National Cooperative Soil Survey Newsletter

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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.

You are invited to submit articles for this newsletter to Jenny Sutherland, National Soil Survey Center, Lincoln, Nebraska. Phone—(402) 437–5326; FAX—(402) 437–5336; email—jenny.sutherland@lin.usda.gov.

2014 NCSS Regional Conferences

The NCSS Regional Conferences for 2014 are rapidly approaching. All four conferences are being held in June.

The north-central conference is being held June 2–5 at Ames, Iowa. The conference theme is "Soil Health and Dynamic Soil Properties—Critical Components of Modern Soil Surveys." Additional information is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/?cid=stelprdb1252141.

The western conference is being held June 16–19 at Portland, Oregon. The conference theme is "Volcanoes, Vineyards, and Glacial Floods." Additional information is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/?cid=stelprdb1245468.

The northeastern conference is being held June 23–26 at Plymouth, New Hampshire. The conference theme is "Forest Soils and Ecology." Additional information is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/?cid=stelprdb1242569.

The southern conference is being held June 23–26 at Jackson, Tennessee. The conference theme is "Soil Science—Partnerships for Ecological Deliverables and Sustainability (PEDS)." Additional information is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/?cid=stelprdb1247565.

The Vesicular Horizon

By Jon Hempel, Director, National Soil Survey Center, Lincoln, Nebraska.

The presence of vesicular horizons has long been recognized in semi-arid and arid (desert) environments. These unique horizons are of particular interest to ecologists and hydrologists because the horizons regulate the distribution of water, a critical ecosystem function in desert environments. Although recognized since the 1950s, these distinctive horizons have not been part of the National Cooperative Soil Survey official morphologic definitions in either the “Soil Survey Manual” or the “Keys to Soil Taxonomy.”

The vesicular horizon has unique features that distinctly separate it from any other horizon. Vesiculation occurs when gases in the soil cannot escape as the soil is wetted and thus form bubbles (vesicles). The gases cannot escape because (1) the surface is sealed by desert pavement or a physical or biological crust and (2) the soil itself does not have an interconnected pore system to allow gases to escape.

Vesicular horizons form in layers of accumulated dust on stable surfaces in the desert and are ecologically important because they severely restrict infiltration, impede seedling emergence, and are a major source of dust if disturbed.

A research paper by Dr. Judith Turk, The Richard Stockton College of New Jersey; Dr. Robert Graham, University of California–Riverside; and Carrie-Ann Houdeshell, USDA–NRCS, Victorville, California, has documented and advanced the understanding of this unique horizon and suggested a means to define the horizon morphologically. This definition will be especially useful for professionals in a wide variety of disciplines who work in desert ecosystems.

Pedologists throughout the National Cooperative Soil Survey Program have unanimously agreed that adding nomenclature that describes and provides designation for this feature is an important new contribution that advances soil science and adds to the understanding and importance of desert environments.

A portion of a profile showing a V horizon.

Lengthy and passionate discussions were held regarding options for describing the vesicular horizon. The discussions included soil survey standards committees at the NCSS regional and national conferences, a team of designated specialists, and many additional soil scientists. Through these discussions, the options were boiled down to the following distinct possibilities:

- Designate the vesicular horizon as part of the A horizon with subscript vv, i.e., "Avv"
- Designate the vesicular horizon as a new master horizon, i.e., "V"

The two options are differentiated by the accepted definition of A horizons in the "Keys to Soil Taxonomy, Eleventh Edition," which follows:

> *Mineral horizons that have formed at the surface or below an O horizon. They exhibit obliteration of all or much of the original rock structure and show one or both of the following: (1) an accumulation of humified organic matter closely mixed with the mineral fraction and not dominated by properties characteristic of E or B horizons (defined below) or (2) properties resulting from cultivation, pasturing, or similar kinds of disturbance.*

Analysis of the vesicular horizon clearly illustrates that it does not meet either of the two qualifiers, thereby effectively disqualifying the use of the subscript "vv" unless the definition of the A horizon is modified. Modifying the long-standing and internationally accepted definition of the A horizon would impair the continuity of past soil science progress on which the definition of the A horizon is based.

Designating the vesicular horizon as a master horizon and adding a capital "V" into the accepted and official soil survey nomenclature provides the best rationale from a definitional standpoint. Most importantly, such a designation provides recognition of this feature so that environmental interpretation can be stimulated.

V horizons can be defined as:

> *Mineral horizons that have formed at the soil surface, or below a layer of rock fragments (e.g., desert pavement) or a physical or biological crust. They are characterized by the predominance of vesicular pores.*

The decision to designate the vesicular horizon as a new master horizon was proposed by the National Soil Survey Center through a decision memorandum to the Director of the Soil Science Division. The Director subsequently signed the memorandum, thereby finalizing the decision. The addition of a new master horizon is an exciting step forward for the Soil Science Division, and there will be much discussion about how to bring this new concept into the classification system. ■

2014 National Earth Team Volunteer Awards

The Earth Team is the volunteer workforce of the Natural Resources Conservation Service. Earth Team volunteers are an integral part of the conservation partnership. They are making a difference in every county in the Nation, and each member can take pride in the fact that they maintain and improve our natural resources and environment.

The job of conserving our natural resources cannot be done by the government alone. NRCS needs help in reducing soil erosion, conserving our water and improving its quality, and developing pride in our country's natural resource heritage.

Anyone 14 years of age or older and interested in conserving our precious natural resources can become an Earth Team volunteer. Volunteers work part-time or full-time, outdoors or in a local NRCS office. Volunteers can join as an individual or can form or join a group. NRCS has opportunities in every State.

Each year, NRCS recognizes exemplary efforts by and for volunteers. This year's national award winners follow. Recipients of the Earth Team volunteer national awards are selected regionally by a committee that considers volunteer work with an emphasis on magnitude of work, need for service, challenges, and building partnerships.

Volunteer Service Award—Chief's Cup:
Arkansas

NACD/NRCS Earth Team Award:
Madison County SWCD, Alabama

Earth Team Partnership Award:
Lake Fleming Wetlands/Outdoor Learning Area, Virginia

Chief's Field Award:
Washington County Service Center, Indiana—Central Region
Tuscola County Field Office, Michigan—Northeast Region
Harrisonburg Service Center, Virginia—Southeast Region
Glenwood Springs Service Center, Colorado—West Region

Individual Volunteer Award:
Brittanie Schuette, Missouri—Central Region
Molly Stetz, New York—Northeast Region
Jason Hinshaw, North Carolina—Southeast Region
Shaun Oliver, Washington—West Region

Group Volunteer Award:
Boundary Waters Canoe Area Wilderness ETVs, Minnesota—Central Region
12-TOL Pedon Team, Connecticut—Northeast Region
Miller County Back to Nature Volunteer Group, Arkansas—Southeast Region
Garden of Hope—Lamar County NRCS/Powers Conservation District, Colorado—West Region

NRCS Employee Earth Team Award:
Gary Larson, Minnesota—Central Region
Lori Ryan-Griffin, Ohio—Northeast Region
Terry Reeves, Arkansas—Southeast Region
Christian E. Davis, California—West Region

Volunteer Coordinator Award:
Mary Giles, Missouri—Central Region
Dianne Johnson, Ohio—Northeast Region
Georgia Solseth, Virginia—Southeast Region

Meet Some of the Award Winners

Group Volunteer Award: Central Region

By Larissa Schmitt, soil scientist, USDA-NRCS, Duluth, Minnesota.

Earth Team volunteers Jeff Albers, Tim Nigh, Aaron Janz, Kim Steffen, Kyle Lilly, Meghan Zenner, and Dennis Meinert were the recipients of the Earth Team 2014 National Group Volunteer Award for the Central Region. The volunteers worked on the soil survey of Boundary Waters Canoe Area Wilderness (BWCAW). They assisted five wilderness expeditions, providing 510 total hours of volunteer time.

The BWCAW is a million-acre wilderness area in northeastern Minnesota managed by the U.S. Forest Service (USFS). NRCS and USFS formed a partnership to collect soils data for 595,000 acres. The BWCAW soil survey is a national pilot project to help create standards for raster-based soil surveys. NRCS is moving forward and using technology to construct soil survey raster products.

Left to right: Pete Weikle, soil database specialist, and Kim Steffen, Earth Team volunteer and retired NRCS soil scientist, in the Boundary Waters Canoe Area Wilderness, Minnesota.

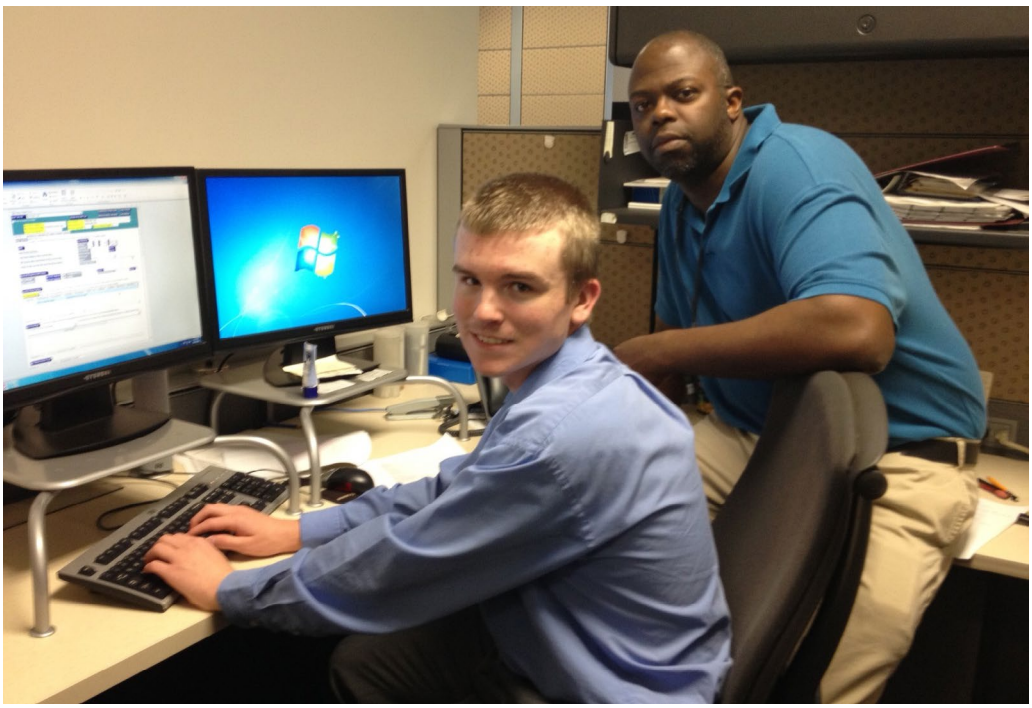
One of the biggest challenges in conducting this soil survey is the extreme remoteness of the area. Many parts can be reached only by canoe or on foot. In addition, because the survey area is wilderness, there are no modern utilities, such as roads, electricity, or running water. After analyzing the workload for the survey area, Duluth MLRA staff decided that the best way to complete the project was to recruit volunteers. Earth Team volunteers selected for this project needed to be trained in soil science, have wilderness experience, or have paddle skills.

Volunteers on the project went above and beyond normal work hours. Expeditions ranged from 5 to 10 days with an average workday of 10 hours. During work hours, volunteers assisted soil scientists by navigating and paddling canoes, bushwhacking to sample points, carrying soil sampling tools, digging soil pits (to a depth of 200 centimeters), and recording soil data. After work hours there were still chores to be done at camp, including wilderness cooking, chopping fire wood, and maintaining wilderness stewardship.

Earth Team volunteers were a large asset to the BWCAW project. Crew members collected over 200 sample points for the 2013 field season. Without the help from the volunteers, this large quantity of soils data could not have been collected.

Individual Volunteer Award: Southeast Region

Jason Hinshaw, Earth Team volunteer in MLRA Soil Survey Office 3-GRE in Greensboro, North Carolina, won the Southeast Region Individual Volunteer National Earth Team Award from NRCS. Jason came to the Greensboro Soil Survey Office through a work-study agreement with Grimsley High School. The agreement was part of the school's Occupational Course of Study and Life Skills program. Jason is an autistic student who needed to gain experiences and life skills outside of a classroom. The Greensboro office has had the pleasure of working with Jason as an Earth Team volunteer every week for the past 2 years. Jason has been assisting the office with data entry for counties in MLRA 136 (Southern Piedmont) in North Carolina and Virginia. He is under the direct supervision of James Lewis, soil scientist, and Jay Ham, MLRA soil survey leader. Jason's work has assisted in the completion of high-priority projects, including initial and extensive revision of soil surveys and the Soil Data Join Recorrelation.



Jason at work on his computer as James Lewis looks on.

The 3-GRE office is working to complete the initial soil survey of Caswell County, North Carolina, and an extensive revision of the soil survey of Alamance County, North Carolina. The soil lines for these soil surveys were documented on paper aerial photography. With the help of the regional GIS Analyst, Chad Ferguson, the process of "lifting" the soil survey lines has been automated. What cannot be automated is transferring field symbols from the field sheets to the new digital soil polygons. For this, Jason has been indispensable. He has symbolized over 4,000 polygons for these two surveys. This process involves placing the digital lines over the scanned aerial images and manually typing the soil map unit symbols into the database using ArcGIS.

Jason has also been assisting with populating the NASIS database with pedon descriptions from the original published soil survey manuscripts. He has nearly completed entering pedons for all of the MLRA 136 counties in North Carolina and

Virginia. In all, Jason has entered over 500 pedon descriptions. These pedons are a necessary component of the requirements for Soil Data Join Recorrelation projects. The volume of data entered by Jason is more than that of any other individual in the region, and Jason accomplished all of this while working only one half-day each week.

In addition to the national award, Jason also received a North Carolina Earth Team Volunteer award. On May 20, 2014, he was presented the Individual Volunteer National Earth Team Award at his school during a ceremony with his peers. Soil Survey Regional Director Debbie Anderson and Soil Survey Project Leader James Lewis attended the ceremony and presented Jason with his award.

Group Volunteer Award: Northeast Region

By Marissa Theve, NRCS soil scientist, Tolland, Connecticut.

The 12-TOL Pedon Team from Tolland, Connecticut, was awarded the Earth Team 2014 National Group Volunteer Award for the Northeast Region. The current team roster includes Michelle DuCharme (recent graduate of Central Connecticut State University), Daniel Grondin and Analia Bertucci (East Connecticut State University), and Aaron Parsons and Danny Beutler (University of Connecticut).

To prepare for the Soil Data Join Recorrelation project, soil scientists must update and enter all available soil data into the National Soil Information System (NASIS). The data is needed so the new map units resulting from the project reflect the most representative soil properties across each major land resource area (MLRA). The process includes updating existing pedons to reflect laboratory results and entering typical pedons that were described in manuscripts but not yet entered into the database.

Volunteers attend the sampling of newly correlated Nipmuck soils. Left to right: Volunteer Michelle DuCharme, Soil Scientist Marissa Theve, Soil Scientist Donald Parizek, and Volunteer Devin Spector.

At Soil Survey Office 12-TOL in Tolland, Connecticut, Earth Team volunteers (ETVs) help at the data entry step. At the beginning of the spring 2013 semester, members of the soil survey office put out a flyer to local colleges and universities that have soils, geology, and environmental science/natural resource departments. The flyer invited students to volunteer to enter pedon data. Little did the soil survey office know that by the end of the semester eight volunteers would be assisting with the effort. Most of the students are gaining course credit for their work, but some are simply using the experience to learn about soils, boost their resumes, and help out.

To facilitate the data entry, students download the PedonPC program, are individually trained on their personal laptops at the Tolland State Office, and are given a reference guide to help populate the fields. The ETVs take prepared pedons from the office and work on them at home or school. Most of the volunteers come to the office once a week or less in order to share the completed data and pick up new pedons.

Volunteer Dan Grondin shared, “With relatively little exposure to pedology, I was able to get a head start in understanding how to classify soils taxonomically. This helped me later in the semester as I was introduced to more in-depth studies of soil sciences during a geomorphology class. Everything from mapping and understanding how soils formed, along with the practical application in agricultural, engineering, geological, and soil scientist’s perspective. I plan on staying with NRCS to help when I can and further my understanding of the topic.”

The program has proven to be a great success. The volunteers have entered over 250 pedons as of January 2014! Pedons come from surveys as old as 1973 (Strafford County, New Hampshire) to as recent as 2013 (Fulton County, New York). Soil series completed so far include: Ackerman, Adrian, Alden, Atherton, Bernardston, Berryland, Birdsall, Brancroft, Branford, Broadbrook, Canandaigua, Canton, Carlisle, Catden, Charlton, Chatfield, Cheektowaga, Fonda, Freetown, Halsey, Hinckley, Hollis, Ipswich, Leicester, Linwood, Lyons, Madalin, Manahawkin, Mansfield, Matunuck, Merrimac, Montauk, Muskego, Natchaug, Ossipee, Palms, Paxton, Pinnebog, Preakness, Rainbow, Raynham, Ridgebury, Saco, Scarboro, Scitico, Scituate, Sutton, Swansea, Timakwa, Tonawanda, Wallkill, Walpole, Wapanucket, Wapping, Wappinger, Wayland, Westbrook, Whitman, Wilbraham, Windsor, Woodbridge, and Yalesville. Two of the longer-term volunteers have also entered most of some recently acquired lab data from University of Massachusetts Amherst.

The overwhelming success of the program shows that with a simple flyer and a little training time, NRCS is able to attract exceptional volunteers and accomplish a lot of work. The 12-TOL staff looks forward to sustaining new and continued university relationships and hopes to attract more students who need college credit and experience throughout the SDJR process. ■

Global Soil Partnership

By Jon Hempel, Director, National Soil Survey Center, Lincoln, Nebraska.

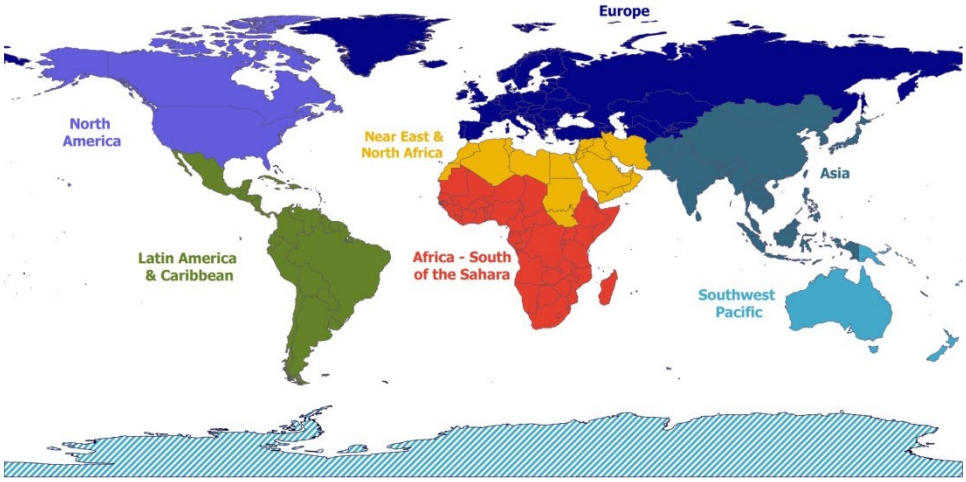
The Global Soil Partnership (GSP) was formed in response to renewed recognition of the central role of soil in promoting food security, adapting to climate change, sustaining biodiversity and bioenergy production, and provisioning other key ecosystem services.

Despite the role of the soil resource in these important environmental and societal activities, soil as a natural resource is still seen as a second-tier priority. There is no international governance that can advocate for the soil resource and coordinate initiatives to ensure that knowledge and recognition of soils are appropriately represented in global and regional dialogues and decision-making processes.

The GSP can become central to the coordination of a strong partnership dedicated to maintaining the healthy soils required for feeding the growing world population and providing biomass, fiber, fodder, and other needed products.

The GSP is being facilitated by the United Nations Food and Agriculture Organization (FAO). The GSP is an interactive, responsive, voluntary partnership that is open to governments, regional organizations, institutions, and other stakeholders at various levels. The GSP includes the following important partnerships:

- **Secretariat.—**This body acts to coordinate and facilitate the implementation of GSP actions through regional partnerships and networks. Because of the global mandate of the GSP, the secretariat is composed of FAO technical and administrative staff.
- **Intergovernmental Technical Panel on Soils (ITPS).—**The mission of the ITPS is to provide scientific and technical advice on global soil issues. The experts of the ITPS should act to provide the best available scientific and technical knowledge. The ITPS advises the GSP and FAO and provides an authoritative technical voice on global soil issues.
- **Regional Soil Partnerships (RSP).—**RSPs are being formed among interested and active stakeholders in the seven FAO regions. The RPSs will work in close coordination with FAO regional offices and will establish an interactive consultative process that includes national entities and relevant regional institutions.
- **Global Soil Partnership Plenary Assembly.—**The Plenary Assembly is the main yearly meeting of ITPS members, the GSP executive secretariat, representatives of the different partners, and representatives of member countries of the FAO. This assembly is in charge of reviewing and prioritizing GSP actions and facilitating a balanced, regional decision-making process.



The seven regional soil partnerships.

The GSP has developed five specific pillars of action to support the adoption of goals related to sustainable development for soils. These goals promote environmental well-being of the soil resource through prevention of soil erosion and degradation, reduction of greenhouse gas emissions, expansion of carbon sequestration, and promotion of sustainable use of agricultural inputs for soil health and ecosystems management. The pillars of action are:

1. Promote sustainable management of soil resources for soil protection, conservation, and sustainable productivity;
2. Encourage investment, technical cooperation, policy, education awareness, and extension in soil;
3. Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental, and social development actions;
4. Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring, and integration with other disciplines; and
5. Harmonization of methods, measurements, and indicators for the sustainable management and protection of soil resources.

Work plans for pillars 1, 2, 4, and 5 have been approved by the ITPS. Implementation of the plans will be discussed and voted on at the Plenary Assembly in July 2014. A work plan for pillar 3 is currently under development and will hopefully be approved by the ITPS prior to the Plenary Assembly. All of the work plans have had input from the United States. Of particular interest, "Soil Taxonomy" is recognized as a GSP-supported system of soil classification within pillar 5.

Other initiatives the GSP is working on and coordinating include:

- **World Soil Day.—**Under the leadership of the Kingdom of Thailand and within the framework of the Global Soil Partnership, FAO has supported the formal establishment of World Soil Day as a global awareness-raising platform. The FAO Conference in June 2013 unanimously endorsed World Soil Day and requested official adoption by the U.N. General Assembly. In December 2013, the 68th U.N. General Assembly declared December 5th as World Soil Day.
- **International Year of the Soil.—**After 2 years of intensive work, the 68th U.N. General Assembly declared 2015 as the International Year of Soils. The goal of the International Year of the Soil is to raise awareness of the importance of soils for food security and essential eco-system functions.

The following activities are planned within the National Cooperative Soil Survey as part of the development of the North American Regional Soil Partnership:

- Provide facilitation among USDA–NRCS leadership, Canadian agencies, and national soil science societies in Canada and the United States for the approval of the Regional Soil Partnership for the North American Region;
- Work closely with the Canadian ITPS representative, Dr. Dan Dennock, and other Canadian colleagues to develop the ideas and concepts for Global Soil Partnership within the North American Region;
- Assist with coordination between the U.S. and Canada to provide the regional section of the "Status of World Soil Resources Report, Part II, Global Soil Change Plan, Section 8" (which assesses threats to soil functions);
- Provide information on the potentials of the Global Soil Partnership; and
- Work with the Soil Science Society of America to promote the International Year of Soils.

For complete information on the Global Soil Partnership, please see the following site: http://www.fao.org/globalsoilpartnership/en/. For more information on the Global Soil Partnership within NCSS, please contact Jan Hopmans, SSSA president; David Limbo, past SSSA president; Charles Rice, SSSA GSP Liaison; or Jon Hempel, ITPS member. ■

USDA–NRCS Soil Survey Program Continues Support for Haiti Soil Survey

Meeting with the Haiti Government Project Partners

From February 17th through April 4th, 2014, a group of NRCS soil scientists participated in activities related to a detailed (2nd order) soil survey for 3,000 hectares located in the Cul-de-Sac Area of Haiti. The activities were part of a joint project between U.S. Agency for International Development (USAID), Foreign Agricultural Service (FAS), NRCS, Direction Rurale Forestière et du Sol (DRFS) of Ministry of Agriculture (MARNDR), Faculty of Agriculture and Veterinary Medicine (FAMV), and the USAID-funded WINNER soils laboratory and training facility at Bas Boen. The NRCS field team was comprised of Charles Kome, soil scientist and project leader at the NRCS World Soil Resources program; Tony Rolfes, assistant director for Soil Science and Natural Resource Assessments, USDA–NRCS Pacific Islands Area; Nathan Jones, MLRA party leader, Pierre, South Dakota; Zamir Libohova, research soil scientist, NSSC, Lincoln, Nebraska; Steve Monteith, soil scientist, NSSC, Lincoln, Nebraska; and Manuel Matos, MLRA project leader, Mayagüez, Puerto Rico.

The main objective of the project is to build capacities within MARNDR to enable the soil scientists in Haiti to conduct a detailed soil survey for the entire country. Other project goals are to (i) develop skills to plan, conduct, and disseminate soils information; (ii) demonstrate the usefulness of soil survey in resource planning and management; and (iii) publish online soil survey maps and a hard-copy soil survey that will include interpretations for such uses as crops, urban development, erosion, and soil degradation; land use capability and limitations; and recommended management practices. The participation by the NRCS soil scientists was a continuation of training activities that started in the summer of 2013 during the visit of a Haitian delegation to the USDA–NRCS National Soil Survey Center in Lincoln, Nebraska.

During the week of February 17th, 2014, the team of NRCS soil scientists, led by Project Leader Charles Kome, visited the Ministry of Agriculture and the Faculty of Agriculture and Veterinary Medicine. The team met with officials to discuss the project activities and expected outcomes. Pierre Guy Lafontant, Ing. Agr., General Director of Natural Resources and Rural Development at the Ministry of Agriculture, met with the

The team meeting with Ing. Agr. Pierre Guy Lafontant, the General Director of Natural Resources and Rural Development at the Ministry of Agriculture. (Photo courtesy of Tony Rolfes.)

team to discuss a vision for soil survey beyond the pilot area. The general consensus was to: (1) use the pilot area as an example of the ability of the Haitian government to conduct soil survey and (2) approach various donors for funding in order to conduct the soil survey for the entire country. During a meeting with Vernet Joseph, Ing. Agr., Secretary of Etat à la Relance Agricole, the team discussed training logistics. The team also met briefly with the Minister of Agriculture, who welcomed the team and assured his support for the successful completion of the pilot project area.

The team visited the pilot project area (PPA) and was accompanied by Jean Pierre-Louis Ogé from the Ministry of Agriculture. During the visit, the team conducted a site evaluation of the project area and an overview of the area surrounding the PPA.

The team also visited with the USAID official at the U.S. Embassy and met with Rodrigo Brenes (USAID Haiti PASA manager), Frislain Isidor (PASA program specialist), and Marie Danielle Salomon (PASA program specialist) to discuss the project. Issues related to field equipment were discussed.

Training the New Generation of Haiti Soil Scientists

The NRCS team visited the USAID center in Bas Boen, where they made arrangements with the USAID-funded WINNER team for a classroom setting and for a storage place for tools, equipment, and samples. The team met the trainees and discussed the overall project goals. Charles Kome explained the short-, mid-, and long-term goals of the project and the importance of the soil survey. Tony Rolfes introduced the trainees to published soil survey manuals—as examples of the expected output from the project—and to the Web Soil Survey (WSS)—as an alternative medium for distribution of the soil survey information. Nathan Jones introduced the trainees to the tools, methods, and equipment needed to conduct a successful soil survey. Zamir Libohova introduced the trainees to the use of remotely sensed data for preliminary field mapping, to computer and software requirements, and to other online data sources. Jean Pierre-Louis Ogé from the Ministry of Agriculture explained to the trainees the long-term goals of the Ministry for the soil survey.

The trainees introduced themselves and spoke about their background and expectations. The majority of the trainees did not have a formal training and education in soil science. The team interacted with the trainees and discussed scales and soil-forming factors as the paradigm of the soil survey. Trainees were asked to engage in discussions about soils, topography, geology, vegetation, natural resources, and land use and about how these factors all need to be considered when planning and conducting the soil survey.

The trainees were taken to the field and shown field tools and methods that characterize soils based on color and texture. They were introduced to the standard

Participants making observations and taking field notes based on training from the NRCS soil scientist team. (Photos courtesy of Tony Rolfes.)

field form 232; the relationships between soil landscape models and observable soil physical and morphological characteristics; and basic techniques for observing soil horizons based on color, texture, structure, and other characteristics. The trainees learned how to develop mental soil-landscape models of the study area and how to build and test hypotheses regarding the soil distribution, which are necessary for soil map predictions.

Graduation Ceremony for the New Haiti Soil Scientists

On March 6th, the Ministry of Agriculture organized a ceremony at Bas Boen Center to deliver the training certificates for the participants. The ceremony was attended by the Minister of Agriculture, USAID officials, NRCS employees, and other project partners.

Moving Beyond the Pilot Project Area

Throughout the training and field data collection, the NRCS team maintained a dialog with staff of the Ministry of Agriculture and the Soil Science Division headquarters regarding follow-up plans and further steps needed to finish the pilot area project. Based on the current activities, the following project goals were accomplished:

1. Partial training of new soil scientists on various aspects of soil survey, including:
   a) Describing soils based on morphological characteristics, such as texture and color,
   b) Recognizing major landscape concepts,
   c) Navigating to sites using GPS, and
   d) Sampling for bulk density and full characterization of soil pedons.
2. Improvement of database capacity, including:
   a) Training soil database specialists to enter data in the adopted standard 232 forms,
   b) Building the simple database and establishing parent-child tables or one-to-many relationships in Microsoft Access that will be vital for building the national soil database for Haiti, and
   c) Identifying Rony Bien-Aime as a specialist who, with some additional training, would be capable of building and maintaining the National Soil Database for Haiti.
3. Collection by the new soils scientists of about 280 samples from approximately 100 sites.
4. Detailed descriptions of 13 pedons for full chemical and physical laboratory characterization.
5. Training of soil scientists on basic GIS functions and utilities. ■

Getting to Know Puerto Rico's Soil Diversity—SSSA Soils Tour 2014

The Soil Science Society of America (SSSA) held a soils tour of Puerto Rico during the week of February 18, 2014. The tour was hosted by soil scientists from the NRCS Caribbean Area and professors from the University of Puerto Rico—Mayagüez (UPRM). Attending the tour were 16 members of SSSA and their companions, 15 UPRM students, and a representative from the NRCS Mid-Atlantic and Caribbean Area Soil Survey Regional Office.

The tour featured 5 of the 10 recognized soil orders in Puerto Rico: Oxisols, Ultisols, Mollisols, Vertisols, and Inceptisols. The U.S. soil classification system has 12 soil

Puerto Rico hosts, from left to right: Samuel Ríos, MLRA soil scientist; Dr. Victor Snyder, professor at UPR–Mayagüez; Agenol González, Corozal AES agronomist; Dr. David Sotomayor, professor at UPR–Mayagüez; Carmen L. Santiago, state soil scientist; and Manuel Matos, Mayagüez MLRA leader. (Photo courtesy of Erin Segar.)

orders. The presence of 10 of these orders distinguishes Puerto Rico as a very diverse area in terms of soils.

The tour began on the afternoon of Tuesday, February 18th, with a welcome and tour overview by Dr. David Sotomayor and an overview of the soils of Puerto Rico by Dr. Victor Snyder. Dr. Sotomayor and Dr. Snyder are UPRM professors.

The following day, the participants visited the El Yunque National Forest visitor center at Río Grande. NRCS State Soil Scientist Carmen L. Santiago briefly described the history of soil surveys in Puerto Rico, including the recent SSURGO certification process for the soil survey of El Yunque National Forest and the inclusion of the survey data in Web Soil Survey. Throughout the tour, Manuel Matos, MLRA leader, and Samuel Ríos, MLRA soil scientist, described the soil pits, explaining classification and formation processes. In the Dwarf Forest area, they described the Dwarf and Guayabota soil series.

On Thursday, the group toured the central part of the island, visiting the Corozal Agricultural Experiment Station (AES). Agronomist Agenol González welcomed the group and briefly introduced the different investigations taking place at the station. NRCS soil scientists described the Corozal soil series for the group. Next, the group visited the Atenas pineapple farm in Barceloneta. The farm's agronomist explained the characteristics and agronomic management of the pineapples. The Bayamón soil series, which is the representative soil of Puerto Rico, was described and shown to the group. The next stop was the Isabela Agricultural Experiment Station, where the soil scientists described the Coto soil series. The tour ended for the day on the west end of the island with a visit to the UPRM Alzamora farm and descriptions of the Humatas and Consumo soil series.

The group started their final day with a visit to the site of a Nipe soil at a road cut on Route 100 near Cabo Rojo. Next, the group travelled to the Cabo Rojo Lighthouse and explored, with guidance from UPR Sea Grant staff, the cliffs, beaches, and salt flats

of the area. The group later visited the Lajas Valley Agricultural Reserve, where the irrigation system and drainage infrastructure were explained by UPRM Professor, Dr. Pérez Alegría. Manuel and Samuel described the soil-forming factors for the Guánica and Aguirre soil series. The trip ended with a visit to the vegetable farm of Carlos González in Guánica. At the farm, the Pozo Blanco soil series was described.

The 2014 Soils Tour of Puerto Rico was dedicated to Dr. Fred Beinroth, retired UPRM professor of soils. Dr. Beinroth is recognized as a world authority on tropical soils with more than 30 years of leadership, academic excellence, and scientific contributions to the soil science profession.

The NRCS Caribbean Area soils staff thank the following individuals for their contributions that made this event such a great success: the professors from UPR–Mayagüez; Pablo Cruz and Pedro Ríos from El Yunque USDA–Forest Service; Juan Ortiz, Agenol González, Pedro Marquez, and Angel Bosques from AEE (UPR); the administrator and agronomist from Atenas Pineapple Farm; the farm administrator from UPR–Mayagüez Alzamora; the municipality Cabo Rojo; Lilliam Ramirez from UPR Sea Grant; the staff from the Puerto Rico Land Authority; Carlos González, vegetable farm owner from Guánica; and all the participants from SSSA. The tour was coordinated by Bob Kendall from SSSA, sponsored by the University of Puerto Rico–Mayagüez, and assisted by the Caribbean Area NRCS Soil Science Division. ■

In Memoriam of Dr. Hari Eswaran

By Paul Reich, NRCS World Soil Resources.

Hariharan (Hari) Eswaran, 73, of Arlington, Virginia, died Monday, April 14, 2014.

Hari was born in Kluang, Johore, Malaysia. He graduated from English College, Johore, Malaysia, and the University of Malaya, Malaysia, and earned a Master's degree and Ph.D. in Soil Science from Ghent University, Ghent, Belgium. He retired from the U.S. Department of Agriculture, Natural Resources Conservation Service, Washington, DC, in 2010.

As National Leader for World Soil Resources, USDA–NRCS, Hari led an international effort in providing technical assistance in soil survey, soil conservation, and soil fertility. During his 30-year career, he worked with scientists in over 100 countries, helping to promote better land management in support of sustainable agriculture world-wide. The Soil Science Society of America made him a Fellow in 1993, and he was honored by the International Union of Soil Sciences with the Guy Smith Medal for Soil Classification in 2012.

The Pillars of the Soil Management Support Services project (left to right): Terry Cook, Hari Eswaran, Dick Arnold, and John Kimble.

In 1980, Hari joined the USDA Soil Conservation Service (later NRCS) as leader of the USAID-funded project called Soil Management Support Services (SMSS). The purpose of SMSS was to help developing countries better understand their soil resources and to apply the U.S. system of soil classification, Soil Taxonomy, to their soil survey programs. Through dozens of organized workshops on soil

classification, laboratory methods, and sustainable land management, SMSS provided training to more than a thousand soil scientists throughout the world.

Over the years, I was fortunate to have witnessed firsthand the many ways that Hari impacted the soil science community. For example, he taught soil workshops that involved intensive training in both the classroom and in the field. Hari enjoyed giving classroom lectures, and everyone respected his vast knowledge. But I think that where he really excelled was in the field at the soil pit, helping students learn the art and science of describing and classifying soils. He would ask the participants many questions to make them think more deeply about what they were seeing. He led the group discussions on how the soil had formed, its relationship with the landscape, and how best to manage the soil for sustainable agriculture. By the end of a week of traveling through the countryside and looking at different soils, the students had a much better understanding of the soils they had seen. They all appreciated Hari's passion for soils. He had the admiration of his peers all over the world. I believe that his fellow soil scientists and his many students had a tremendous affection for Hari because they all could see how much he loved soils and loved protecting our Earth.

He will be missed. ■

National Land and Range Judging Contest

The 63rd Annual National Land and Range Judging Contest, hosted by the Oklahoma Association of Conservation Districts, was held April 29th to May 1st. Student members of 4-H and FFA chapters from across the country came to Oklahoma City to compete for the title of the Nation's best land, homesite, or range judge. This year, the competition hosted 612 contestants from 34 States, including 531 contestants in the land and homesite contest and 81 contestants in the range site contest.

NRCS soil scientists and range specialists assisted the Oklahoma Association of Conservation Districts with setting up and running the practice and contest sites.

Contestants evaluating soil pits at field 3. An FFA pit is in the foreground, and 4-H and adult soil pits are in the background.

Practice sites were available for 2 days, giving the contestants a chance to hone their skills before the official contest.

On Thursday, contest day, coaches and sponsors were given the route to the contest location. At the contest site, the land and homesite contestants found four field sites to be judged. Due to a high number of FFA contestants, they were divided into odd and even groups. Two identical pits were dug for the FFA contestants, one pit (similar to the FFA pits) was dug for 4-H contestants, and one pit was dug for the adult contestants at each field site. The range contest was set up in a nearby area that was more representative of range conditions used in judging. The range contest consisted of three range sites and two plant ID sites.

After the contest, all contestants were provided a catered lunch and given the afternoon off. The winning teams and individuals were announced at the evening banquet at the National Cowboy and Western Heritage Museum in Oklahoma City.

First-Place Contest Winners

FFA Homesite Team: North Miami FFA (IN)
FFA Homesite Individual: Nick Thompson, Southern Wells FFA Team (IN)
4-H Homesite Team: Barbour County 4-H (WV)
4-H Homesite Individual: Harley McVay, North Miami 4-H Team (IN)
FFA Land Judging Team: North Miami FFA (IN)
FFA Land Judging Individual: Connor O'Neill, Lind-Ritzville FFA Team (WA)
4-H Land Judging Team: Barbour County 4-H (WV)
4-H Land Judging Individual: Kelton Miller, Barbour County 4-H Team (WV)
FFA Range Team: Hondo FFA (TX)
FFA Range Individual: April Molitor, Hondo FFA Team (TX) ■

Maryland Soil Scientists Assist NEON

By Dean Cowherd, assistant state soil scientist, USDA-NRCS, Annapolis, Maryland.

In early May, NRCS personnel in Maryland provided assistance to the National Ecological Observatory Network (NEON), which is a continental-scale observatory with a mission to measure the causes and effects of climate change. Soil Scientists Dean Cowherd and Jim Brewer, accompanied by State GIS Specialist Michelle Guck, assisted with describing a representative pedon at the site of an observation tower that is currently under construction.

At present, NEON has 14 sites representing 7 soil orders across the United States. The number of sites is planned to increase to 60 in the years to come. NEON is funded by the National Science Foundation.

After the soil at the Maryland site was described, each horizon was sampled by NEON personnel and the samples were sent to the USDA–NRCS Kellogg Soil Survey Laboratory for analyses. In addition to the samples collected for laboratory analyses, about 1.2 kilograms of soil was collected from each horizon for archiving by NEON. A subsample of these archived samples can be requested by individuals for research. The site is about 12 miles from Annapolis in Edgewater, Maryland, on the historic 2,650-acre wooded campus of the Smithsonian Institute. The Institute generates research interest around the world. As stated on their website, their mission is “uncovering mysteries of the Chesapeake Bay and other coastlines around the globe.” So their property is a perfect fit for one of the NEON towers, which will extend many feet above the forest canopy and collect extensive data, including measurements of carbon emissions.

It was a real pleasure working with the NEON research scientists, who are top professionals in a partnership that addresses climate change and the global impact of soils. ■

NRCS Soil Scientists Jim Brewer (in pit) and Dean Cowherd (standing on right ledge) working alongside the NEON crew.

Shawnee Hills Loess Catena Project and Healthy Watersheds

NRCS is an agency that is committed to “helping people help the land.” The Soil Science Division is a key part of that commitment, supplying timely, science-based information about soils, landscapes, and soil-landscape relationships.

Brief History of the Shawnee Hills Loess Catena Project

In 2002, an MLRA soil landscape project was initiated in response to demands for soils information that would address production, conservation, and environmental concerns. The concerns included soil productivity, soil erosion, soil health, climate change, water quality, water quantity, and watershed health. To address these modern soil survey issues, the Shawnee Hills Loess Catena Project was initiated (fig. 1). The project was designed to produce foundational soil information about common soil landscapes that occur in MLRA 120—Kentucky and Indiana Sandstone and Shale Hills and Valleys. This long-term study systematically collected soil-landscape data that would be of importance in decision-making for current and future land-use issues. This project fulfilled, in part, the vision of Dr. Bob Grossman (NSSC, retired) who saw the need for regional soil studies that responded to current demands for soils information and that showcased the technology and tools of the Soil Science Division.

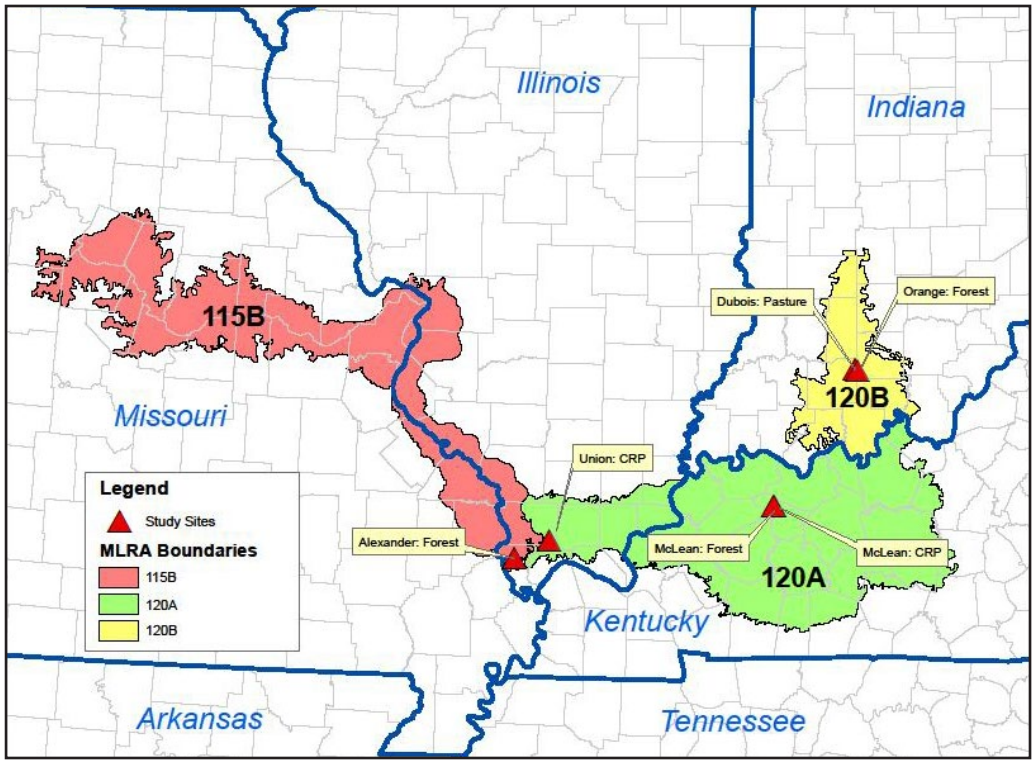


Figure 1.—The Shawnee Hills Loess Catena Project covers approximately 24 million acres and spans MLRAs in Illinois, Kentucky, and Indiana.

The first of these three MLRA-based, soil-landscape studies was initiated in 2002 in response to the MLRA soil survey modernization and digitization program (fig. 2). This study was intended, in part, as an example of the type of study that

would improve and enhance the next generation of soil surveys. The study, which was conducted in southern Illinois (Union and Alexander Counties), focused on two watersheds that were similar but differed in land use (forest versus pasture). Shortly after the start of the study, a second, similar study was developed by NCSS.

Figure 2.—Crew that performed the initial sampling of the Alexander County forested site in Winter 2002 (left to right): Mike Wilson (NRCS-KSSL), Matt McCauley (NRCS, KY), Leon Follmer (IL State Geological Survey, retired), Dwayne Williams (NRCS, IL), and Brad Lee (University of Kentucky). (Photo courtesy of Sam Indorante.)

Cooperators included NRCS in Indiana and Kentucky and Purdue University. The second study was conducted in southern Indiana (Dubois and Orange Counties) in MLRA 120B and (using the first study as a template) was also in a first-order pasture and forest watershed. A third study was later developed in McLean County, Kentucky, in MLRA 120.

To date, this soil systems project has involved an interagency collaboration of scientists from USDA–NRCS Soil Science Division, Illinois Geological Survey, USDA–Forest Service, Southern Illinois University, Purdue University, Kentucky Geological Survey, USGS Kentucky Water Sciences Center, and the University of Kentucky. All sites have detailed topographic maps, detailed soil maps, detailed geomorphic maps, pedon descriptions at various slope positions, complete soil characterization, soil samples to measure soil variability at various slope positions, soil conductivity measurements (by EM-38), GPR transects, saturated hydraulic conductivity measurements (by Amoozemeter), water table measurements (by pressure transducer) at various slope positions, and water flow measurements by flumes over, into, and through the soil landscape.

Over the course of the project, more than 70 people have participated in field activities. Outcomes of this cooperative effort include 9 publications, 4 national extension publications, and 22 national presentations. Research results have been presented or published regarding soil carbon, soil-landscape geochemistry,

hydropedology, location and distribution of fragipans, and digital soil mapping, just to name a few. The results have been included in SSURGO updates and will be included in the Soil Data Join Recorrelation. In addition, the two Kentucky sites were part of the field trips of the 2012 NCSS South Regional Soil Survey Conference, held at Bowling Green, Kentucky.

Current Research Emphasis of the Shawnee Hills Loess Catena Project: Healthy Watersheds

In March 2014, Dr. Samuel Indorante, NRCS Illinois; Matt McCauley, NRCS Owensboro, Kentucky; Dr. Brad Lee, University of Kentucky; Dr. Phillip Owens, Purdue University; and USGS hydrologists in Kentucky installed two flumes in pasture and forested watersheds (fig. 3). The flumes are part of the Healthy Watershed Baseline Initiative, which aims to spatially and temporally quantify the role that soils play in maintaining vital ecosystem functions at the watershed level. This initiative is also part of the soil systems approach, which has been identified as one of the future priorities of the Soil Science Division. The team was joined by Research Soil Scientist Dr. Zamir Libohova from the National Soil Survey Center in Lincoln, Nebraska. Dr. Libohova provided expertise on selecting the flume size, design, and location. NSSC provided about $10,000 for the purchase of flumes. It continues to support the project with soil expertise from Dr. Mike Wilson and Dr. Phil Schoeneberger, research soil scientists. The installation of the flumes completes the instrumentation of six paired watersheds in Illinois, Indiana, and Kentucky. The watersheds represent a loess thickness sequence covering MLRAs 115 and 120 and 9.7 million hectares (24 million acres). ■

Figure 3.—Soil scientists from NRCS, USGS, University of Kentucky, and Purdue University installing a flume in March 2014. (Photos courtesy of Sam Indorante and Zamir Libohova.)

Dig It! In California!

By Susan B. Southard, NRCS soil scientist, Davis, California.

The Smithsonian National Museum of Natural History's Dig It! exhibit opened in Sacramento, California, at the California Museum. The museum is run by a local nonprofit organization and is situated adjacent to the State Capitol grounds. The

original, larger exhibit was designed to be used as a traveling exhibit that includes 54 soil monoliths collected by NRCS. The founding sponsor of the exhibit was the Soil Science Society of America. Presenting sponsors for the exhibit in California include the California Department of Food and Agriculture; the California Department of Conservation; the University of California at Davis Department of Land, Air, and Water Resources; the University of California Division of Agriculture and Natural Resources; the California Department of Pesticide Regulation; NRCS; the U.S. Forest Service; and individual contributors.

Jennifer Wood and Carrie-Ann Houdeshell, soil scientists from the NRCS regional office in Davis, California, help set up the exhibit.

A donor reception was held on May 1st, 2014; a grand public opening was held on May 3rd; and a Soil Science Society of America (SSSA) board meeting and reception was held on May 6th. Staff from the NRCS regional soil office and the NRCS state office in Davis, California, assisted with set up and served as docents for the grand opening. The University of California at Davis has hired two graduate students to assist the museum's education staff with docent training and volunteer scheduling.

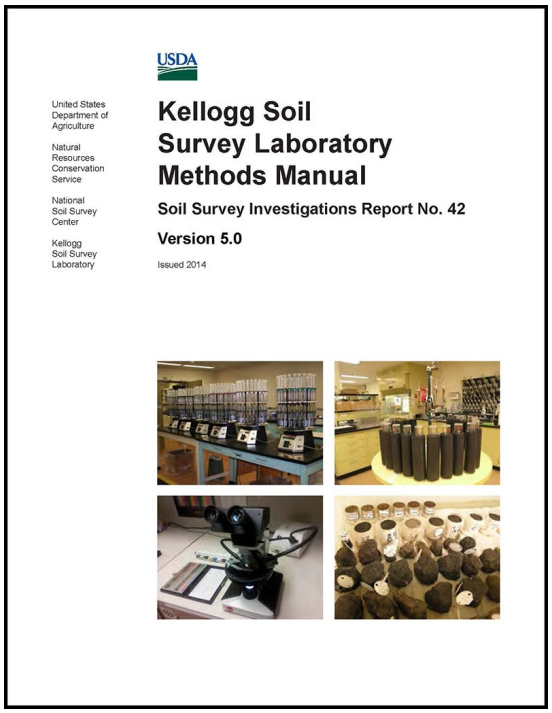
At the donor reception, opening remarks by Karen Ross, Secretary of the California Department of Food and Agriculture, highlighted the efforts of Brent Roath, retired USFS soil scientist, and Dr. Micheal Singer, professor emeritus at the University of California—Davis, for their efforts to bring Dig It! to California. Also acknowledged was Soil Consultant John Kelly and NRCS Soil Scientists Susan Southard, Jennifer Wood, and Sid Davis, who were part of the original organizing team. Also in attendance were Debra Bowen, California Secretary of State, and representatives from numerous State and federal agencies. Patrick Megonigal, Smithsonian curator of the Dig It! exhibit from Washington, DC, acknowledged appreciation of local efforts.

The exhibit will be in Sacramento until the end of March 2015. It is hoped that the exhibit will then travel to another museum in California before heading back East. ■

Kellogg Soil Survey Laboratory Methods Manual

The 5th edition of the "Kellogg Soil Survey Laboratory Methods Manual," Soil Survey Investigations Report 42, is now available (http://go.usa.gov/ktaJ). The manual provides detailed documentation of analytical methodology for KSSL procedures and serves as a definitive reference for laboratory analysts. Methods described in the 5th edition supersede those in earlier versions of the "Soil Survey Laboratory Methods Manual," SSIR No. 42, issued in 1989, 1992, and 1996, as well as versions of "Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey," SSIR No. 1, issued in 1972, 1982, and 1984.

The manual contains the detailed analytical methods used by the USDA–NRCS Kellogg Soil Survey Laboratory (KSSL) for soil analysis. The methods are the peer-recognized standard analytical procedures that are used by KSSL and other laboratories participating in the National Cooperative Soil Survey. The methods have been developed concurrently with "Soil Taxonomy" throughout the history of the Cooperative Soil Survey. They are specifically applicable to the classification of soils under the criteria established in "Soil Taxonomy" and to soil science research and interpretations.



Analytical data produced from the methods described in all versions of the "Soil Survey Laboratory Methods Manual" are stored in the NCSS soil characterization database, which can be accessed and queried at http://ncsslabdatamart.sc.egov.usda.gov/.

Take Your Child to Work Day

On April 24, the National Soil Survey Center played host to the children of NRCS employees for the annual "Take Your Child to Work Day." This year's theme was "Plant a Seed, Grow a Future."

Because of the work of committee members Cindy Stuefer-Powell, Diane Hooper, and Michelle Etmund, along with presenters and administrative staff, 15 children ages 4 to 17 enjoyed a day of learning activities. The activities included processing soil samples, applying techniques for soil ribboning, making edible geodes, and creating terrariums. The children also had the opportunity to shadow their parent or adult mentor for part of the morning. Later in the day, the children were treated to a healthy snack inspired by USDA's health initiative "My Plate."

Started in 1992 as "Take Our Daughters to Work Day," the initiative later included boys, ultimately evolving in 2003 into "Take Your Child to Work Day." ■

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