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## Editor's Note

Issues of this newsletter are available at <http://soils.usda.gov/>. Under the Soil Survey tab, click on Partnerships, then on NCSS Newsletters, and then on the desired issue number.

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## 2014 North Central Regional Conference

By Lee Burras, professor, Iowa State University, Ames, Iowa.

Seventy-six pedologists and related professionals registered to learn about—and contribute to—the topics of soil survey, soil health, and soil dynamic properties at the 2014 North Central Regional Cooperative Soil Survey Conference, held June 2<sup>nd</sup> through 5<sup>th</sup> on the campus of Iowa State University. Forty-four of the registrants were USDA–NRCS employees (14 from Iowa, 22 from regional and MLRA offices, and 8 from national postings), and 24 were university employees (7 faculty from ISU, 9 faculty from cooperating universities, and 8 graduate students). The remaining eight registrants were with cooperating agencies from Iowa, Minnesota, or the Federal government. The meeting had three core components: research presentations, technical discussions and updates, and a field trip. The field trip illustrated Iowa soils and mapping issues and opportunities.

The opening session was held in the beautifully renovated Curtiss Hall Auditorium. Rick Bednarek, USDA–NRCS state soil scientist for Iowa and cohost for the conference, kicked off the meeting by outlining the conference goals and making introductions. Wendy Wintersteen, dean of ISU's College of Agriculture & Life Sciences, welcomed everyone to Iowa State University, noting the importance that ISU and the State of Iowa place on soil survey. Allen Gehring, USDA–NRCS state conservation engineer for Iowa, built on Dean Wintersteen's comments by discussing the role of soil survey in ensuring the success of conservation in Iowa, where 90 percent of the land is farmland.

The technical core of the conference began with Roy Vick, Associate Director

for Soil Operations. Mr. Vick outlined recent and ongoing restructuring, personnel changes, and priorities within the NRCS Soil Science Division. The next speaker, Ken Scheffe, soil scientist with the Soil Survey Standards Branch at the National Soil Survey Center, explained new and updated procedures in soil survey. Director Vick's and Mr. Scheffe's presentations illustrated the importance and relevance of cooperators to the U.S. soil survey program as well as clarified within-agency needs and expectations. Their presentations stressed the importance of smooth and efficient delivery of soil survey products to the public and other government agencies. The timeliness of their messages was highlighted by the numerous questions they handled.

The final two speakers for the opening session were Kendall Lamkey, professor and chair of ISU's Department of Agronomy, and Elwynn Taylor, professor of climatology in ISU's Department of Agronomy. Dr. Lamkey challenged the group to better identify the importance of soils in crop yields, going so far as to suggest that additional soils knowledge will likely have little impact on crop yields since maximum yields have already been reached. Dr. Taylor explained why he predicts increased weather extremes for the next 15 years in the central U.S. Both presentations resulted in thoughtful questions, fun debate, and some respectful skepticism.

The second day of the conference was held in ISU's Scheman Hall. It began with three progressively more detailed presentations about dynamic soil properties and ecological site indexes. The speakers were Stacy Clark, ESI specialist for soil survey regions 10 and 11; Skye Wills, soil scientist specializing in dynamic soil properties at the National Soil Survey Center; and Ryan Dermody, soil survey office leader at Waverly, Iowa. The perspectives offered by their various levels of responsibility, coupled with the specific examples they provided, were highly useful and relevant to the intensely farmed landscapes of the North Central Region. The next part of the day was dedicated to posters, including several focused on dynamic soil properties, and to committee breakouts.

The afternoon of day two featured three themes: nutrients and organic matter, committee meetings, and soil data join recorrelation (SDJR). First up was Jim Gillespie, division director with the Iowa Department of Agriculture and Land Stewardship, who explained Iowa's nutrient reduction strategy. Tom Sauer, USDA-ARS research soil scientist at the National Laboratory for Agriculture and the Environment, then discussed his research regarding the effects of tree plantings on the content of soil organic matter in Mollisols in the Great Plains and the Russian Steppe. The session ended with an explanation of the goals, challenges, and opportunities of SDJR by Paul Finnell, NRCS national soils database manager; Michael Whitehead, senior regional soil scientist for soil survey region 10; and Ryan Dermody. The presentation by Mr. Dermody, which illustrated the success that he and his team are having with SDJR in MLRA 104, was especially useful and meaningful given that he explained the methods by which they readily meet local, regional, and national goals.

A banquet was held the evening of day two. The highpoint was Tom Fenton's presentation on the contributions of R.V. Ruhe to soil survey and soil geomorphology in Iowa, the U.S., and the world. Dr. Fenton is professor emeritus at Iowa State University and Dean of Iowa Soil Survey. He has been part of the National Cooperative Soil Survey program for over 50 years.

Day three featured the field trip, which focused on soil health, dynamic soil properties, and benchmark catenas of Iowa's Late Wisconsinan-aged Des Moines Lobe. Like any pedology tour, this field trip began with a discussion of the location's physical geography, soil-forming factors, and major human issues. The trip had four stops: the Altamont Moraine uplands; Doolittle Prairie State Preserve and Greg Stindt's field within the lakebed of glacial Lake Wright; the Jewell Bog, where R.V. Ruhe and his student P.H. Walker quantified the spatial relationship of soil properties across closed basins; and Lost Lake Farm, including the drained area that was historically under Lake Cairo. The speakers were ISU's Mary Tiedeman, Ethan Dahlhauser,

Jenny Richter, and Tom Fenton as well as the conference hosts, Rick Bednarek and Lee Burras. The critical observations of the trip involved the differences between Mollisols under natural and quasi-natural vegetation and Mollisols under long-term cropping. The differences are significant in both rolling and flat landscapes. The resulting question was “How can our next generation of soil maps, classification, and interpretations best capture these differences?” The field trip ended with a meal and an informal tour of ISU’s Field Extension and Education Laboratory.

Mike Konen, professor of geography at Northern Illinois University, kicked off the final day of the conference with twin presentations about northern Illinois. The presentations illustrated that the natural and human-affected pedology of Iowa and Illinois are very similar. The five subsequent speakers were USDA–NRCS regional leaders who gave updates about their areas of responsibility. The speakers were Mike Jones, Region 6; Dave Zimmermann, Region 12; Cleveland Watts, Region 5; Michael Whited, Region 10; and Travis Neely, Region 11. The conference wrapped up with reports from the New Technology, Research Needs, Standards and Technology, Interpretations, North Central Education/Extension Research Activity (NCERA–3), and Business committees. Regarding soil taxonomy, John Allen (MLRA project leader, Indiana) reported that the committee liked the “Illustrated Guide to Soil Taxonomy,” supported the modifications for “kalkic” Histosol and for Wassists and Wassents, but did not at that time support changing the definition of densic horizons or Aquic Hapludults. Lee Burras reported that NCERA–3 is maintaining a strong pedologic presence in the region’s universities. Rick Bednarek reported a change in the by-laws that replaced “MO” with “RO.” He announced that in 2016 and 2018 the North Central Region conferences will be in Illinois and Minnesota, respectively, and he invited everyone to the 2014 National Soil Survey Conference in St. Paul.

Overall the conference was a success. ■

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## 2014 Southern Regional Conference

By Paula M. Gale, professor of soil science, University of Tennessee at Martin.

The 2014 NCSS Southern Regional Cooperative Soil Survey Conference was held June 23–26 in Jackson, Tennessee. Over 65 soil scientists and cooperators attended the conference, which included discussions and information sharing related to the theme “Soil Science—Partnerships for Ecological Deliverables and Sustainability (PEDS).” Speakers on Monday and Tuesday provided updates regarding issues and priorities relative to soil survey interspersed with topics of particular importance to West Tennessee. Region-specific topics included: “Bottomland Forest Management in a Changing Environment” by Dr. Alan Houston; “No-tillage and Soil Erosion in West Tennessee” by Dr. Don Tyler; and “Soil Moisture Studies in the Mississippi Delta” by Dr. Kris Brye. Tuesday afternoon included lively discussions in the committee breakout sessions.



**Partnerships for Ecological Deliverables and Sustainability**



Participants in the field trip.

The highlight of the conference was the field trip through West Tennessee. The group began the day reviewing ecological sites at the Hatchie River National Wildlife Refuge. Lunch time found participants at the University of Tennessee Research and Education Center at Milan, where they were treated to a barbeque lunch and learned about the research priorities of the station. Everyone had the opportunity to tour the Ag Museum at the station and review soil pits in fields under long-term no-till crop production. Next, the group went to observe impacts of the New Madrid earthquakes of 1811–1812. The first site was at Bogota Wildlife Management Area, where soil pits featured sand blows associated with the earthquakes. Then it was off to Reelfoot Lake for a boat tour and catfish dinner.

The conference concluded on Thursday with committee reports and discussions of emerging issues that were identified during the meetings. The lunch banquet included tributes to former colleagues from the region, namely, Moye Rutledge, Bill Brown, and Tom Ammons. The tributes were given by Edgar Mersiovsky, Don Tyler, and Darwin Newton, respectively. Keven Godsey was honored as Soil Scientist of the Year. ■

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## 2014 Western Regional Conference

By Thor Thorson, state soil scientist, USDA–NRCS, Portland, Oregon.

During the week of June 16<sup>th</sup>, representatives of the National Cooperative Soil Survey (NCSS) and others met in Portland, Oregon, for the Western Regional Cooperative Soil Survey Conference. The purpose of the conference was to bring together the partners of the NCSS to review the past 2 years of work and to discuss the direction for the next 2 years of work. The conference was hosted by Dr. Scott Burns, Department of Geology, Portland State University. The theme of this year's conference was volcanoes, glacial floods, and their impact on Oregon's soils and wine industry. The conference was attended by about 70 participants, including representatives of the Natural Resources Conservation Service, U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Environmental Protection Agency, and State agencies. Also attending were retirees, students, and consultants. Presentations included such diverse topics as use of soil survey information, soil health, ecosystem management, ecoregion development and use, geomorphic

landform mapping, geology of Oregon, soil climate, and ecological site inventory and descriptions. All of the presentations are available at [www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership).

On Wednesday, June 18<sup>th</sup>, a field tour was held to observe the landforms shaping northwestern Oregon, the soils of the region, and the impact of the soils and landforms on the wine industry. The tour was hosted by Dr. Burns, who presented on Oregon's geology and "terroir" (the taste of the place). Terroir is a French term that refers to the relationship between geology, soils, hydrology, and climate and the resulting wine. The tour started in Portland and traveled east up the Columbia River Gorge, where the results of volcanic events and glacial flood events were observed and discussed. The tour ended with a visit to each of two Oregon vineyards. The first vineyard is on Jory soil (Oregon's official State soil), which is a Xeric Palehumult. The Jory soil formed over basaltic parent material from volcanic activity. The second vineyard is on Willakenzie soil, which is an Ultic Haploxeralf. The Willakenzie soil formed in parent material from flood deposits of Glacial Lake Missoula. Participants were offered to sample the wines produced from the two soil types that portray the terroir of the area.

The conference concluded with meetings of the Standards, Applied Technology, Research, ESI/ESD, and By-laws committees. The committee reports are available under the Agenda link at the website above. Also available is a brief executive summary of the conference. The 2016 Western Conference will be hosted by the State of Alaska. ■

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## 2014 Northeast Regional Conference

By Kim McCracken, state soil scientist for Maine and New Hampshire, USDA-Natural Resources Conservation Service.

The Northeast Regional Cooperative Soil Survey Conference was held at Plymouth State University in Plymouth, New Hampshire during the week of June 23, 2014. The conference was hosted by the Society of Soil Scientists of New England (SSSNNE), USDA-Forest Service (USFS), and USDA-Natural Resources Conservation Service (NRCS). The location was the perfect backdrop to highlight the conference theme of "Forest Soils and Ecology." The group of over 70 participants was treated to 2 days of field tours in the White Mountain National Forest (WMNF), excellent technical presentations, and engaging large group and breakout discussions. This conference stressed the importance of strong partnerships and collaboration—the heart of the Cooperative Soil Survey mission.

Tom Wagner, WMNF forest supervisor (USFS), and Rick Ellsmore, state conservationist for New Hampshire (NRCS), offered opening remarks to kick off a great week emphasizing the partnership between NRCS and the Forest Service. The conference started with National Cooperative Soil Survey reports from Tom Reinsch that provided an update on the NRCS Soil Science Division and the status of the reorganization. Dave Hoover reported on Soil Survey Investigations, the Soil Data Join Recorrelation (SDJR) Initiative, and National Soil Survey Center activities. Andy Colter shared the U.S. Forest Service update on the White Mountain National Forest and priorities for the Northeast Region. The Consulting Soil Scientist report was delivered by Ray Lobdell, President of the Society of Soil Scientists of Northern New England. Mark Stolt, University of Rhode Island, provided an informative overview of the broad range of projects led by university cooperators in the region. We also had



**Fascinating soil pit on the Hubbard Brook tour featuring an E horizon and cemented Bhs/Bs horizon (ortstein).**

several interesting presentations from university cooperators related to ecological site descriptions, which sparked some healthy discussion among participants throughout the week. The afternoon was packed with productive committee breakout sessions. Day one ended with a poster session and a group social with refreshments provided by SSSNNE.

On Tuesday, the group traveled to one of the premier long-term ecological research sites in the U.S., the Hubbard Brook Experimental Forest (HBEF), for presentations to prepare us for site visits highlighting linkages between podzolization and hydrology. The day was moderated by Dr. Scott Bailey, USFS. At Hubbard Brook, we explored variation in podzolization glacial parent materials, which are being investigated as part of a project combining the study of hydrology and soil development (hydropedology).

The Hubbard Brook Hydropedology Initiative investigates the influences of hydrology on pedogenesis and soil chemistry and, in turn, the controls on stream water quality in headwater catchments. Many of the podzolized soils we saw at Hubbard Brook do not meet the taxonomic criteria for Spodosols based on morphology or chemistry. However, micromorphology and extraction chemistry suggest that podzolization is a major process in their formation. Investigators at Hubbard Brook, led by Dr. Scott Bailey, interpret what we saw in the field as lateral podzolization, a concept where a downslope illuviation zone results from translocation of spodic materials from higher on the hillslope. We saw some very interesting pits with a variety of features common to Spodosols, including pockety E horizons, ortstein (partially cemented spodic horizon), and well developed Bhs horizons. For more information on the work, see:

S.W. Bailey et al. 2014. Influence of landscape position and transient water table on soil development and carbon distribution in a steep, headwater catchment. *Geoderma* 226-227:279-289.

The second field day highlighted the coordinated approach to NRCS and USFS natural resource and soil inventories on the White Mountain National Forest. Before heading to the field, we had a project overview from NRCS employees Craig Busskohl and Jessica Philippe and Forest Service employees Greg Nowacki and Andy Colter. The presentations and field tours included ecological site descriptions (ESDs), the USFS and NRCS partnership for ESD mapping in the WMNF, and raster soil mapping using LIDAR. The group traveled to the Wild Ammoonosuc watershed to observe soil site and vegetation data collection methods for the joint NRCS-Forest Service project. We examined three pits in the field and were able to compare them to model predictions of the raster soil model produced using the Arc Soil Inference Engine... with amazing outcomes! So the collaboration has resulted in a mutually agreed-upon methodology for conducting soil and vegetation inventories on the WMNF. This approach is serving as the basis for developing both USFS landtype phase concepts and NRCS ecological site descriptions in addition to the primary goal of completing an initial soil survey of the WMNF. Due to inclement weather and some transportation issues, we had a chance to stop and explore an area (formerly a road) devastated by Hurricane Irene in 2012. The tour ended a little early due to severe thunderstorms.

Wednesday evening featured a banquet with two keynote speakers: Dr. Phil Schoeneberger, NRCS, and Dr. Lisa Doner, Plymouth State University (PSU). Dr. Doner, a climatologist, presented her climatological and soil research in Iceland. Her presentation focused on the interactions between the climate fluctuations associated with the North Atlantic Oscillation, current human land-use activities, and the physical (erosional) features and chemical properties of soils and sediment deposits on the island.

The conference closed on Thursday after breakout sessions and committee and MLRA reports. Two sessions on the last morning highlighted the interest in and



**A quick lunch stop turned into a few hours as soil scientists were treated to thousands of feet of exposed soil at a former road washed out by Hurricane Irene in 2012!**

passion for the Cooperative Soil Survey in the Northeast and throughout the country. Conference attendees expressed concern for the future of the Cooperative Soil Survey given shrinking budgets and increasing workload demands for everyone. The group discussed strategies to prepare for the future with a special focus on 2015 as the International Year of Soil. Recommendations and concerns from the group discussion were passed along to the National Cooperative Soil Survey Leadership.

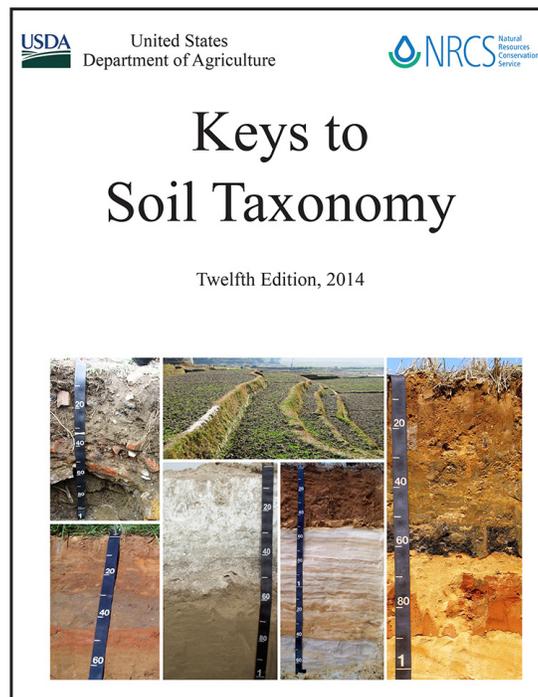
New York is slated to host the next Northeast regional meeting in 2016. ■

## Soil Taxonomy Goes Global!

The International Union of Soil Science (IUSS) has given its official endorsement to Soil Taxonomy as an approved system of soil classification. The endorsement came at the recent World Congress of Soil Science in Korea after almost 2 years of ongoing efforts by the Soil Science Division and the National Soil Survey Center. The vote was 10 to 1. The endorsement is a significant step that will lead to improvements in NRCS' ability to apply Soil Taxonomy around the world.

The Soil Science Division used the World Congress as a platform to release the 12<sup>th</sup> edition of the "Keys to Soil Taxonomy." The "Keys" provide a summary and update of Soil Taxonomy and are used in many places around the world.

The Soil Science Division is establishing an International Committee on Taxonomy (ICOMTAX) to provide technical feedback and overview for new proposals submitted by the global soil science community. Development of this new international committee is an effort to reach out to the international community for help in the continuing improvement and development of the "Keys." ICOMTAX is the latest in a long progression of international committees established to provide input for the continued development of Soil Taxonomy. ■



## Soil Monoliths Complement Fine Art at Minneapolis Institute of Arts

By Al Giencke, retired soil scientist.

“What’s beneath our feet?” is the question that Monica Haller, artist-in-residence at the Minneapolis Institute of Arts (MIA), asked herself when creating a theme for her art exhibit at MIA. She became curious about this question when her father removed piles of soil from the family farm in Minnesota before selling the land. He had felt so attached to his land and soil that he did not want to part without taking some with him. That gesture was the starting point for intriguing discussions about soil and its many geological, historical, cultural, and sociological aspects.

In order to learn more about soil, Monica contacted geologists, soil scientists, members of academia, and Native Americans. I was among the lucky ones she chose to work with. Being a quick study, she soon realized that the best way to

display soils and soil properties indoors was with a set of soil monoliths. For the monoliths, she selected soils that were in some way related to pieces of fine art at MIA. The monoliths were later paired with the art in the exhibit.

Self-guided tours have been set up for visitors to view and read about the soil-and-art pairings. More formal, hour-long guided tours are also available. The guided tours feature an MIA docent paired with a soil scientist docent. Although scheduled for an hour, many of the guided tours go longer as people have lots of questions to ask.

Additional information regarding the display is available



**Monica Haller stands with a soil that is shallow to bedrock and from the Minnesota Iron Range. The monolith is paired with a Dutch painting that shows similar soils that are shallow to bedrock in outstate New York. The painting shows many areas of sparse vegetation, as one would expect on the shallow soils in that area. The monolith seems to give a 3D effect to the 2D painting. (And, yes, she did cut the bedrock to fit into the monolith frame!)**

at <http://www.youtube.com/watch?v=i6jsIYVnc60&feature=youtu.be>

The exhibit has been quite popular. Bringing soil (or dirt as some say) into a fine art museum is unusual and gets the attention of visitors. However, after a month of having the exhibit open and conducting tours, those involved would be less likely to ask “Why is there soil in the museum?” and more likely to ask “What took so long to make this connection?” As one MIA docent recently said, “I will never again look at fine art and not look at the landscape and for the affect soil has on it.”

Mission accomplished! ■



**A monolith of kaolin clay paired with a 3,000-year-old Greek water vessel made from what is believed to be similar kaolin clay.**

## U.S. Collegiate Soil Judging Teams in Korea

By Amy Overstreet, public affairs specialist, USDA–NRCS.

Over the past 4 years, numerous colleagues in the [National Cooperative Soil Survey](#), the [Soil Science Society of America](#), and the [International Union of Soil Scientists](#) worked to launch the first [International Soil Judging Contest](#). The event took place June 5–7 on the island of Jeju, Korea, in conjunction with the [20th World Congress of Soil Science](#). The theme, “Globally Qualified to Get Dirty,” illustrates the spirit of camaraderie and fun which infused the event.

Two teams of U.S. college students and their coaches, sponsored by the Soil Science Society of America, the Agronomic Science Foundation, and their universities, travelled to Jeju for the competition. A total of 13 teams, representing 5 continents, converged on Jeju to interpret Korea’s volcanic soils. The contest hosted teams from the U.S., Japan, China, Korea, South Africa, Australia, Taiwan, Mexico, Hungary, and the United Kingdom. Maxine Levin, USDA–NRCS; Steve Cattle, University of Sydney (Australia); Cristine Morgan, Texas A&M University; and David Weindorf, Texas Tech University, helped to prepare the contest, offered guidance to the international coaches and students, and served as official judges.

The contest focused on both team and individual performance. Team USA–B and Team USA–A were victorious, earning the first and second highest team scores, respectively. Tyler Witkowski (Team USA–B) earned second place overall for individual performance out of 45 contestants. Emily Salkind, Virginia Tech; Nancy

Kammerer, Penn State; Julia Gillespie, Virginia Tech; and Caitlin Hodges, University of Georgia, finished fourth through eighth, respectively.

Collegiate soil judging contests in the U.S. date back over 54 years and involve the description, classification, and interpretation of soil. The events help students recognize important soil and landscape properties. Soil judging encourages the students to consider these characteristics when deciding how to use soils appropriately and to keep conservation in mind. Hopefully, these students will go on to a career in natural resources management. Maxine Levin, USDA–NRCS National Leader for Soil Interpretations, describes the importance of soil judging, “Soil and land judging at the high school and collegiate level is a baseline entry for young people to study the land and learn to read the landscape so that they can better manage and protect it.”



**Team USA (left to right): Tyler Witkowski (individual 2nd place overall), Caitlin Hodges, Bianca Peixoto, John Galbraith (coach), Emily Salkind, Brian Maule, Nancy Kammerer, Julia Gillespie, Kyle Weber, and Chris Baxter (coach).**

“The students interpreted the soil and land conservation for what the people on Jeju Island are most economically interested in—tangerines, carrots, golf courses, and septic tank suitability,” said Levin. “Participating in the soil judging contest gives students the confidence to go anywhere in the world and describe what they see in the context of land management. With their peers, they learn together to communicate the language of soil science and collaborate professionally to make the best decisions for economic and environmental conservation.”

David Lindbo is a professor of soil science at North Carolina State University and past president of the Soil Science Society of America. He attended the conference, where he met and spoke with attendees from all over the world. “We distributed nearly 20,000 copies of the ‘I Love Soils’ stickers at the conference, in 11 different languages,” Lindbo said. He also said the experience was valuable to the students from a number of different perspectives: “In this field of soil science, employers really look for students that have soil judging experience, but it’s not all about winning. It is also about knowing how to work with a team, being skilled at soil description, and mastering the ability to capture that in writing.”

Lindbo also said the students’ participation at an international competition will make them more marketable as they enter the workforce. “These students represent the future of soil science,” he said. “So giving them an international perspective early in their career is critical to ensuring our science is viewed as globally important.”

Organizing an international contest of this scope is no easy task, but professors Cristine Morgan and Stephen Cattle joined forces to make the first international contest a reality. Morgan is the coach of the soil judging team at Texas A&M. After attending the Joint Australian and New Zealand Soil Science Conference in 2012 and meeting and working with Professor Cattle, she decided it was time to take soil judging to an international level.

“These contests generate enthusiasm for soil sciences,” Morgan said. “It reminds me of why I got into the discipline.” She said that between Stephen and herself, they have a lot of institutional knowledge about such contests, as both have coached

college teams and coordinated national competitions. This endeavor, however, was different. “It was risky, as this was the first ever international contest,” she said. “But, it’s been in the planning stages for years and we had great support and help from the local planning committee in Korea.” She described the arduous schedule, which included 2 days of soil judging practice in eight different soil pits. On the day of the contest, the students “explored two soil pits in garlic fields and then traveled to a mountain where they investigated Andisols, or volcanic ash soils.” The competing teams were each composed of four students and a coach. The two U.S. teams included students that had earned the highest scores at the National Collegiate Soils Contest in Doylestown, Pennsylvania, this April.

Dr. Morgan said preparations are already underway for the next contest, which will take place in 2018 in Brazil at the next World Congress of Soil Science. In the meantime, at least five countries have committed to conducting their own national contests next year.

Levin, Morgan, and Cattle also teamed up to present a poster at the conference. The poster, “Soil Judging as an Instrument for Community-Building in the Discipline of Soil Science,” explored the history of soil judging, its benefits, and how supporting such contests can “bolster the strength and ensure the future of the soil science community.” The poster earned top honors.

The winning team, USA–B, was coached by Dr. Chris Baxter, professor of soil and crop science at the University of Wisconsin, Platteville. “The competition was exceptionally well organized and provided an outstanding learning experience for the students,” he said. “Our Korean hosts and contest organizers worked very hard to select sites that were representative of soils that are of economic and environmental importance to Jeju Island and provided the coaches all the necessary information we needed to instruct our students.”

Baxter also said that opportunities were offered for students from different teams to interact with each other and make friends, and that his students took full advantage of this. “I believe all of the U.S. students made friends with students from other countries while there, even when they didn’t speak the same language.” Finally, Dr. Baxter said it was a bit of a challenge clearing customs in Korea. “Having to explain traveling with the tools involved in soil judging, which includes large knives, was interesting!” He also said that many of the contestants from other countries were actually graduate students in soil science. “The fact that the U.S. students were able to excel in this competition is a testament to the excellent education they are receiving at their respective universities. They were all well prepared before we even started practicing for the competition, which made my job as coach much easier.”

The team claiming second place overall was led by Dr. John Galbraith, associate professor of Soil and Wetland Sciences at Virginia Tech. To prepare his team, he developed a website that included travel tips, contest information, cultural information about Korea, and information on geology and soils. He said one of the highlights of the contest was that the students “learned how to be professional, to represent their country, to meet peers from other countries, to learn about diverse cultures, and they were afforded the chance to explore soils and geology much different than any they had seen before.”

“Most of the students competing in Korea from the U.S. are currently being considered for positions with [USDA's Pathways Program](#),” said Levin. The Pathways Program offers opportunities for students and recent graduates to intern in the fields of agriculture, science, technology, math, environment, management, and business. Hopefully, some of these outstanding students will be future NRCS employees. “This was one of the best experiences of my entire career, and I am hopeful that our U.S. student competitors will remember it as a touchstone that they can make a difference, seeing the world globally through soil science,” concluded Levin. ■

## Field Tour of Forest and Mountain-Meadow Soils in Plumas County, California

By Jennifer Wood, soil data quality specialist, NRCS, Davis, CA, and 2013–2014 Chair of the California Forest Soils Council.

The California Forest Soils Council (CFSC) has been hosting summer field tours for over 30 years, mostly in the mountains of central and northern California. The Council strives to bring together soil scientists and other professionals from the public, private, tribal, and educational sectors to discuss the role of soils in the management of forest and wildlands. On June 20<sup>th</sup> and 21<sup>st</sup>, the council teamed up with the Professional Soil Scientist Association of California (PSSAC) to explore resource management issues in Plumas County, California, an area where the Sierra Nevada Mountain Range meets the Cascade-influenced (volcanic) mountains to the north. NRCS participants included staff from the MLRA soil survey offices at Sonora, Chico, and Arctata and from the soil survey regional office at Davis. U.S. Forest Service soil scientists and other staff attended from Forest Service Region 5. They were joined by private consultants, university faculty, and students from across California.

The first day was dedicated to hearing from and honoring founding CFSC and PSSAC member, Earl Alexander. Earl is a soil scientist who has spent a long career studying ultramafic soils in areas ranging from Alaska to Mexico as well as in Puerto Rico. He has worked with the USFS, NRCS, and BLM and with university researchers and has been a private consultant. He has published many journal articles and book chapters on ultramafic soils. His career embodies the collegial principles of NCSS.

The second day was spent learning about the historic and prehistoric management of Humbug Valley and the surrounding forested slopes. Fire, grazing, and human

activities have shaped the landscape we see today. The group examined the effort of a local restoration company to restore historic meandering stream conditions using the “pond and plug” technique. For this technique, soil is excavated from old meander scars and used to fill and regrade the incised channel, which is then planted with willow and cottonwood. In winter and spring, the borrow areas become ponds, which help to store and spread water across the historically wet meadows.

The group learned about traditional ecological knowledge from two members of the Mountain Maidu Indian Tribe, who are working towards the reacquisition of land in and around Humbug Valley. The tribe’s ancestors were active managers of the land, cultivating plants and using fire regularly to keep the land productive for their uses. The tour group also visited a recently burned area and discussed modern forest and fire management on surrounding public and private lands.

The first evening was spent hearing about a new [USFS General Technical Report](#), titled “Fuel Reduction Practices



Earl Alexander leading a discussion on the properties of a serpentinized peridotite soil that formed in an area of the Feather River Ultramafic Complex.



The group observing a burn in an area of ultramafic soil.

and Their Effects on Soil Quality,” from co-author and long-time CFSC member Matt Busse. His talk explored some of the myths and misunderstandings about fire effects on soil properties. The research for the report supports the use of a mosaic approach to fuel reduction practices. This approach strives to achieve a mixture of low- to medium-intensity burn patches across the treatment area. Roots, soil microbes, and soil chemistry are resilient at these temperatures, and burn patchiness can mitigate the negative effects of hydrophobicity and loss of soil cover. The authors of the report encourage monitoring soil properties in current long-term studies to understand site impacts on soil function from multiple fuel reduction treatments over time. The report also has an excellent summary of projected impacts to soil properties by climate change for regions of the United States.

The second evening was a networking barbeque at which the open mic was surprisingly popular, especially considering it was a gathering of soil scientists. Perhaps the profession is attracting more extroverts, a trend that would bode well for the dissemination of the important knowledge we have to offer. ■

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## Field Week in Northern Minnesota

During the week of June 16<sup>th</sup>, approximately two dozen NRCS soil scientists and ecological site inventory specialists joined forces with the U.S. Forest Service, The Nature Conservancy, the Minnesota Geological Survey, the Minnesota Department of Natural Resources, and an Earth Team volunteer to share knowledge and collect data on soils and vegetation in Lake and Cook Counties, Minnesota. The initial soil survey in northern Minnesota is nearing completion, and the correlation of Forest Service mapping, in preparation for SSURGO certification, has strengthened the traditional NCSS partnership. At the same time, the development of ecological site descriptions



**Left:** Soil scientists from NRCS and an ecologist from The Nature Conservancy collecting soil and vegetation data. **Right:** Larissa Schmitt, NRCS soil scientist, on a typical Lake Superior north-shore soil that has a perched water table. The soil formed in loamy colluvium over red, clayey glacial till.

is forging exciting new alliances. The data and knowledge sharing that was, and will be, produced as a result of the activities will strengthen the Great Lakes Restoration Initiative, improve the development of ecosystem adaptive management strategies, and accelerate the development of ecological sites for USDA. ■

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## Two Must-See Field Tours

NRCS soil scientists and NCSS cooperators are coordinating two field trips for the 2014 International Annual Meeting of ASA, CSSA, and SSSA. These pre-meeting field trips will be held October 30 through November 2. The meeting for the tri-societies will be November 2 through 6, in Long Beach, California.

The themes for the tours were requested specifically by the pedology and urban soil communities. The tours are independent but, taken sequentially, will provide a full view of issues related to field soil survey in dry lands, desert environments, wild lands, and urban areas. Each tour will take advantage of the efforts and research of an NCSS soil survey: the desert pedology tour will use the soil survey of Mojave National Preserve and the urban soils tour will use the soil survey of Los Angeles Basin, Southeast Part. Both of these surveys are in their final years of initial fieldwork. They offer a tremendous amount first-hand, critical knowledge related to the field issues of desert pedology and urban development.

The desert pedology tour will start in Las Vegas at 7:30 a.m. on Friday, October 31; travel through Mohave National Preserve; and end in Long Beach, California, at 5 p.m. on Saturday, November 1. The tour will examine the soils with primary consideration for the preservation of land, vegetation, wildlife, and watersheds. It will also include a visit to the largest solar energy plant in North America and an overnight stay at the Desert Studies Center at Zzyzx, California.

The urban soils tour of the Los Angeles Basin will be conducted from 7:30 a.m. to 4 p.m. on Sunday, November 2. This bus tour will include discussions of the urban-anthropogenic soil landscape, soil mapping in urban areas, and adaptive soil uses and management. It will also include visits to the Griffith Park Observatory at the base of

the Santa Monica Mountains, La Brea Tar Pits in downtown Los Angeles, community gardens in South Los Angeles, and Long Beach Harbor.

Detailed descriptions of the tours are available at <https://www.acsmeetings.org/tours-workshops>.

Active participants in the planning and implementation of these tours include Matt Ballmer (NRCS, CA), Brenda Buck (University of Nevada, Las Vegas), Robert Graham (University of California, Riverside), Beverly Harben (NRCS, CA), Daniel Hirmas (University of Kansas), Carrie-Ann Houdeshell (NRCS, CA), Leon Lato (NRCS, CA), Maxine Levin (NRCS, NSSC, MD), and Randy Riddle (NRCS, CA).

The deadline for early registration for the tours is September 17. ■

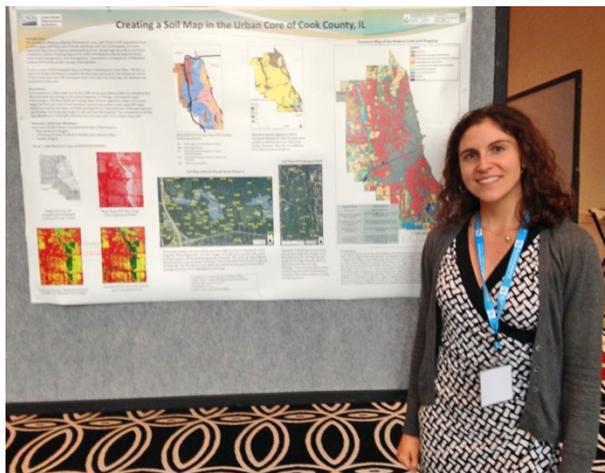
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## Soil in the City Conference

NRCS was represented at the Soil in the City Conference by Lindsay Reinhardt (soil scientist, Aurora, IL) and Maxine Levin (National Leader for Interpretations, Beltsville, MD). Lindsay and Maxine provided well-received presentations at the conference, which was hosted by Chicago's Metropolitan Water Reclamation District (MWRD) from June 30<sup>th</sup> to July 2<sup>nd</sup>. The conference was an action-packed affair where speakers from academia, the private sector, government agencies, and local community groups gathered to share their passion, projects, and research. The main presentation topics included urban farming, urban ecology, green infrastructure, and greening brownfields.

Maxine's talk, "Green Economy and Infrastructure Contributions of the USDA: Urban and Nonfarm Soil Projects in the U.S.," highlighted urban soil surveys and urban and suburban soil interpretations developed by NRCS. She discussed NRCS information and other products that are available to the public. She also mentioned current goals to expand the Ecological Site Inventory and to disaggregate NRCS spatial data, thereby providing users greater access to information. Following the conference, EPA, USDA–NIFA, SSSA, and Morton Arboretum approached the Agency to discuss continued collaboration on related topics on a national and international scope.

Lindsay presented a poster about the soil survey of Cook County, which was created for the urbanized core of Cook County (City of Chicago) in late 2012. An



Lindsay Reinhardt standing by her poster at the Soil in the City Conference.

overwhelmingly enthusiastic gathering of people wanted to know more about how the Cook County survey was completed. The participants were impressed by the amount of data that was available to help generate the map and by the level of detail available. Anecdotally, Nele Delbecque, a Ph.D. student from Ghent University in Belgium, was amazed that NRCS was able to traverse the paved and unpaved landscapes of Chicago, collecting thousands of data points with soil characterization information. She had been

unable to collect similar data for her study in the Flanders Region of Belgium and so was excited to return home and expand her study to include additional ground traverses.

The conference concluded with a half-day field trip to the Stickney Wastewater Treatment Plant. A busload of scientists donning hard hats were eager to see the plant. Stickney has the capacity to treat 1,200 million gallons of effluent each day, making it the largest wastewater treatment plant in the world. The MWRD extensively tests to ensure that the biosolids generated at their treatment plants are safe for land application. Farmers and local land managers alike line up to receive this nutrient-dense material for topdressing.

The future holds tremendous opportunity for urban work to find a niche paired with studies of dynamic soil properties and the Soil Health Initiative. Healthy soils truly do grow healthy people, and urban centers undoubtedly have the interest and the people power. Cities across the country are actively

changing the role of open lots, and room is being made for high-intensity urban farming. Austin, Boston, Chicago, and Seattle are just a handful of cities that have rezoned areas for commercial and agriculture uses. Look out soil scientists, there just may be a few more “farm” acres left to map! ■



**Conference participants observing the primary settling tank at the Stickney Wastewater Treatment Plant.**

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## Soil Interpretations in the Northeast

By Susan Southard, soil scientist, USDA–NRCS, Davis, CA.

During the week of August 4th, soil scientists from the Connecticut State Office, the Tolland MLRA Soil Survey Office, and the Amherst Regional Soils Office met with Connecticut State cooperators and National Soil Survey Center (NSSC) personnel to review the need for modifications to existing soil interpretations. The need for new interpretations was also discussed and strategized. The meeting was coordinated by Debbie Surabian, state soil scientist of Connecticut and Rhode Island. I represented the NSSC as part of the Soils Interpretations Staff. Glenn Stanisewski and Luis Hernandez represented the Amherst staff.

The Connecticut State Department of Energy and Environmental Protection (DEEP) is interested in collaborating with NRCS to develop a forest biomass harvesting suitability rating that would result in sustainable use of forested ecosystems. Criteria for the sustainable harvesting of biomass were penciled out while reviewing State standards for best management practices.

DEEP is also greatly involved with the development of geothermal energy and is interested in correlating the soil conductivity measurements that they have gathered with the soil types that NRCS has mapped. This information will be used for design and placement of geothermal infrastructure used in heating and cooling buildings throughout the State. Some systems are deep, vertical wells, and others are near-

surface, horizontal structures. The NRCS State office is heated and cooled by a geothermal system (see images below). The Amherst office will use DEEP's georeferenced soil thermal conductivity measurements to model correlations with soils mapped in the State. Such modeling will lay the foundation for developing soil criteria concerning geothermal energy efficiency.



Left: Geothermal system outside NRCS office in Tolland, CT.  
Right: Interior geothermal installation inside the office.

A suite of draft interpretations for subaqueous soils was also reviewed and edited during the week. The interpretations, which are used in Connecticut and Rhode Island, currently involve NASIS component horizon data elements for soil consistence, manner of failure, and presence of reduced monosulfides.

Lastly, the need for a road-salt interpretation was reviewed. Use of salts in Connecticut and throughout New England has increased in the last few years. Increased use has resulted in nutrient runoff to ponds and streams and in roadside vegetation kills. ■

Table of Road Salt and Chemicals Used as Alternatives to or in Combination with Road Salt.  
(Courtesy of Carey Institute of Ecosystem Studies)

Product	Cost relative to road salt	Freezing point depression	Effective lower limit	Corro-sive?	Aquatic toxicity	Other environmental impacts
		°C / Wt.	°F			
Road salt (NaCl)	\$1.00	1	20	Yes	Moderate	Roadside tree damage
KCl	\$1.60	0.78	12	Yes	Very	K fertilization
MgCl <sub>2</sub>	\$2.40	0.29	5	Yes	Very	Mg addition to soil
CaCl <sub>2</sub>	\$5.70	0.53	-25	Very	Moderate	Ca addition to soil
CMA: C <sub>8</sub> H <sub>12</sub> CaMgO <sub>8</sub>	\$19.30	0.30	0	No	Indirect	Decreased aquatic oxygen
CH <sub>3</sub> CO <sub>2</sub> K	\$26.30	0.60	-15	No	Indirect	Decreased aquatic oxygen
Urea	\$1.80	0.97	15	No	Indirect	N fertilization
Sand	\$0.60	0	---	No	Indirect	Sedimentation

## USDA CarbonScapes: Mapping Terrestrial Carbon Pools

By Sharon Whitmoyer Waltman, soil scientist-spatial data analyst, USDA–NRCS, Morgantown, WV.

The goal of the USDA CarbonScapes project is to educate stakeholders and to answer questions about USDA's inventorying, modeling, and mapping of terrestrial biosphere carbon across the landscape. The goal includes the creation of a useful, easy-to-navigate, web-based map application. The application will provide information on a diverse set of carbon sequestration inventories and simulation models for soils and vegetation under various climate change scenarios in different geographies of the United States. The geographies include States, counties, ecoregions, basins, major land resource areas, and the entire United States. West Virginia University is

The image shows a screenshot of the USDA CarbonScapes website on the left and a diagram of the Carbon Cycle on the right. The website screenshot includes a navigation bar with 'Welcome', 'Carbon Visualization Tool', 'Model Information', and 'Map Layer Information'. The main content area features a 'Welcome' message and a 'Coming Soon' watermark. The diagram, titled 'The Carbon Cycle', illustrates the exchange of carbon between the Atmosphere, Terrestrial Biosphere, and Oceans, with a 'Fossil Fuels' source. A URL <http://www.esri.noaa.gov/gmd/outreach/isotopes/> is provided below the diagram.

<http://www.carbonscapes.org/usda>

presently (2013–2015) working toward the goal by enhancing the functionality and user experience of the former USDA Carbon Data Visualization Tool (CDVT), which was developed by Critigen. The WVU development team (Plant & Soil Science Division, WV GIS Technical Center, and the Department of Geology and Geography) invites interested parties to help identify functions and develop the appearance of the CarbonScapes web tool by participating in a brief questionnaire. The questionnaire can be accessed at <https://www.surveymonkey.com/s/carbonscapes>.

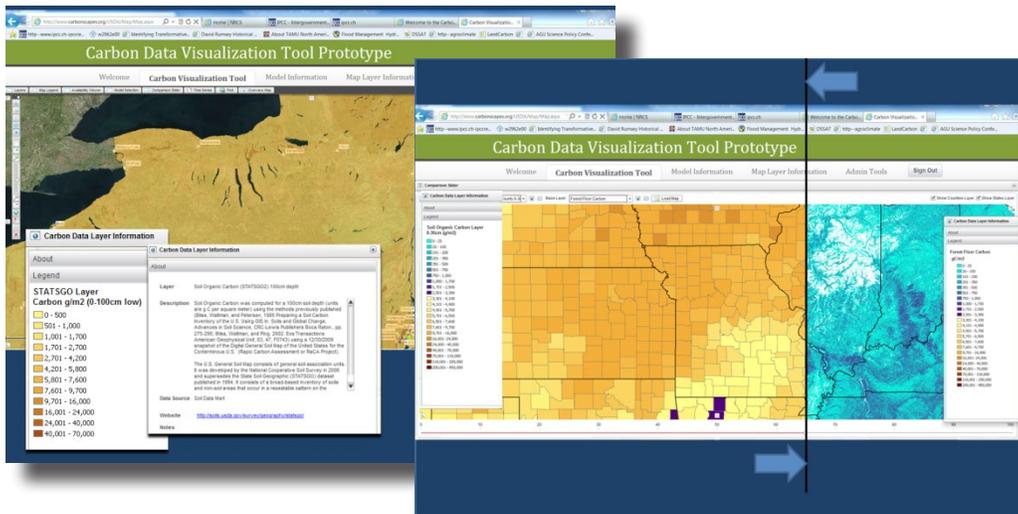
### How to Access USDA CarbonScapes

Visit <http://www.carbonscapes.org/usda> to access USDA CarbonScapes (currently under development). To review the entire content of the site, you will need to request a user name. On the right side of the page, click “Create New Account” and fill out the form. Please take note of your username and password. After you create your new account, you can log in and explore all of the features on the site.

### USDA CarbonScapes Functions and Uses

The terrestrial carbon cycle has received renewed interest because of the drastic economic impacts of recent climate-change phenomena, such as droughts and storms of increased sizes and intensities. USDA CarbonScapes is being designed to better meet the growing need for rapid, multi-scale assessments of terrestrial carbon stocks within U.S. landscapes. Web mapping tools, such as CarbonScapes, are intended

to provide USDA with a more comprehensive understanding of the geographic and temporal nature of the terrestrial carbon cycle. USDA CarbonScapes will provide natural resource researchers and managers with an online tool for querying carbon data at various landscape scales and in different ecosystems. Example data sources include forest inventory data (FIA), detailed and generalized soil geographic data (SSURGO and STATSGO2), and various model representations of other environmental factors, such as regional climate. These inventoried and modeled carbon-map layers, along with supporting natural resource layers, are from a variety of different agencies and research groups, including the U.S. Forest Service, Natural Resources Conservation Service, National Agricultural Statistics Service, PRISM Climate Group, and U.S. Geological Survey.



**Left:** Screenshot of CarbonScapes in which STATSGO2 soil carbon stocks are queried. **Right:** The swipe tool on CarbonScapes, which allows for comparison of multiple data layers simultaneously.

## Unique Features of USDA CarbonScapes

The following features are planned.

- Various modeled estimates of terrestrial carbon and other supporting data will be available for quick geographic assessment. Unique national and regional patterns in carbon pools (mass and stocks) will be made more apparent across U.S. landscapes, including patterns that cannot be perceived when viewing small land areas.
- This tool will provide a clearinghouse of various USDA models and their estimates at a single website. A quickly and easily accessible archive of model metadata will be available for researchers. Metadata maintenance will be simplified for model authors.
- This tool will provide data (geographic and tables) for download and web services. This useful feature has already been identified as essential by researchers interested in answering a variety of questions about terrestrial carbon pools as inventoried, modeled, and mapped by USDA.

For more information, please contact Sharon Waltman, USDA soil scientist and spatial data analyst ([sharon.waltman@usda.gov](mailto:sharon.waltman@usda.gov)) or James Thompson, WVU professor of pedology and land use ([james.thompson@mail.wvu.edu](mailto:james.thompson@mail.wvu.edu)). ■

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