USDA United States Department of Agriculture

Natural Resources Conservation Service

WEEKLY UPDATE

December 1, 2017

Office of the Chief
Soil Science and Resource Assessment
Soil Science Division

Previous SSD Weekly Updates available at:
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/soils/?cid=nrcseprd1326313

DEADLINES AND REMINDERS

Due Date	Link	Description
December 9, 2017	National Bulletin 360-18-5	Extension of Fiscal Year (FY) 2018 Performance Plans
December 11, 2017	National Bulletin 360-18-2	Federal Benefits Open Season
December 31, 2017	National Bulletin 190-18-2	Solicit Nominees for Ecological Site Committees
January 2, 2018	National Bulletin 360-18-11	2018 Service to America Medals
April 30, 2018	National Bulletin 360-18-13	Fiscal Year 2018 Performance Standards for the Farm Production and Conservation (FPAC) Mission Area **NEW**
NRCS Directives	http://directives.sc.egov.usda.gov/default.aspx	
Other Deadlines and Reminders	https://ems-team.usda.gov/sites/NRCS_SSRA/ssd/Lists/Announcements/AllItems.aspx (accessible by NRCS staff only)	

WEBINARS AND TRAINING

Date and Time	Description	Information
December 5-6, 2017	NASIS: Understanding Soil Interpretations	NEDC training via Adobe Connect
December 7, 2017	Spatial Analysis Workshop	NEDC training via Adobe Connect
December 12, 2017 2pm ET	Soil Microbes Every Agronomist Should Know. *Presented by Dr. Kate Scow, Professor, Soil Science and Soil Microbial Ecologist, University of CA-Davis*	NRCS Science & Technology Webinar series http://www.conservationwebinars.net/webinars/soil-microbes-every-agronomist-should-know
December 12-15, 2017	Science of Interpretations	NEDC training via Adobe Connect
January 9, 2018 2pm ET **NEW**	Effective Ecological Site Collaboration. *Presented by Jamin Johanson, NRCS-SSD Forester/Ecological Site Specialist, Farmington, ME*	NSSC Webinar Series. Available via Adobe Connect. http://nrcs.adobeconnect.com/r4npr03zrjm/
Other Training	Training for NCSS Members	https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/edu/ncss/

Meetings and Conferences

Description	Date	Location	Link/Other Information
West Virginia Work Planning Conference	December 11, 2017	Sutton, WV	jared.beard@wv.usda.gov
Society for Range Management Annual Meeting	January 28-February 2, 2018	Sparks, NV	http://rangelands.org/events-abstracts/
2018 NCSS Regional Conferences	May 21-25, 2018 June 25-29, 2018 July 9-12, 2018	Tucson, AZ Summersville, WV Brookings, SD	West NCSS Conference Northeast/South NCSS Conference North Central NCSS Conference
21st World Congress of Soil Science	August 12-17, 2018	Rio de Janeiro, Brazil	https://www.21wcss.org/
Other Meetings	https://ems-team.usda.gov/sites/NRCS_SSRA/ssd/Lists/Calendar/calendar.aspx (accessible by NRCS staff only)		

Notices

NCSS Newsletter Available, Issue 81

Following is the URL for issue 81 of the NCSS Newsletter: https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1368139&ext=pdf

The URL for all issues is: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=nrcs142p2_054340.

If you would like to automatically receive the newsletter, please go to the address below, click on "**Sign up for E-mail updates on the National Cooperative Soil Survey**," and provide the needed information.

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=nrcs142p2_053423

Updates from National Headquarters

None.

UPDATES FROM SSD FOCUS TEAMS

Initial, Digital Soil Mapping, and Database Focus Teams Discuss Soils2026

The Initial Mapping (IMT), Database (DT), and Digital Soil Mapping (DSMT) Focus Teams met with staff from the regions, National Soil Survey Center (NSSC), and National Headquarters (NHQ) November 14th-16th in St. Paul, MN. The teams discussed how we can work together to meet the goals of Soils2026. Each presented the status of the team and their proposals for Soils2026. Discussion of the merits and potentials of the proposals led to a three-tiered approach to Soils2026 and numerous actions items for development and enhancement of soil survey information.

The three tiers are as follows:

1.—Gridded National Soil Survey Database (gNATSGO)
This short-term approach is designed to deliver full-coverage soils information while improved full-coverage products are developed by blending traditional and digital soil mapping techniques.

The DT will develop a new full-coverage product that delivers the best available soil survey information for all areas of the United States and Island Territories. This product is currently referred to as the Gridded National Soil Survey Geographic Database (gNATSGO), although the name and acronym are subject to change. gNATSGO will be created by filling in all NOTCOM areas of SSURGO with the best available soils information. For most NOTCOM areas, the STATSGO2 information will be used, but any non-SSURGO product that is correctly formatted can be used. Management teams will decide what information is included. Essex County, Vermont, component product is an example of non-SSURGO information.

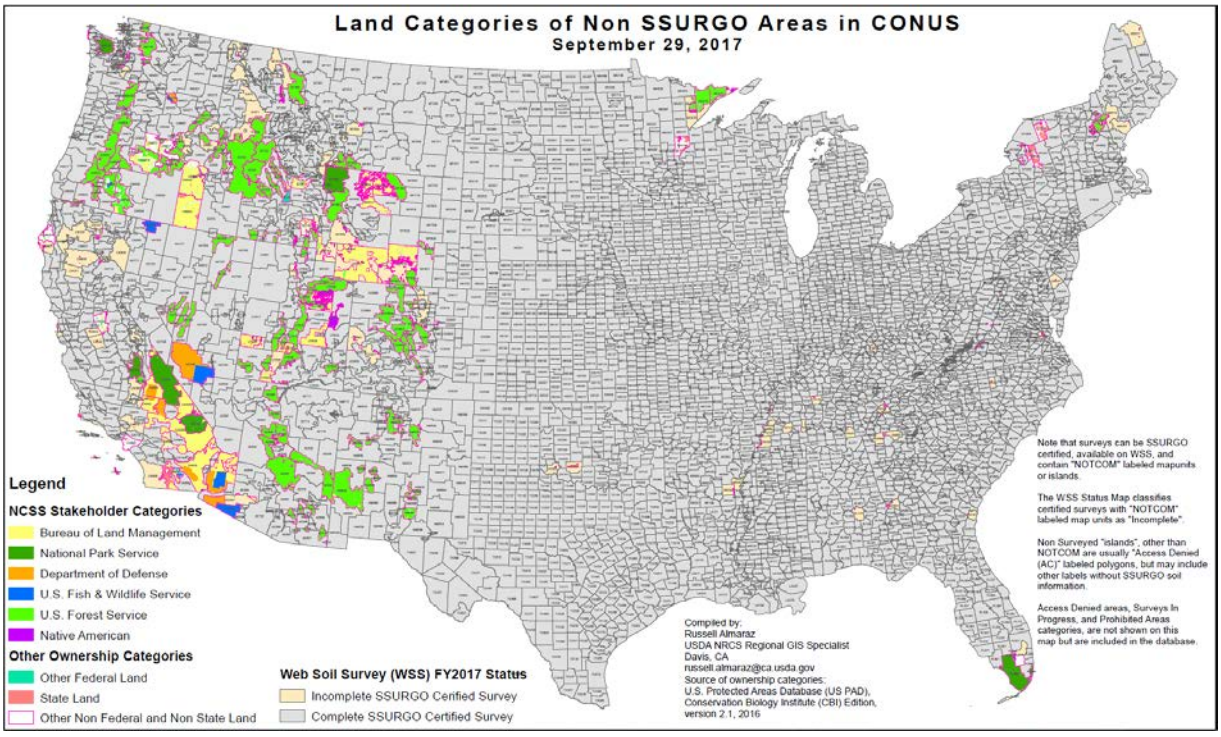
gNATSGO will be delivered on the geospatial gateway at the beginning of FY19, and it will be formatted identically to gSSURGO. It will not be made available on Web Soil Survey. Regional office and State staff will have a period of time to improve the STATSGO2 data before it is incorporated into gNATSGO, but minimal work is expected.

2.—Order 4 or 5 SSURGO Data for All NOTCOM Areas of SSURGO
A combination of digital soil mapping techniques and STATSGO2 updates will be used to develop order 4 or 5 SSURGO data for all NOTCOM areas of the United States and Island Territories by 2026. This data will be available for downloading and viewing on Web Soil Survey.

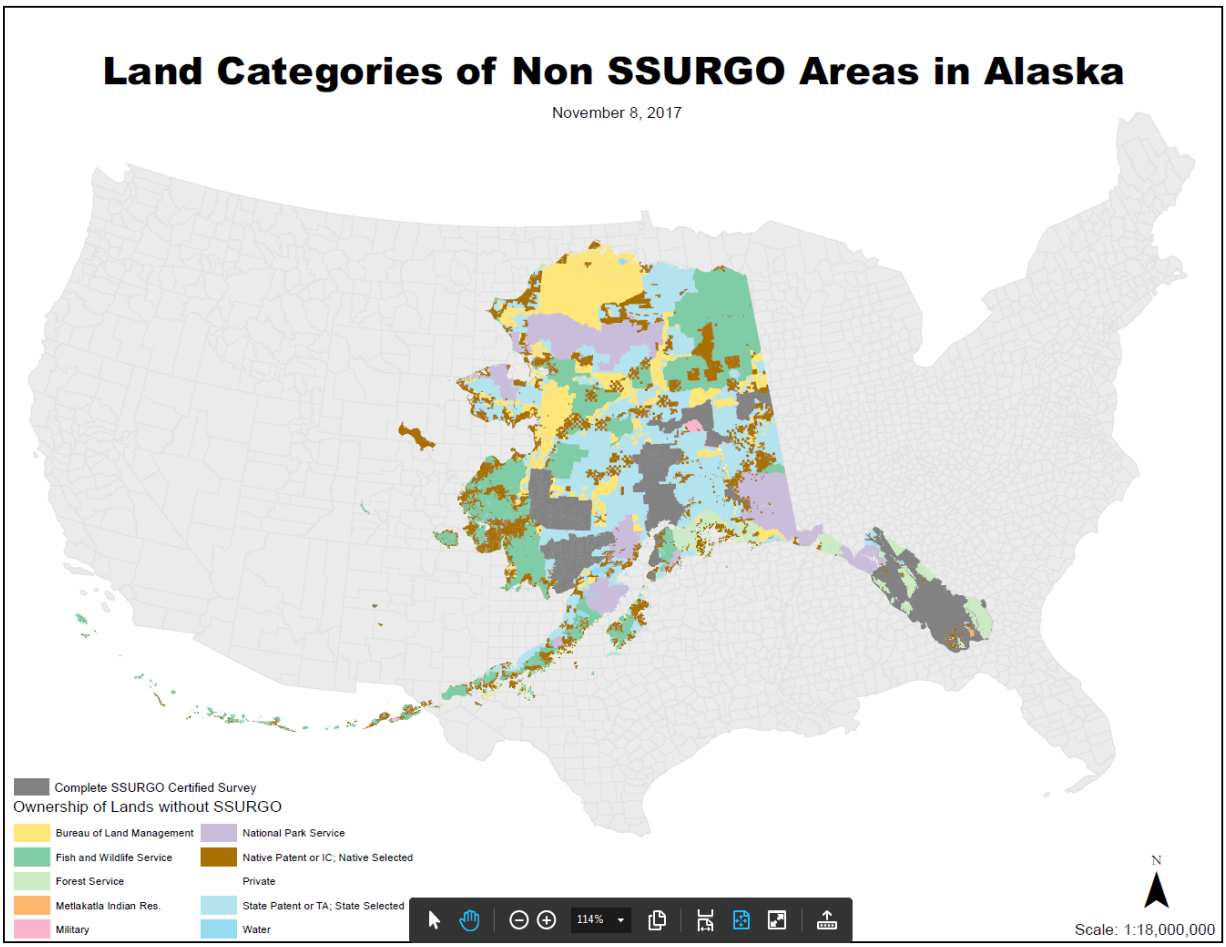
Management teams will decide the best methods for creating the data. When STATSGO2 is updated, significant tabular and spatial database work and correlation commonly are involved. Regions will manage goals in the same manner as SSURGO projects are managed. Active initial soil survey project plans will be unaffected.

3.—Full Coverage Raster Property Maps

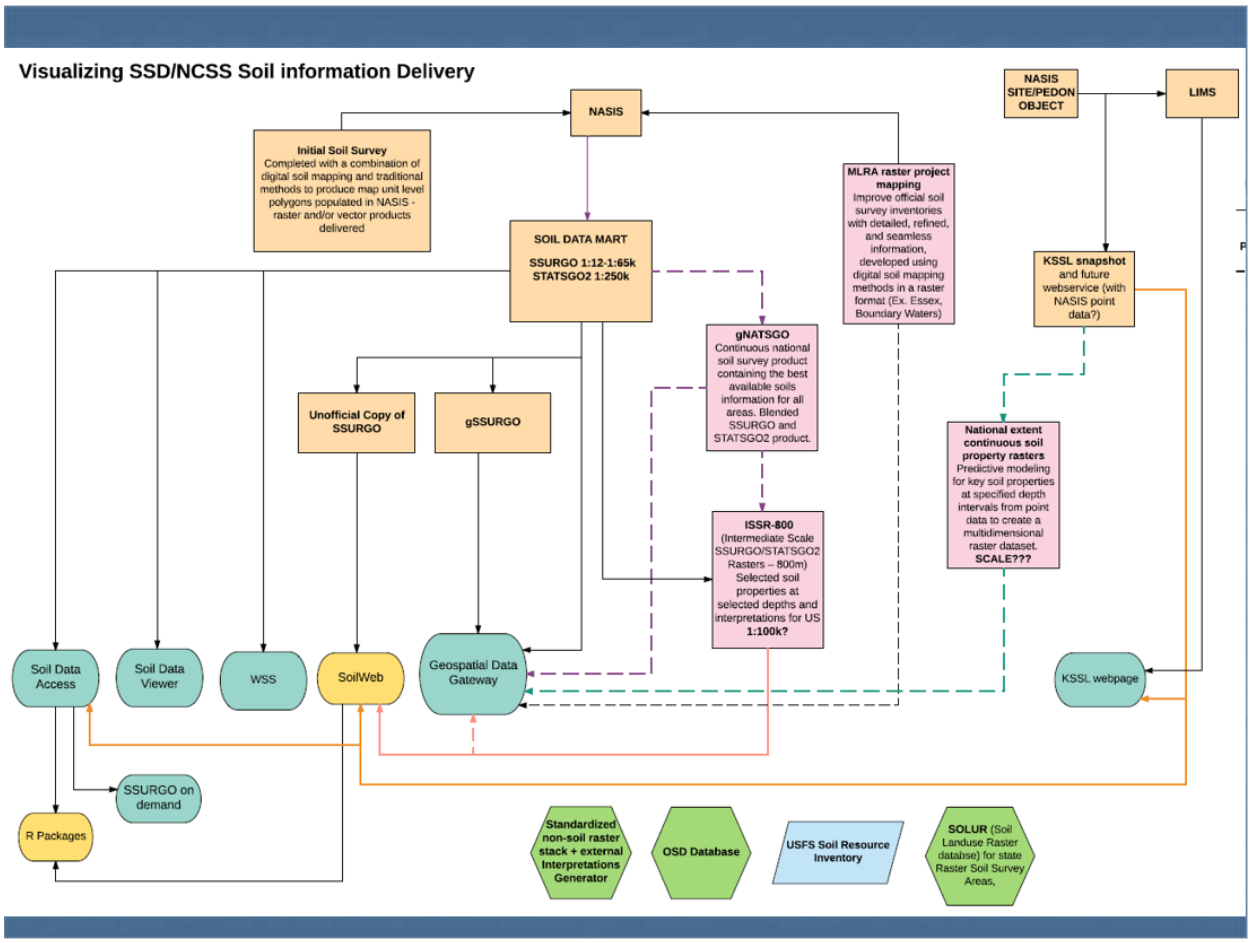
This is a full-coverage product that is an alternative to order 4 or 5 SSURGO data. It includes continuous raster layers representing key soil properties predicted at predefined depth intervals with modeling methods using point data. Generation and delivery of interpretations will accompany this dataset.



SSURGO NOTCOM areas in CONUS.



SSURGO NOTCOM areas in Alaska.



Current and proposed database systems for Soils2026.

Action Items

Initial Mapping Team:

- Evaluate existing information and needs; assemble or catalog data/information currently residing outside of NASIS.
- Identify data and information needs for areas of NOTCOM that would be required to create specific deliverables.
- Create workload analysis for required data acquisition.

Database Team:

- Form a subteam to develop gNATSGO by 12/15/2018 and publish by end of FY18.

Digital Soil Mapping Team:

- Form a subteam by January 2018 to plan for generation of a continuous raster soil property dataset.
- Subteam to have an implementation plan for developing a continuous raster soil property dataset and interpretations by February 2018.

All:

- Improve communication among teams and expand use of websites to include minutes of meetings, membership of teams and subteams, and scheduled meetings.
- Suggest modifications to the soil correlation course that include digital soil mapping methods. Send suggestions to the Training Focus Team.

Participants
David Lindbo, NHQ; Michael Whited, DSMT lead; Suzann Kienast-Brown, DSMT lead; Tom D'Avello, DSMT lead; Kyle Stephens, DT lead; Mike Regan, IMT lead; Cory Cole, IMT; Dave Zimmerman, DT; Wayne Gabriel, DT; Chad Ferguson, NSSC; Erik Dahlke, SSR1; Aldofo Diaz, SSR10; and Jason Nemecek, DT.

Updates from the National Soil Survey Center

Webinar on Vegetation GIS/Data System

A 3-part panel provided an overview of the Vegetation GIS/Data System (VGS) as a webinar November 16th to a nationwide audience of over 100 people. VGS is a CCE-compliant, data storehouse that operates on a field tablet platform and allows users to enter measured and observed data while in the field with producers. Dr. Del Despain, University of Arizona; Mike Hannemann, USFS National Range Program Manager; and Loretta Metz, CEAP-Grazing Land Component Leader participated on the webinar panel. The webinar focused on the flexibility and field-friendly data entry capabilities of VGS as well as efficient data management. VGS offers the planner the ability to inventory resource concerns and specific plot- or transect-level data, conduct resource stewardship evaluations and land health/condition/habitat assessments, take site photographs, view and manage additional documents such as ecological site description information, and link everything spatially via GIS. The webinar recording is available on the NSSC YouTube Channel: https://www.youtube.com/user/nrcsnssc.

The National Soil Survey Center Provides Geophysical Assistance in Washington State

During the week of November 13 - 17, 2017, Wes Tuttle, Geophysical Soil Scientist, Soil Survey Research and Laboratory Staff, NSSC provided technical assistance to the NRCS and the Franklin Soil and Water Conservation District located just north of Pasco, WA near the small town of Kahlotus, WA. GPR (ground-penetrating radar) and EMI (electromagnetic induction) surveys were completed at a site that is exhibiting "sink-like" subsidence features across a lake bed that no longer contains water (referred to as Kahlotus Lake). Excess precipitation in a short period of time (14 inches in a 2 - 3 months period in winter/spring of 2016/2017) is thought to be the

major contributing factor. Annual precipitation is approximately 10 inches. Excess water movement both on the surface and below the surface is thought to contribute to piping and subsidence across the site.

The site is being used for crops and pasture. Very legitimate concerns have arisen concerning safety of farm equipment, people, animals, etc., and whether or not the problem and potential danger is worsening. Minimally invasive geophysical techniques were used to help with an overall evaluation of the site and will help with a more informed management decision across the site along with site selection concerning further investigations and sampling.

This "sink hole" feature suddenly appeared according to the landowner. This particular feature was approximately 20 feet deep.

Joe Gasperi, State Geologist, Spokane, WA, USDA/NRCS is completing an EMI survey with the Dualem-2 sensor. Changes in apparent conductivity are associated with changes in salt, clay and moisture content. The Dualem-2 sensor has an effective depth of observation of 0 - 3.0 meters in the deeper sensing geometry.

EMI survey completed with the Dualem-4 sensor. "Sink-like"/subsidence features can be observed in the foreground.

National Soil Survey Center and Soil Science Division Upcoming Publications

Research Soil Scientists and Soil Scientists Staff at the National Soil Survey Center and Soil Science Division work together on soil science topics relevant to the soil survey and soil science. Such efforts have led to the submission and acceptance of two recent papers in Vadoze Zone Journal (VZJ) and Soil Water Conservation Journal (SWCJ). The VZJ paper titled "Soil Systems for Upscaling Saturated Hydraulic Conductivity (Ksat) for Hydrological Modeling in the Critical Zone", demonstrates the usefulness of soil landscape models and soil systems in upscaling soil hydrological properties by leveraging on the vast soil information and knowledge accumulated over decadal soil survey activities conducted in the United States. The SWCJ paper titled "Reevaluating the Effects of Soil Organic Matter and Other Properties on Available Water-Holding Capacity Using the National Cooperative Soil Survey Characterization Database" addresses the most recent controversial soil health statements regarding the contribution of SOM to AWHC. The abstracts along with the authors are provided. The papers will become available upon publication from the respective journals.

Libohova, Z., Schoeneberger, P, Bowling, L., Owens, P.R., Wysocki, D., Wills, S, Williams, C., Seybold C., 2017. Soil Systems for Upscaling Saturated Hydraulic Conductivity (Ksat) for Hydrological Modeling in the Critical Zone. Vadose Zone Journal (In Press).

Abstract

Successful hydrological model predictions depend on appropriate framing of scale and the spatial-temporal accuracy of input parameters describing soil hydraulic properties. Saturated soil hydraulic conductivity (K_{sat}) is one of the most important properties influencing water movement through soil under saturated conditions, and one of the most expensive to measure and highly variable. The objectives of this research were to: (i) assess the ability of Amoozemeters, wells, piezometers, and flumes to accurately represent K_{sat} at a small catchment scale; and (ii) extrapolate K_{sat} to a larger watershed based on available soil data and soil landscape models for simulating streamflow using the Distributed Hydrological Soil Vegetation Model (DHSVM). The mean K_{sat} between Amoozemeters, wells, and flumes varied from 2.4 to 4.9e-07 m sec^{-1}, and differences were not significant. Mixed trends in mean K_{sat} for slope positions and soil series were observed. The strongest significant and consistent trend in mean K_{sat} was observed for soil depth. The mean K_{sat} decreased exponentially with depth, from 6.51e-06 m sec^{-1} for upper horizons to 2.37e-07 m sec^{-1} for bottom horizons. Recognizing the significantly decreasing trend of K_{sat} with soil depth and lack of consistent trends between soils and slope positions for small catchments, K_{sat} values were extrapolated from the small catchments occurring in Dillon Creek to another large watershed (Hall Creek) based on soil similarity and distribution. The Nash-Sutcliffe (N-S) model overall efficiency of 0.52 indicated a good performance in simulating streamflows without model calibration. Combining K_{sat} measurement methods in small catchments with an understanding of soil landscapes and soil distribution relationships allowed for successful upscaling of localized soil hydraulic properties for streamflow predictions to larger watersheds.

Libohova, Z., Seybold, C., Wysocki, D., Wills, S., Schoeneberger, P., Williams, C., Lindbo, D., Stott, D., Owens, P., 2018. Reevaluating the Effects of Soil Organic Matter and Other Properties on Available Water-Holding Capacity Using the National Cooperative Soil Survey Characterization Database. Journal of Soil and Water Conservation, (In Press).

Abstract

Soil organic matter (SOM) has been known to hold water and be an important factor in contributing to the available water-holding capacity (AWHC). Recently, however, there have been overestimates of this amount. The objective of this research was to reevaluate the relative contribution of SOM to AWHC as influenced by soil physical properties (particle size, texture, bulk density) and mineralogy using the NCSS Soil Characterization Database and also to elucidate on the theoretical capacity of SOM to hold water. Silt content had the greatest correlation with AWHC (r = 0.56). AWHC increased with decreasing soil bulk density (r = -0.34), but the relationship was highly variable depending on SOM and soil texture. SOM was weakly

correlated with AWHC for samples between 0-8% SOM (r = 0.27) but moderately correlated (r = 0.62) for all samples (0-100% SOM). The increase of AWHC was more pronounced for sandy soils than for silty clay loam and silt loam soils. For soils with clay contents greater than 40%, the correlation varied by minerology class: mixed (r = 0.24), smectitic (r = 0.08), and kaolinitic (r = 0.49). In general, a 1% increase in SOM content increased AWHC, on average, up to 1.5% times its weight, depending on soil texture and clay mineralogy. These values were consistent with the theoretical calculations that showed that the potential AWHC increase (on a volumetric basis) from a unit increase in OM (wt. %) is about 1.5 to 1.7% for the 0-8% OM range. This equates to 10,800 liters (2,800 gallons) of water for each additional 1% increase in SOM (up to 8% OM) for a layer thickness of 15 cm covering 0.4-ha area (an acre furrow slice).

Updates from States and Regions

North Carolina – NRCS Soil Scientists Assist with State FFA Land Judging Event

Submitted by Debbie Anderson, Regional Director, Soil Survey Region 3, Raleigh; Kent Clary, State Soil Scientist, Raleigh; and Larry Sink, Soil Scientist, Greensboro

NRCS soil scientists assisted with the 64th Annual North Carolina FFA State Land Judging Career Development Event held on November 18th in Johnston County, North Carolina. There were over 200 students who participated in this State level event this year. The soil scientists are vital to this event and are responsible for selecting the sites for the pit, preparing the samples for judging, and scoring the actual results on each hole. Soil scientists participating this year included Kent Clary, State Soil Scientist, Debbie Anderson, Soil Survey Regional Director, Greg Taylor, Senior Regional Soil Scientist, Larry Sink, Soil Scientist from the 3-GRE office, and Vincent Lewis, ACES employee retired from the State.

The State Land Judging Career Event is rotated around North Carolina between the Piedmont, the Mountains, and the Coastal Plain. The event this year was in the Upper Coastal Plain, just outside of Raleigh. In North Carolina, two farms are used for this event. The local Soil and Water Conservation District is responsible for locating farmers who are interested in hosting this event. One farm is chosen as the practice site. This farm is used on Friday before the actual contest on Saturday. Many of the students who participate have not been across the state and aren't familiar with the soil types found in other MLRAs. Friday is the chance for them to compare their knowledge with the local conditions. No pits are provided on the practice site but two profiles are laid out. The judges score the practice sites and those answers are provided to the schools. The soils at the contest site will have similar properties but are not necessarily the same soil types seen at the practice site.

For the actual contest, four pits are dug and prepared. Two soil piles are placed near the pit and labelled as surface soil and subsurface soil. It is important when digging the pits, not to mix the different horizons. The students cannot enter the pits, but a stake marked in 6 inch increments is placed along the pit wall. They can judge the erosion by the thickness of the surface and look for redox depletions within the profile, to a depth of 48 inches. The texture, structure, and consistency for the surface and subsurface layer is determined from the marked piles of soil. In addition to the soil properties, students must also determine slope within the field, permeability, drainage, and surface water removal. They must also look at landscape position to determine the risk of flooding and assign the soil to a land capability class. From there they must choose recommended land treatments and determine the suitability of the site for urban uses including septic tanks, landscaping, foundations, sanitary landfills, and basements. That's a lot for a high school student to learn!

After the judging, there is a luncheon at the host high school and then the winners are announced. This event is very competitive in North Carolina and the coaches know the handbook well. The top team is given financial support by event sponsors that include the Soil Science Society of North Carolina, to attend the National Event in Oklahoma City. This is a great outreach opportunity to reach many high school students who have an interest in natural resources. North Carolina State University is also present each year and assists the students and coaches at the practice site on Friday.

A soil profile representing the Norfolk soil series. This site had a sandy surface with a loamy subsoil. It is some of the best prime farmland in the Coastal Plain.

A soil profile representing the Wagram soil series. This soil is very similar to the Norfolk soil except it has an arenic surface.

Students must take into consideration the field properties and the crops that the farmer plans to grow.

Students viewing the profile to determine erosion, depth of water table, and if there is a restrictive layer.

Two separate piles of soil are marked as surface and subsoil.

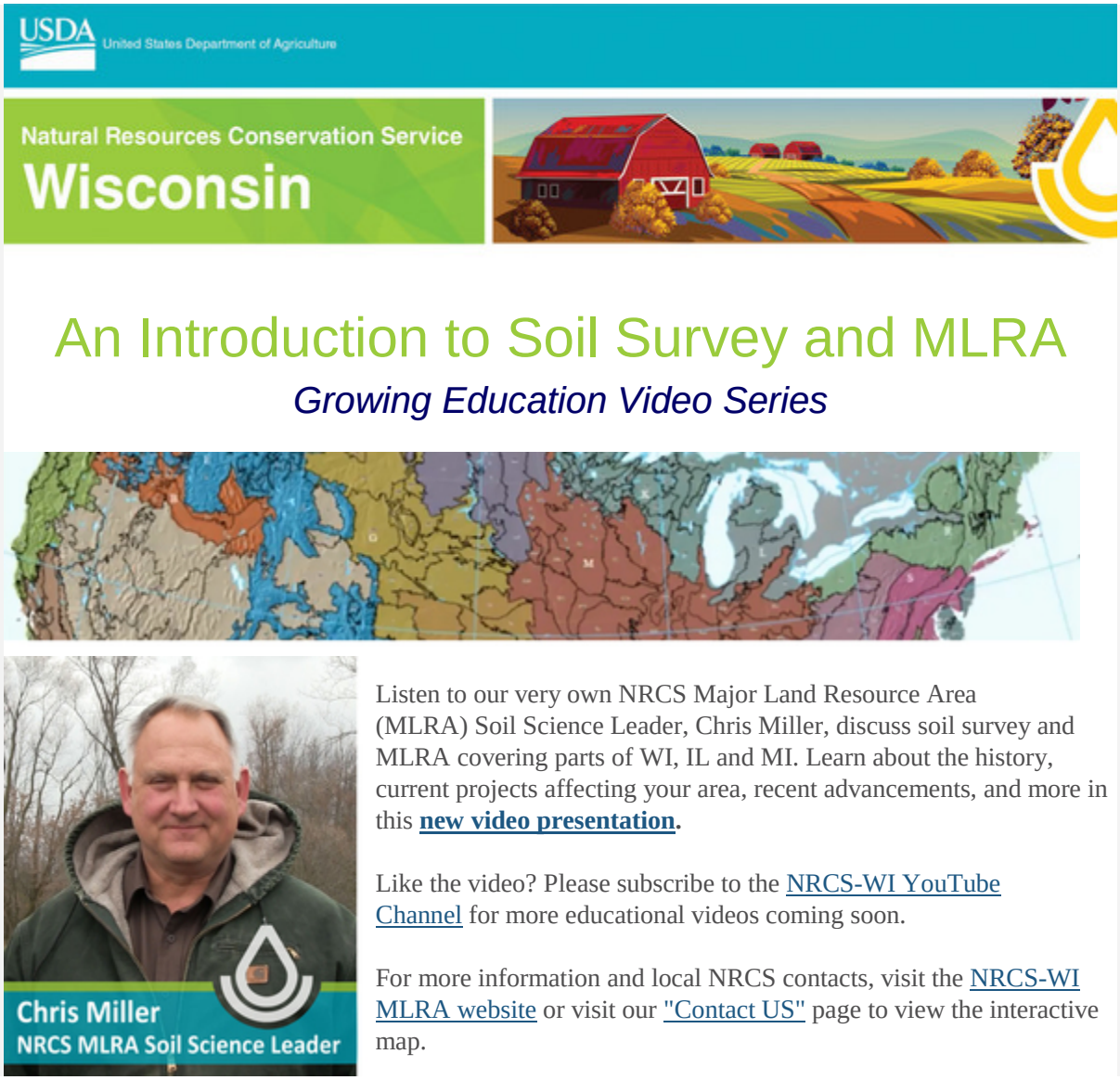
Students must determine texture from the two piles of soil.

Students from across North Carolina participate and are divided into 4 groups to rotate between pits. This represent about ¼ of the total students at one site.

Wisconsin – An Introduction to Soil Survey and MLRA

Submitted by Jason Nemecek, State Soil Scientist, Madison

This video, part of a series of videos to help educate and learn about NRCS Wisconsin. In this video Chris Miller, NRCS MLRA Soil Science Leader. Juneau, Wisconsin is talking with local landowner, farmers and crop consultants at the Brey Field Day about the NRCS soil survey and major land resource areas (MLRA).



Listen to our very own NRCS Major Land Resource Area (MLRA) Soil Science Leader, Chris Miller, discuss soil survey and MLRA covering parts of WI, IL and MI. Learn about the history, current projects affecting your area, recent advancements, and more in this **new video presentation**.

Like the video? Please subscribe to the NRCS-WI YouTube Channel for more educational videos coming soon.

For more information and local NRCS contacts, visit the NRCS-WI MLRA website or visit our "Contact US" page to view the interactive map.

Updates from the Partnership

None.

Personnel Announcements

None.