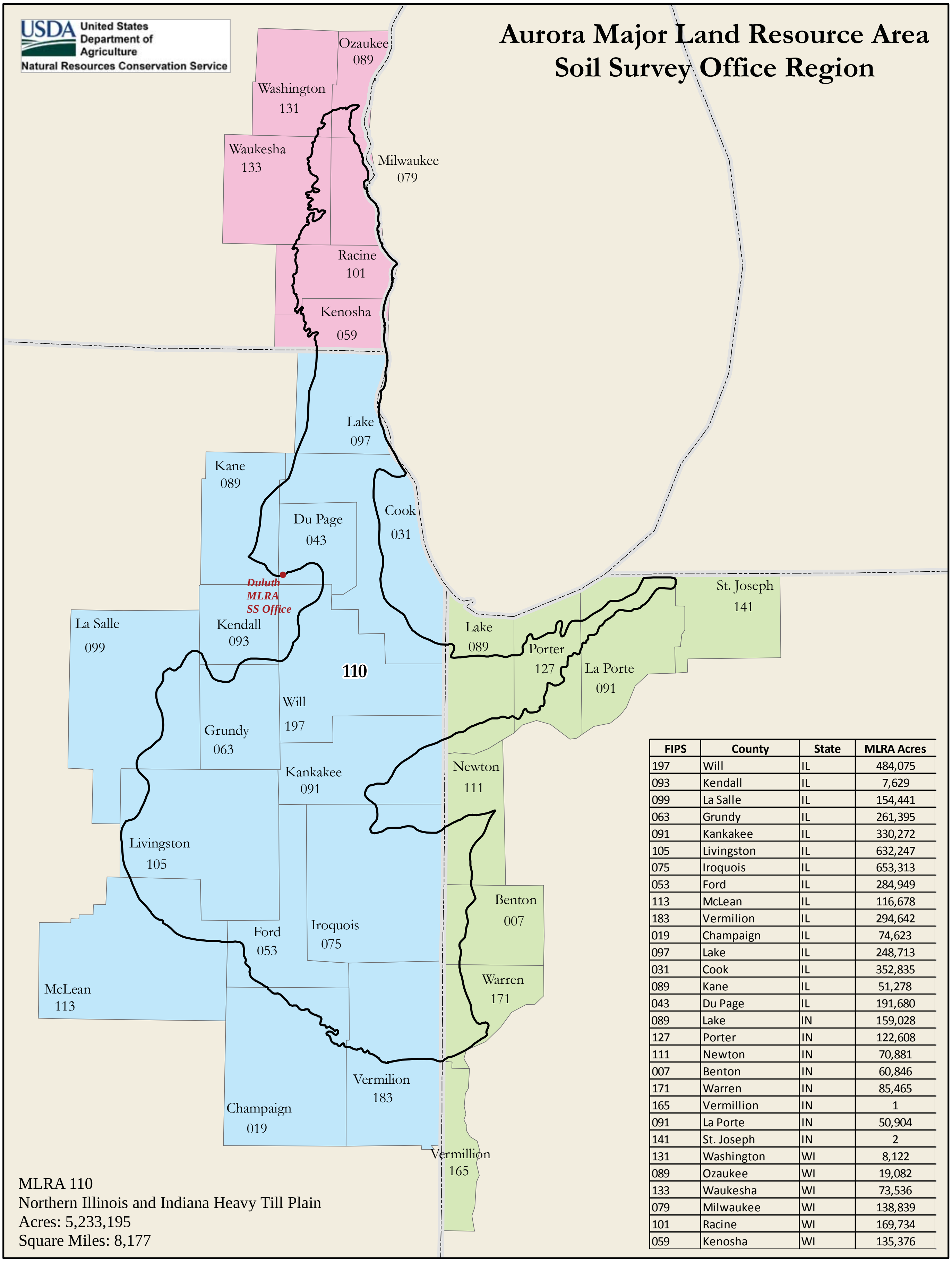
USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

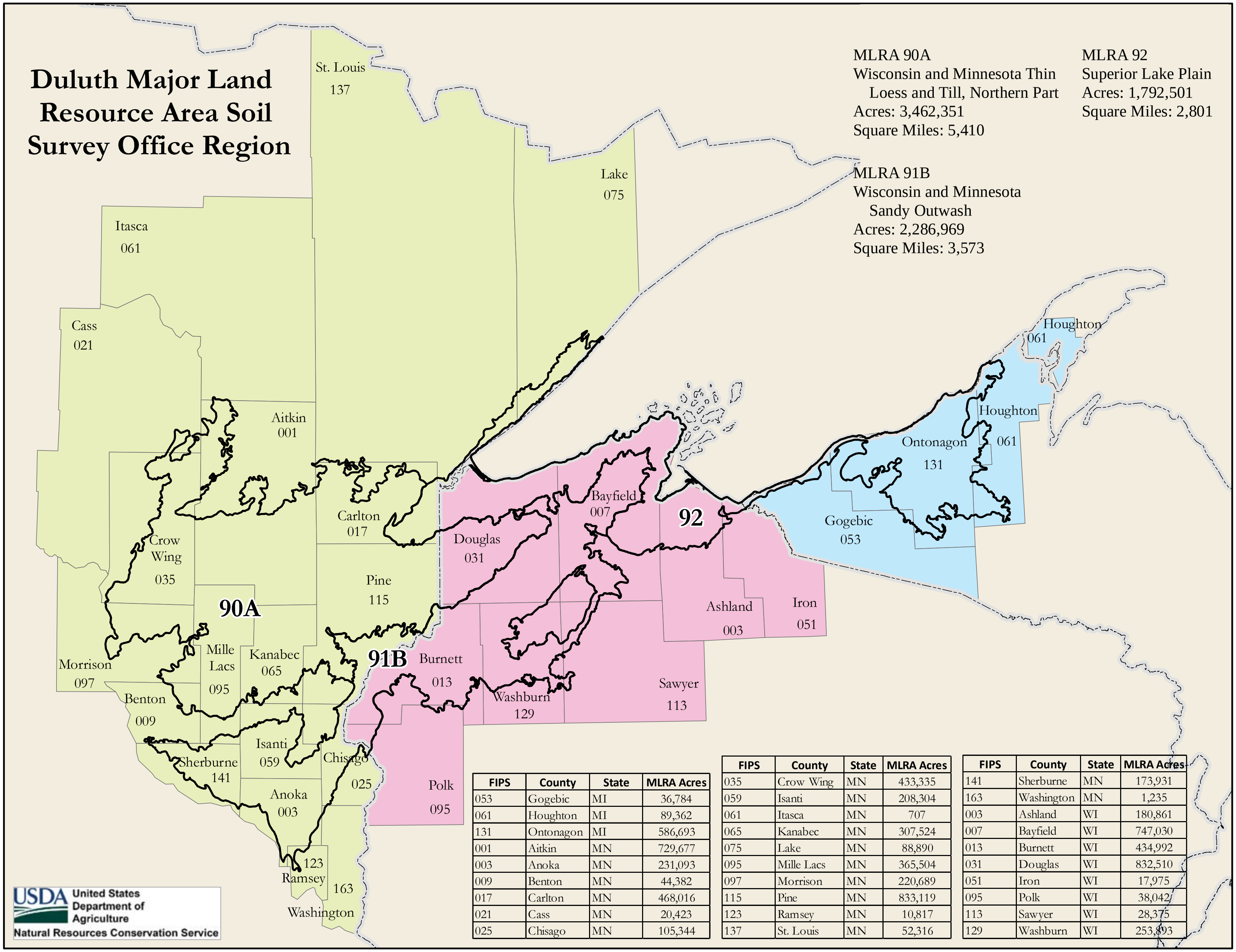
Wisconsin Major Land Resource Area Boundaires

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.





FIPS	County	State	MLRA Acres
197	Will	IL	484,075
093	Kendall	IL	7,629
099	La Salle	IL	154,441
063	Grundy	IL	261,395
091	Kankakee	IL	330,272
105	Livingston	IL	632,247
075	Iroquois	IL	653,313
053	Ford	IL	284,949
113	McLean	IL	116,678
183	Vermilion	IL	294,642
019	Champaign	IL	74,623
097	Lake	IL	248,713
031	Cook	IL	352,835
089	Kane	IL	51,278
043	Du Page	IL	191,680
089	Lake	IN	159,028
127	Porter	IN	122,608
111	Newton	IN	70,881
007	Benton	IN	60,846
171	Warren	IN	85,465
165	Vermillion	IN	1
091	La Porte	IN	50,904
141	St. Joseph	IN	2
131	Washington	WI	8,122
089	Ozaukee	WI	19,082
133	Waukesha	WI	73,536
079	Milwaukee	WI	138,839
101	Racine	WI	169,734
059	Kenosha	WI	135,376



FIPS	County	State	MLRA Acres
053	Gogebic	MI	36,784
061	Houghton	MI	89,362
131	Ontonagon	MI	586,693
001	Aitkin	MN	729,677
003	Anoka	MN	231,093
009	Benton	MN	44,382
017	Carlton	MN	468,016
021	Cass	MN	20,423
025	Chisago	MN	105,344

FIPS	County	State	MLRA Acres
035	Crow Wing	MN	433,335
059	Isanti	MN	208,304
061	Itasca	MN	707
065	Kanabec	MN	307,524
075	Lake	MN	88,890
095	Mille Lacs	MN	365,504
097	Morrison	MN	220,689
115	Pine	MN	833,119
123	Ramsey	MN	10,817
137	St. Louis	MN	52,316

FIPS	County	State	MLRA Acres
141	Sherburne	MN	173,931
163	Washington	MN	1,235
003	Ashland	WI	180,861
007	Bayfield	WI	747,030
013	Burnett	WI	434,992
031	Douglas	WI	832,510
051	Iron	WI	17,975
095	Polk	WI	38,042
113	Sawyer	WI	28,375
129	Washburn	WI	253,893

Rhinelander Major Land Resource Area Soil Survey Office Region

MLRA 90A
Wisconsin and Minnesota Thin Loess and Till, Northern Part
Acres: 7,719,563
Square Miles: 12,062

MLRA 90B
Wisconsin and Minnesota Thin Loess and Till, Southern Part
Acres: 4,051,063
Square Miles: 6,330

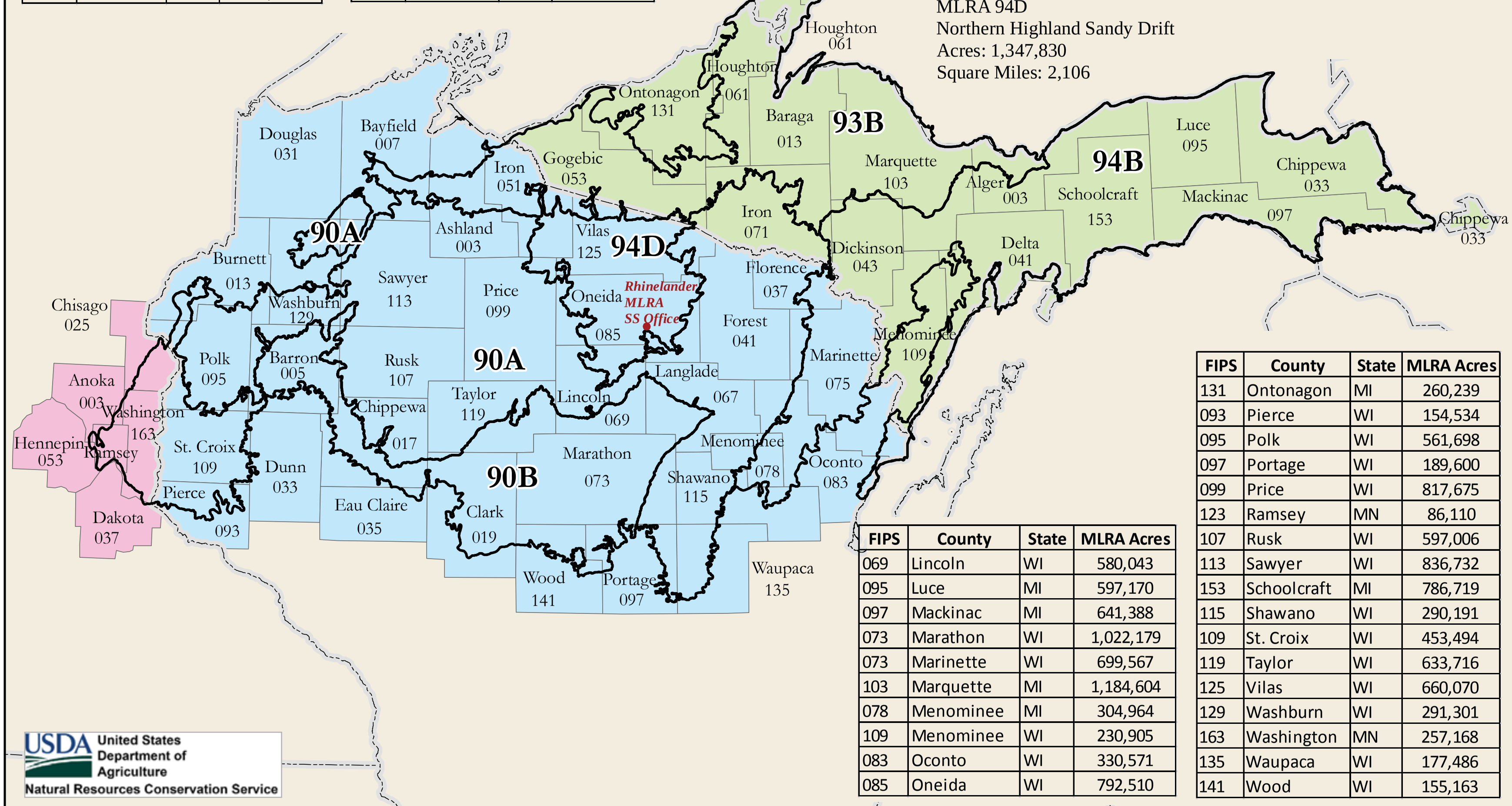
MLRA 93B
Superior Stony and Rocky Loamy Plains and Hills, Eastern Part
Acres: 4,209,132
Square Miles: 6,577

MLRA 94B
Michigan Eastern Upper Peninsula Sandy Drift
Acres: 6,098,112
Square Miles: 9,528

MLRA 94D
Northern Highland Sandy Drift
Acres: 1,347,830
Square Miles: 2,106

FIPS	County	State	MLRA Acres
003	Alger	MI	581,252
003	Anoka	MN	13,825
003	Ashland	WI	447,810
013	Baraga	MI	573,538
005	Barron	WI	472,839
007	Bayfield	WI	205,645
013	Burnett	WI	119,710
017	Chippewa	MI	854,037
033	Chippewa	WI	521,818
025	Chisago	MN	111,302
019	Clark	WI	496,082
037	Dakota	MN	801
041	Delta	MI	628,082

FIPS	County	State	MLRA Acres
043	Dickinson	MI	495,817
031	Douglas	WI	6,571
033	Dunn	WI	7,612
035	Eau Claire	WI	13,299
037	Florence	WI	322,993
041	Forest	WI	676,859
053	Gogebic	MI	684,817
053	Hennepin	MN	2,234
063	Houghton	MI	549,848
071	Iron	MI	774,795
051	Iron	WI	499,212
083	Keweenaw	MI	201,480
067	Langlade	WI	570,619

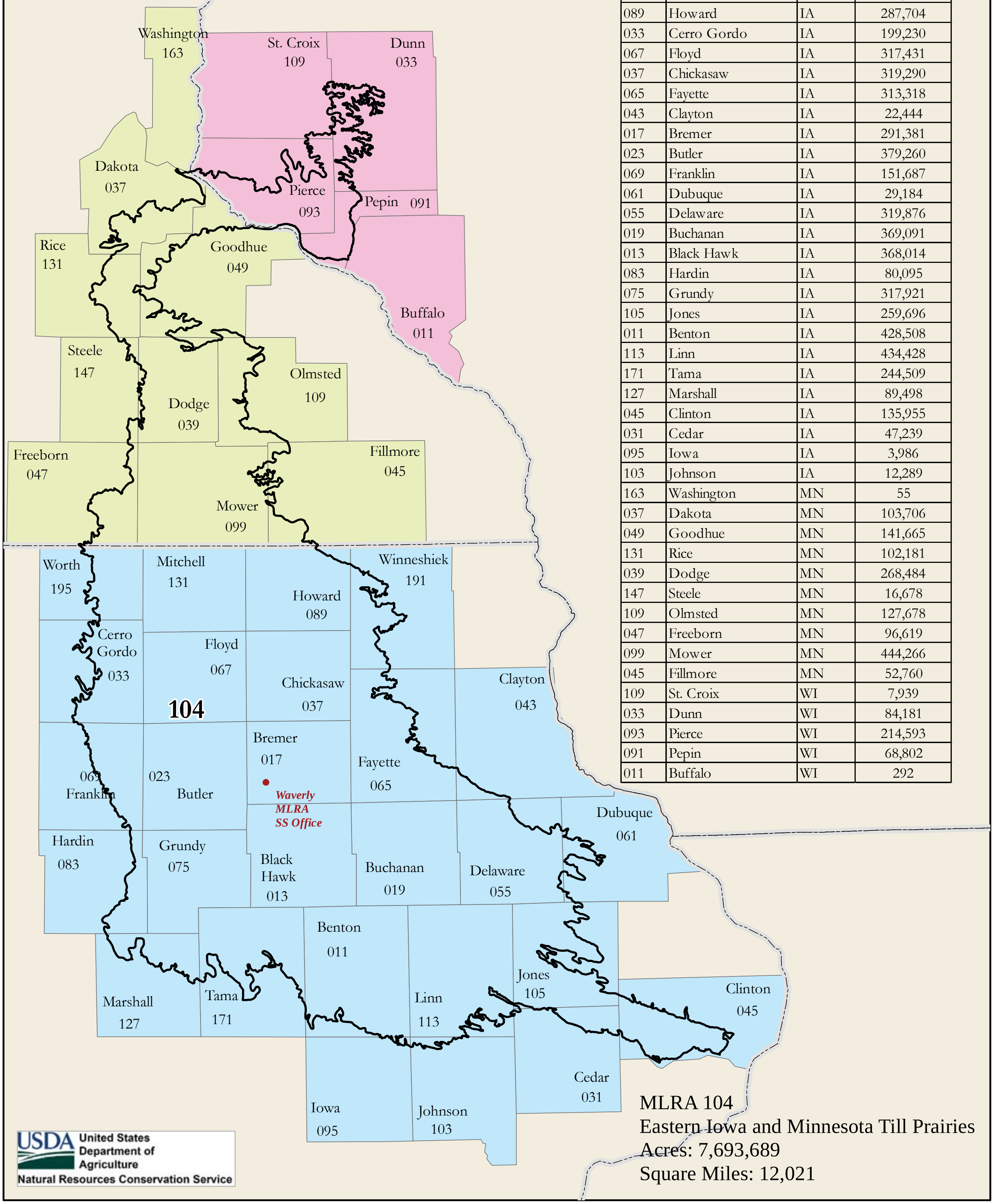


FIPS	County	State	MLRA Acres
069	Lincoln	WI	580,043
095	Luce	MI	597,170
097	Mackinac	MI	641,388
073	Marathon	WI	1,022,179
073	Marinette	WI	699,567
103	Marquette	MI	1,184,604
078	Menominee	MI	304,964
109	Menominee	WI	230,905
083	Oconto	WI	330,571
085	Oneida	WI	792,510

FIPS	County	State	MLRA Acres
131	Ontonagon	MI	260,239
093	Pierce	WI	154,534
095	Polk	WI	561,698
097	Portage	WI	189,600
099	Price	WI	817,675
123	Ramsey	MN	86,110
107	Rusk	WI	597,006
113	Sawyer	WI	836,732
153	Schoolcraft	MI	786,719
115	Shawano	WI	290,191
109	St. Croix	WI	453,494
119	Taylor	WI	633,716
125	Vilas	WI	660,070
129	Washburn	WI	291,301
163	Washington	MN	257,168
135	Waupaca	WI	177,486
141	Wood	WI	155,163

USDA United States Department of Agriculture
Natural Resources Conservation Service

Waverly Major Land Resource Area
Soil Survey Office Region



FIPS	County	State	MLRA Acres
195	Worth	IA	130,181
131	Mitchell	IA	299,260
191	Winneshiek	IA	112,313
089	Howard	IA	287,704
033	Cerro Gordo	IA	199,230
067	Floyd	IA	317,431
037	Chickasaw	IA	319,290
065	Fayette	IA	313,318
043	Clayton	IA	22,444
017	Bremer	IA	291,381
023	Butler	IA	379,260
069	Franklin	IA	151,687
061	Dubuque	IA	29,184
055	Delaware	IA	319,876
019	Buchanan	IA	369,091
013	Black Hawk	IA	368,014
083	Hardin	IA	80,095
075	Grundy	IA	317,921
105	Jones	IA	259,696
011	Benton	IA	428,508
113	Linn	IA	434,428
171	Tama	IA	244,509
127	Marshall	IA	89,498
045	Clinton	IA	135,955
031	Cedar	IA	47,239
095	Iowa	IA	3,986
103	Johnson	IA	12,289
163	Washington	MN	55
037	Dakota	MN	103,706
049	Goodhue	MN	141,665
131	Rice	MN	102,181
039	Dodge	MN	268,484
147	Steele	MN	16,678
109	Olmsted	MN	127,678
047	Freeborn	MN	96,619
099	Mower	MN	444,266
045	Fillmore	MN	52,760
109	St. Croix	WI	7,939
033	Dunn	WI	84,181
093	Pierce	WI	214,593
091	Pepin	WI	68,802
011	Buffalo	WI	292

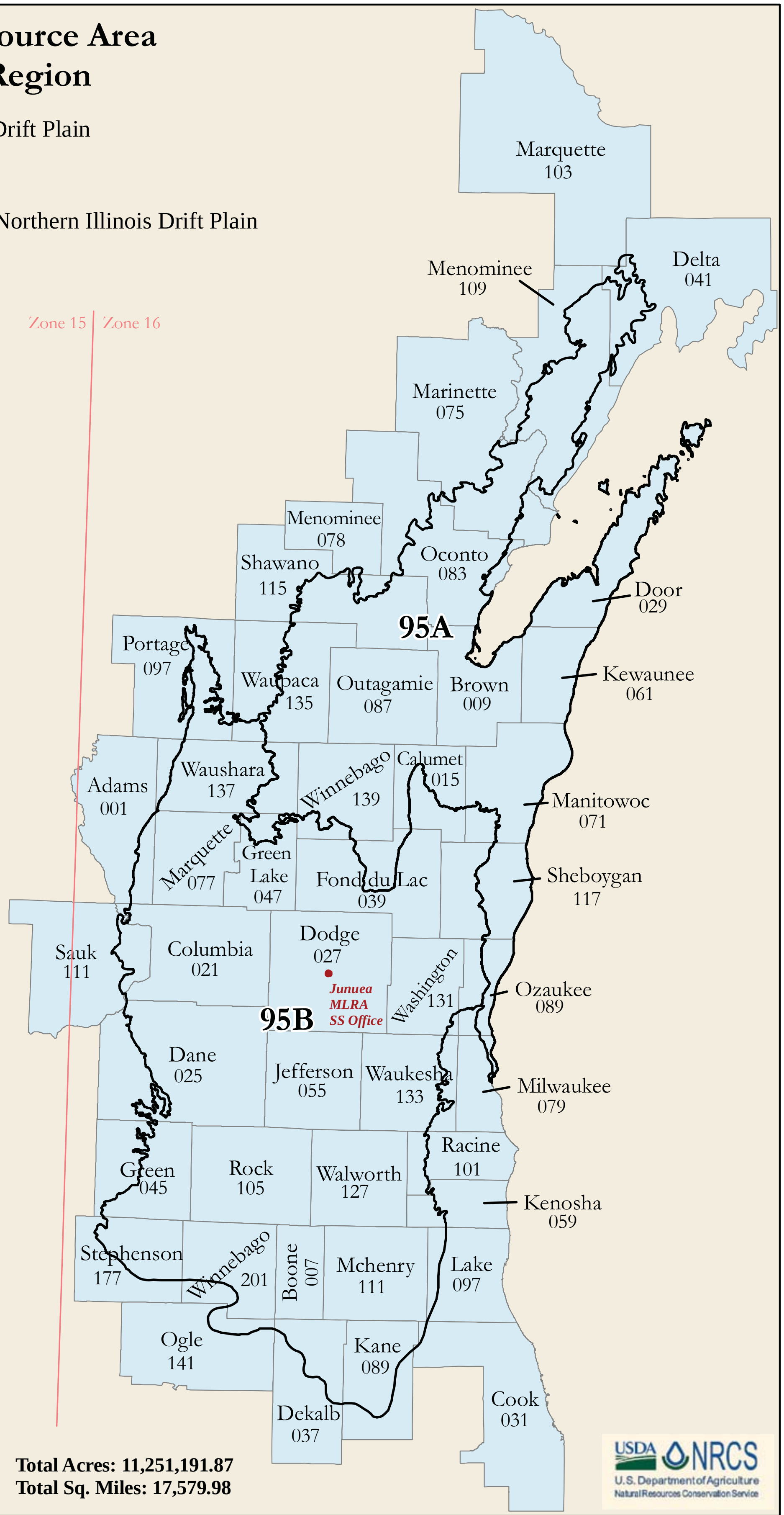
MLRA 104
Eastern Iowa and Minnesota Till Prairies
Acres: 7,693,689
Square Miles: 12,021

Juneau Major Land Resource Area
Soil Survey Office Region

MLRA 95A Northeastern Wisconsin Drift Plain
Acres: 4,127,214.97
Square Miles: 6,448.77

MLRA 95B Southern Wisconsin and Northern Illinois Drift Plain
Acres: 7123,976.90
Square Miles: 11,131.21

FIPs	County	State	MLRA Acres
007	Boone	IL	180,458
031	Cook	IL	5,585
037	Dekalb	IL	139,074
089	Kane	IL	211,411
097	Lake	IL	43,525
111	Mchenry	IL	390,862
141	Ogle	IL	41,187
177	Stephenson	IL	174,483
201	Winnebago	IL	285,439
041	Delta	MI	91,178
103	Marquette	MI	2,619
109	Menominee	MI	358,638
001	Adams	WI	59,587
009	Brown	WI	342,098
015	Calumet	WI	253,860
021	Columbia	WI	503,064
025	Dane	WI	598,047
027	Dodge	WI	580,381
029	Door	WI	312,728
039	Fond du Lac	WI	489,805
045	Green	WI	227,012
047	Green Lake	WI	243,343
055	Jefferson	WI	372,838
059	Kenosha	WI	43,382
061	Kewaunee	WI	219,967
071	Manitowoc	WI	380,712
075	Marinette	WI	211,636
077	Marquette	WI	297,022
078	Menominee	WI	3,724
079	Milwaukee	WI	11,304
083	Oconto	WI	315,352
087	Outagamie	WI	412,366
089	Ozaukee	WI	129,888
097	Portage	WI	117,335
101	Racine	WI	50,696
105	Rock	WI	464,630
111	Sauk	WI	73,630
115	Shawano	WI	291,135
117	Sheboygan	WI	331,024
127	Walworth	WI	368,734
131	Washington	WI	271,137
133	Waukesha	WI	306,437
135	Waupaca	WI	306,338
137	Waushara	WI	367,130
139	Winnebago	WI	370,394

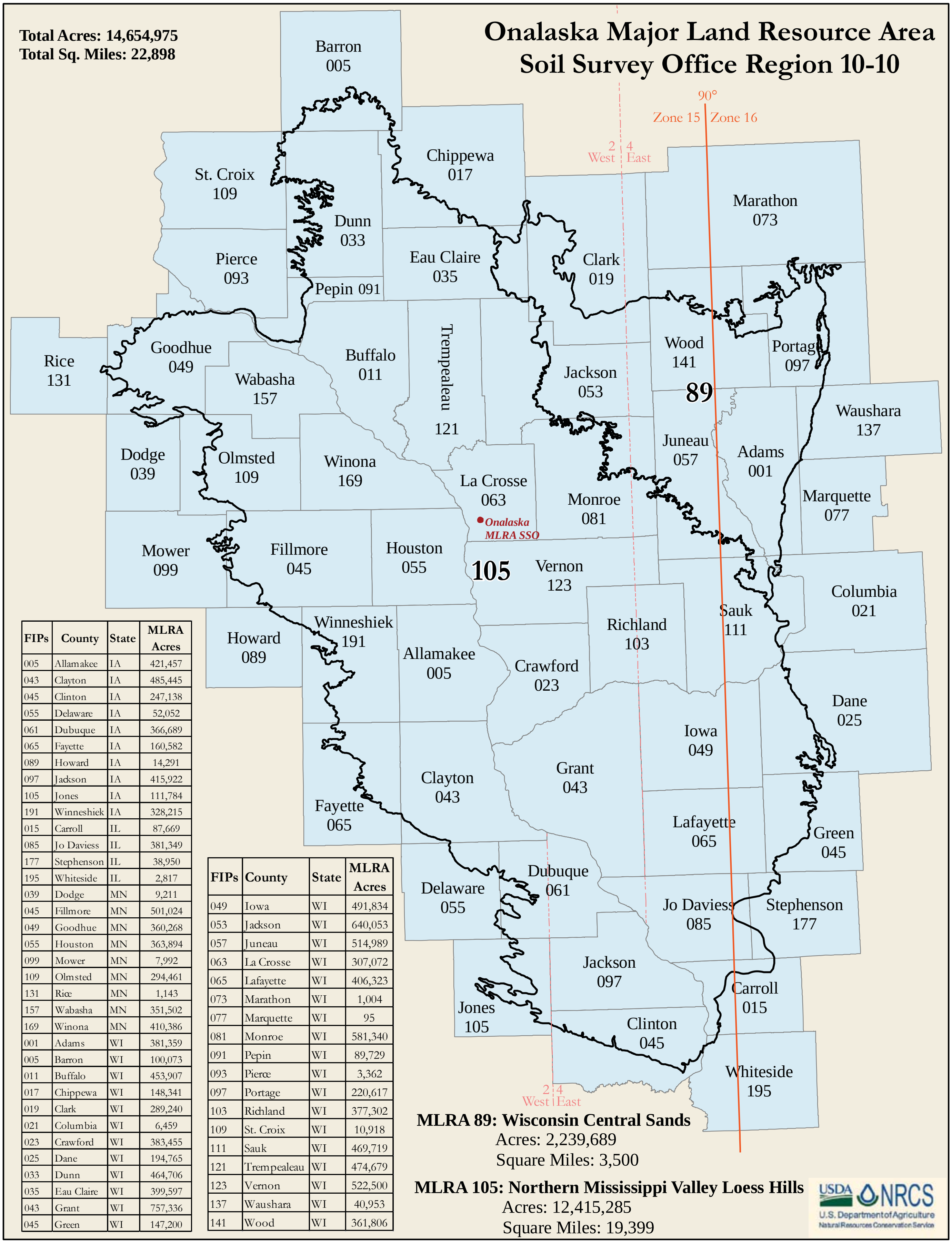


Total Acres: 11,251,191.87
Total Sq. Miles: 17,579.98

USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

Onalaska Major Land Resource Area
Soil Survey Office Region 10-10

Total Acres: 14,654,975
Total Sq. Miles: 22,898



FIPs	County	State	MLRA Acres
005	Allamakee	IA	421,457
043	Clayton	IA	485,445
045	Clinton	IA	247,138
055	Delaware	IA	52,052
061	Dubuque	IA	366,689
065	Fayette	IA	160,582
089	Howard	IA	14,291
097	Jackson	IA	415,922
105	Jones	IA	111,784
191	Winneshiek	IA	328,215
015	Carroll	IL	87,669
085	Jo Daviess	IL	381,349
177	Stephenson	IL	38,950
195	Whiteside	IL	2,817
039	Dodge	MN	9,211
045	Fillmore	MN	501,024
049	Goodhue	MN	360,268
055	Houston	MN	363,894
099	Mower	MN	7,992
109	Olmsted	MN	294,461
131	Rice	MN	1,143
157	Wabasha	MN	351,502
169	Winona	MN	410,386
001	Adams	WI	381,359
005	Barron	WI	100,073
011	Buffalo	WI	453,907
017	Chippewa	WI	148,341
019	Clark	WI	289,240
021	Columbia	WI	6,459
023	Crawford	WI	383,455
025	Dane	WI	194,765
033	Dunn	WI	464,706
035	Eau Claire	WI	399,597
043	Grant	WI	757,336
045	Green	WI	147,200

FIPs	County	State	MLRA Acres
049	Iowa	WI	491,834
053	Jackson	WI	640,053
057	Juneau	WI	514,989
063	La Crosse	WI	307,072
065	Lafayette	WI	406,323
073	Marathon	WI	1,004
077	Marquette	WI	95
081	Monroe	WI	581,340
091	Pepin	WI	89,729
093	Pierce	WI	3,362
097	Portage	WI	220,617
103	Richland	WI	377,302
109	St. Croix	WI	10,918
111	Sauk	WI	469,719
121	Trempealeau	WI	474,679
123	Vernon	WI	522,500
137	Waushara	WI	40,953
141	Wood	WI	361,806

MLRA 89: Wisconsin Central Sands
Acres: 2,239,689
Square Miles: 3,500

MLRA 105: Northern Mississippi Valley Loess Hills
Acres: 12,415,285
Square Miles: 19,399