National Cooperative Soil Survey Newsletter

May 2015
Issue 71

In This Issue—

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. ■

NCSS National Conference

The 2015 NCSS Conference is set for June 7 through 11, 2015, in Duluth, Minnesota. The theme for the conference is "Soils and a Changing Climate: Future Trends of the NCSS." The program for the event can be found at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/?cid=stelprdb1267531.

This biennial conference is an opportunity for U.S. and international representatives from cooperating universities, governmental agencies, and the private sector to meet and address issues of concern to soil science and to the National Cooperative Soil Survey. Some of the important topics that will be discussed at this conference are:

- Enhancing, promoting, and supporting soil data,
- Advancing frontiers in digital soil mapping and information applications,
- Evolving the vision for ecological sites and soil health, and
- Updating and expanding soil survey operations.

Following is a brief summary of the program for the week:

Sunday, June 7, is the date of the optional field tour to the multi-year cooperative (U.S. Department of Energy and the U.S. Forest Service) research site at SPRUCE (Spruce and Peatland Responses Under Climatic and Environmental Change), which is north of Grand Rapids, Minnesota. The ongoing experiment is designed to assess the response of northern peatland ecosystems to increases in temperature and to exposures to elevated concentrations of atmospheric CO_2. Buses will depart from the conference hotel at 8:00 a.m. and return at 5:00 p.m.

Monday, June 8, is the opening of the conference and general session. It will feature comments by agency and partner dignitaries. There will be a keynote speaker addressing the topic of climate as well as several general-session speakers on topics related to the soil science discipline. The afternoon session will revolve around the individual committee meetings. There will be a poster session and social in the evening.

Tuesday, June 9, is a training day. It will open with a keynote speaker discussing the USDA Climate Hubs, followed by multiple training sessions and concurrent presentations. Five oral presentations and four training sessions are planned for each hour for the remainder of the day. Poster presentations will occur in the evening.

Wednesday, June 10, is the date of the conference field tour along the north shore of Lake Superior. This tour will focus on soils derived from the Superior Lobe of the Laurentian Ice Sheet. Buses will depart from the event hotel at 7:30 a.m. and will visit sites along the north shore of Lake Superior. Sites will include: a) soil topo-hydrosequences of Superior dense loamy tills; b) dysic and euic transitions in hemic organic deposits; c) ecological sites of the Till Upland Mesic Hardwood Forests; and d) soils formed in Superior very fine red tills. The tour will conclude with a dinner in Two Harbors, Minnesota. Buses will return to the hotel at 7:30 p.m.

Thursday, June 11, will open with a keynote speaker from the new NRCS Soil Health Division followed by the committee reports. The future direction of soil survey will be discussed, and a new NCSS Strategic Plan will be unveiled in a town-hall-type meeting. An awards luncheon will follow the morning session, during which a keynote speaker from the tribal community will discuss wild rice production. ■

DSP Project at Grand Rapids Soil Survey Office

Last October, members of the Grand Rapids Soil Survey Office (12–GRR MLRA Office) started work collecting soil samples as part of their approved Dynamic Soil Properties (DSP) project to examine hydric soils in restored wetlands. Their work is one of a series of DSP projects proposed nationally and supported by the staff of the National Soil Survey Center (NSSC) in Lincoln, Nebraska. Dynamic soil properties are those properties, such as surface infiltration rate, nutrient content, and bulk density, that can change relatively quickly (over a human lifetime) due to changes in management practices. The Grand Rapids office staff submitted a project plan in the spring of 2014 in response to a call for proposals from the NSSC. The proposal was accepted as a 2-year project.

For this project, the MLRA staff are turning their attention to organic soils, which are common throughout the State of Michigan. In the southern half of Michigan's Lower Peninsula, these soils have commonly been drained and farmed. NRCS has spent a lot of time, effort, and resources over the years in attempts to restore converted and drained wetlands to their original state. In Michigan, these areas have included a large number of organic soils, or Histosols. One of the questions that this project hopes to help answer is "To what extent do restoration efforts restore the soil health of Histosols?" To do so, the staff will collect samples and analyze the resulting dynamic soil property data for Histosols in MLRA 98 under four different states. The states are: actively farmed, recently restored (within the last 5 years), established restorations (more than 5 years ago), and sites with native vegetation and relatively undisturbed hydrology. The primary organic soils addressed in this study are the Adrian series (sandy or sandy-skeletal, mixed, euic, mesic, Terric Haplosaprists) and the similar Houghton series (euic, mesic, Typic Haplosaprists). These hydric soils are common to the sandy outwash channels and lake plains that comprise large areas

A wetland site that was restored prior to 2009. The site supports thick stands of cattails and reed canarygrass and provides habitat for a variety of local wildlife.

of the southwestern Lower Michigan landscape. The Adrian and Houghton mucks in the study make up over 360,000 acres in MLRA 98. Current sampling sites span six counties in the central portion of the MLRA.

Matt Bromley, 12–GRR Office leader, and Jon Quisler, MLRA subset leader, are doing the sampling for the project. Greg Schmidt, ecological site inventory specialist, is doing concurrent and future development of ecological site descriptions (ESDs) for the sites. In addition to the MLRA staff, Erin Segar, area resource soil scientist, and Dr. Martin Rosek, state soil scientist for Michigan, have assisted with project plan development and potential site selection and will be assisting with analysis of the data.

The soils staff completed about half of the preliminary sampling in the fall of last year. By late summer this year, the remainder of the data collection will be completed, including the use of Amoozemeters to determine saturated hydraulic conductivity on this suite of soils. The end result will be data that can be readily populated in NASIS for such properties as saturated hydraulic conductivity (K_{sat}), bulk density, nitrogen content, phosphorus content, and electrical conductivity. Users will benefit from a database populated with real-world data. The ecological site inventory specialist will use the site data to develop future ESDs. A summary report will be developed that will hopefully quantitatively demonstrate the benefits of wetland conservation and restoration. The report will be available for use by NRCS conservationists during program delivery, outreach, and promotional efforts.

Insights have already been gained during the sampling process. While scouting potential forested sampling sites, the staff noted significant occurrences of marl deposits in the subsurface tier of many of the organic soils. Marl is an unconsolidated mix of calcium carbonate and clays deposited over time by the accumulation and decomposition of algal and other freshwater aquatic plant remains. These soils have been recognized as the Edwards series (marly, euic, mesic, Limnic Haplosaprists), and their occurrence seems to have been underreported in the original soil survey manuscripts. This insight comes from sampling the soils using a peat sampler instead of the soil probes that were more widely used for mapping in the original surveys. The current theory is that the marl deposits were not always captured by the probe tubes, a problem also occurring in recent sampling. This type of information will be added to NASIS in the notes for future projects involving these soil map units. ■

Soil Tunnel Becomes Part of Science Fairs

The ever-popular NSSC Soil Tunnel has had a busy spring in Lincoln, Nebraska. The tunnel was at Brownell Elementary School's Science Fair on March 3 and the Lincoln School District's Science Fair on March 5. More than 100 students participated at Brownell, and 775 students were competing at the district fair. Both events provided great opportunities to showcase the Soil Tunnel as an educational tool while highlighting the importance of soil during The International Year of Soils. Michelle Etmund and Cindy Stuefer-Powell, staff members of the Kellogg Soil Survey Laboratory, helped at both events by assisting the children as they crawled through the Tunnel and describing "what they saw" and "what lives in the soil."

The almost 8-foot-long tunnel was constructed with materials and labor donated by local businesses. The project was the brainchild of Patty Jones and Michelle Etmund, physical science technicians in the Kellogg Lab. The finished construction was brought to life by the artistic hands of Janis Lang, also a Kellogg Lab staff member. Lang painted the tunnel with life-like renditions of various inanimate objects and many of the "critters" that live below the soil surface. Visitors to the tunnel were also treated to free educational materials, including soil posters and Sammy Soil coloring books.

The popularity of the Soil Tunnel has grown. The tunnel participated in other science events this spring, including the Lincoln Children's Museum's Science Saturday on April 25th and Science Sunday at the University of Nebraska's Morrell Hall on May 17th.

Spreading the word on the importance of soil and the value it brings to our everyday lives will continue to be part of the National Soil Survey Center's promotion of The International Year of Soils. ■

Elementary school students asking questions about the Soil Tunnel.

64th Annual National Land and Range Judging Contest in Oklahoma City

By Jeremy Dennis, soil scientist, NRCS soil survey office, Stillwater, Oklahoma.

It's that time of year again here in Oklahoma, time for the Annual National Land and Range Judging Contest. The contest was held May 5th through 7th. High school students, from freshman through seniors, in 4-H and FFA from across the Nation converged on Oklahoma City to see who could be the Nation's top land, homesite, and range judge. This year, approximately 655 kids, along with coaches and sponsors, representing 35 States came to compete in this national contest. The contest is hosted by the Oklahoma Association of Conservation Districts. Soil scientists and range specialists from NRCS in Oklahoma assisted the Oklahoma Association of Conservation Districts in setting up and running the practice and contest sites.

On Monday, practice sites were set up. On Tuesday and Wednesday, the students studied the practice sites (fig. 1). The practice sites gave the students a chance to learn about the soils and plants that could possibly be in the sites for the official contest. On Wednesday, an undisclosed location was set up for the official contest.

Figure 1.—The muddy mess left in a practice pit after a storm on Tuesday night.

On Thursday—contest day—coaches and sponsors were given directions to the official contest site (fig 2.). There were 16 pits for land and homesite evaluation and 3 range sites and 2 plant ID sites for the range contest. At approximately 9:15 a.m., the contest began. It was over by 11:30. Afterwards, a catered lunch was provided for all the participants. Scores were tallied in the afternoon, and the winners were announced at a banquet hall in the National Cowboy and Western Heritage Museum in Oklahoma City.

Figure 2.—Students walking through a pit to judge the soil.

Top Winners for Each Category

Placing	Team Winners: FFA Land Judging	
1	Fairfield	IN
2	Hondo #1	TX
3	Vian	OK
4	Marion County	WV
5	Madisonville	TX
6	Two Rivers	AR
7	Anson	TX
8	Wilson Central	TN
9	McCook Central	SD
10	Mid-Buchanan	MO

Placing	Team Winners: 4-H Land Judging	
1	North Miami	IN
2	Rensselaer	IN
3	Jackson County	KY
4	South Newton	IN
5	Barbour County	WV
6	McCook County	SD
7	Jay County	IN
8	Eastern South Dakota	SD
9	White River Valley	IN
10	Maui Dirt Devils	HI

1	Jackson County	KY
2	Sierra County	NM
3	Traill County	ND
4	Greene County	MO
5	Aurora	MO

Placing	Team Winners: FFA Range Judging	
1	Jacksboro	TX
2	Hico	TX
3	Hamilton	TX
4	Bellville	TX
5	Sequoyah	OK
6	Oklahoma Union	OK
7	Granbury	TX
8	Fox	OK
9	Rugby	ND
10	Roland	OK

Placing	Team Winners: FFA Homesite Judging	
1	Hondo #2	TX
2	Hico	TX
3	Marion County	WV
4	Fairfield	IN
5	Taylor County	WV
6	Covington	KY
7	Wirt County	WV
8	Lind-Ritzville	WA
9	Texico #2	NM
10	Wilson Central	TN

Placing	Team Winners: 4-H Homesite Judging	
1	North Miami	IN
2	Barbour County	WV
3	Maui Dirt Devils	HI
4	South Newton	IN
5	White River Valley	IN
6	Tishomingo County	MS
7	Jay County	IN
8	Harvey County	KS

Pathways Intern Experience

By Ariel De Lara and Matt Prendergast.

On the northern coast of California sits the small, evergreen town of Arcata—home to Humboldt State University, old logging legacies, and the Arcata Coastal Redwood Belt & Siskiyou-Trinity MLRA Soil Survey Office (MSSO). The Arcata MSSO is where the two of us—Ari De Lara, soil conservationist, and Matt Prendergast, range conservationist—came to realize the great undertaking that is the mapping and classifying of soils. Although we never technically mapped soils during our 9 months at Arcata (and would not necessarily want to put ourselves under such pressure to do so), we learned the processes by which soils are named, described, and classified in order to gain practical knowledge of the land. The soil survey office is a place both of us have come to appreciate as we discovered an operation that is largely invisible to the public eye. Mapping soils seems to be an almost thankless job, at least from the public point of view, but we see that it yields such useful information.

We began our internship at the Arcata Soil Survey Office in the fall of 2014 as a continuation of our NRCS Pathways positions, which began in the summer in Alturas, CA (for Matt), and Dixon, CA (for Ari). Due to the limited working space in the Eureka Field Office, it had looked like we wouldn't be able to work during the school year, until the Arcata MSSO offered to take us under their wing. The MSSO experience was quite different from work in an NRCS field office. The MSSO provided us with a deeper understanding of the mapping process and other intricacies within soil science.

It comes as no surprise that working in a soil survey office exposed us to the in-depth processes of describing and classifying soils. Working alongside knowledgeable soil scientists, such as Jonathan Hooper, MLRA soil scientist, and Sue Aszman, MLRA office leader, we learned how to determine particle-size control sections, dry colors, and pH and how to collate the range in characteristics for a soil series. There was also plenty of casual conversation concerning slaking, argillic horizons, drainage classes, and a multitude of other topics associated with the wonders of soils. We were even given a small taste of uploading data collected in the field to the National Soil Information System (NASIS 6.0). The data was then available to soil scientists at the regional office for certification and eventually posted to the Web Soil Survey for use by the public for management decisions.

Ariel De Lara and Matt Prendergast, Pathways interns, classifiying a Lepoil soil at the MLRA Soil Survey Office in Arcata, California.

A big portion of our time in the office was spent doing the important task of sanitizing soil samples for full-characterization analyses. These soils came from areas affected by Sudden Oak Death (SOD) and required pre-treatment before shipping. We heated the samples to 83 degrees C for 30 minutes and then packaged them for shipment to the Kellogg Soil Survey Laboratory in Lincoln, Nebraska, for analyses. This treatment was done to keep the SOD causing oomycete, *P. ramorum,* from spreading out of the quarantine zone, which stretches from Monterey County, California, in the south to Curry County, Oregon, in the north. The Arcata MSSO is the only soil survey office located within the quarantined area. The sanitation process was documented using an Omega HH08 multi-logger and probe, which recorded temperatures at 5-minute intervals. The sanitized soil samples were then labeled, double bagged, and weighed according to the USDA-APHIS (Animal and Plant Health Inspection Service) Compliance Agreement for Regulated Domestic Soil Samples from Quarantined Areas and Nebraska State regulations for root knot nematode. It was a big job for a small office. Documentation was reviewed and PPQ-540 Certificates were signed by the Humboldt County Agricultural Commissioner's representative acting for APHIS.

Our time at the Arcata MSSO has been beneficial in the development of our understanding of what it means to be a NRCS employee. It also improved our academic performance by reinforcing lessons learned in the classroom. We are excited to advance our careers by spending our second summer with NRCS along the California Coastal Range in Templeton, California (for Ari), and Eureka, California (for Matt). We hope to begin full-time positions somewhere in California upon graduation in December of 2015. It's been a pleasure to be able to work in an environment where we can expand our knowledge of soil science and explore the properties of the land which support life. ■

Time-Lapse Video of the Restoration of Prairie on Private Cropland

By Mitchell Renteria, Earth Team volunteer, National Soil Survey Center, and project habitat management advisor for the Trook Property.

In 2014, the Trook family of Cass County, Nebraska, decided to create a tribute to Alfred Trook, a long-time farmer and land steward. The family wanted to do something that would not only serve as a memorial but be a model for conservation and crop productivity for future farmers. They chose to restore prairie on their private cropland.

I created a video to be a small representation of the time and effort put into restoring the prairie. The video (https://www.youtube.com/watch?v=UuF9648mIvE) is meant to serve as an educational tool for landowners and conservationists. The Trook family hopes to demonstrate how important this kind of conservation can be for the future of their land, their family farm, and sustainable farmland production. Beyond the act of restoring native tallgrass prairie in a mostly agricultural landscape, the management measures have allowed wildlife to return and thrive. The measures have also provided for better erosion control in sensitive areas near a spring-fed creek that originates on the property. The Trook family and I hope to help others do the same by showing the many benefits of initiating conservation actions, which can improve crop productivity and land health.

The video includes time-lapse photography from many different cameras (one photo every hour of every day) and underwater photography from GoPro videos. It also includes many images taken with a digital single-lens reflex camera. I set up all of the photography, except an image of disking, which is credited to Dane Wilson.

I had been involved in the project and met the Trook family before starting the video, which I made in conjunction with a class called “Digital Imaging and Storytelling.” I really wanted to show how important conservation can be in an increasingly agricultural world, especially for family farmers like the Trooks. I wanted to not only show how this restoration could help prevent erosion and restore wildlife habitat but also how it would help preserve the family’s livelihood and the land that they care for so dearly. It is all about the delicate balance between production agriculture, ecosystem services, and sustainability.

Being able to watch a prairie develop, wildlife return, and erosion diminish is something that I will always remember. I cherish the fact that I could be a part of such an educational experience for a family and, I hope, for the community. ■

Sampling Pedons to Improve Data for CEAP Modeling

By Phil Smith, Hanford, California. Photos by Andy Paolucci, Sonora, California, and Andrew Conlin, Chico, California.

The Conservation Effects Assessment Project (CEAP) is a multi-agency effort initiated in 2003 to estimate the environmental benefits of conservation practices at national and regional scales. In California, the 38-million-acre Bay Delta Watershed has been identified as a priority area for CEAP studies using the Agricultural Policy Environmental Extender (APEX) model. The model is a tool capable of predicting erosion, nutrient routing, and crop growth by estimating nitrogen, phosphorus, carbon, and sediment in several loss pathways through soil and across the land surface. The model uses physical and chemical soil properties as key input parameters.

The West Regional Modeling Unit determined that more than 30 soil series in the Bay Delta Watershed do not have all of the characterization data that is critical to the APEX model. Carrie-Ann Houdeshell, modeling unit coordinator, working

with MLRA soil survey leaders in Region 2, identified several soils to sample for lab characterization in 2014 and 2015. Since May of 2014, MLRA soil survey offices within the Bay Delta Watershed have been sampling pedons for lab characterization to fill data gaps, and they will continue to do so into the near future. This data will improve the modeling capability of APEX.

During the week of March 9, the Hanford MLRA Soil Survey Office sampled three soils for lab characterization in the San Joaquin Valley and the California Delta. The sampling team included Phil Smith, MLRA soil survey leader (Hanford); Genevieve Widrig, soil scientist, Templeton MLRA Soil Survey Office; Andy Paolucci, soil scientist, Sonora MLRA Soil Survey Office; Andrew Farris, soil conservationist, Merced Field Office; and Ed Tallyn, senior regional soil scientist, Region 2 Office in Davis, California (fig. 1).

The team started in the southern San Joaquin Valley near Bakersfield, where they described and sampled a pedon of Granoso soil in a vineyard (fig. 2). The Granoso series, formerly correlated as the Cajon series, is mapped on 77,500 acres in Kern County. Granoso soils are used in various cropping systems but are predominantly used for vineyards. Because of the sandy texture of Granoso soils, producers can control and optimize available water during the different stages of grape production.

Figure 1.—The San Joaquin Valley sampling team after sampling a Hilmar pedon in Merced County, California. Region 2 soil scientists shown from left to right are: Genevieve Widrig, Ed Tallyn, Phil Smith, Andy Paolucci, and Andrew Farris (Merced Field Office).

The team then moved north to Merced County for 2 days of work near the town of Atwater. The Soil Survey of Merced Area, published in 1962, is one of the oldest surveys in California. Several soils mapped in the survey area do not have complete laboratory characterization. Dello and Hilmar soils were identified because they are important for growing annual forage grass mixtures used for silage in the dairy industry as well as grapes and sweet potatoes. Both soils occur on the eastern side of the San

Figure 2.—An area of Granoso loamy sand, 0 to 2 percent slopes, on a flood-plain landscape. Granoso soils are mapped on flood plains and alluvial fans in the southern San Joaquin Valley. The Sierra Nevada Mountains are in the background.

Joaquin Valley. They are mapped on 113,000 and 67,000 acres, respectively.

The Hanford MLRA Soil Survey Office will continue sampling in June of 2015 in the California Delta. The potential benchmark series Egbert, Gazwell, and Kingile will be sampled. Complete lab characterization of these soils will complement the characterization data for Delta soils obtained in 2012 and 2014.

Earlier this spring, the Chico Soil Survey Office sampled Columbia and Tisdale soils in the Sacramento River Valley of Northern California (fig. 3). The Columbia series is extensive on flood plains and natural levees along the Sacramento and San Joaquin Rivers. It has a total extent of more than 113,000 acres. Chico MLRA Soil Survey Leader Ryan Miebach and Project Leader Andrew Conlin will be sampling the Anderson, Churn, Kimball, and Reiff series later this summer. These soils are important for various agricultural uses, including dryland grain production, irrigated pastures, alfalfa, truck crops, stone fruit, walnuts, and almonds. ■

Figure 3.—A profile of a Columbia soil in the Sacramento River Valley. Columbia soils are mapped extensively on flood plains along the Sacramento and San Joaquin Rivers.

Soil Survey of the Yakama Nation Closed Area

By Kelley Paup-Lefferts, MLRA soil survey office leader, USDA-NRCS, Pasco, Washington.

The Yakama Nation is in eastern Washington State and covers an area of approximately 1.3 million acres. It contains two soil survey areas: Yakama Nation Irrigated Area and Yakama Nation Closed Area (fig. 1). The soil survey of the Irrigated Area was first published in 1976. The soil survey of the Closed Area, which consists of about 1.1 million acres, was SSURGO certified in the fall of 2014. The term "closed" refers to "closed to development" (fig. 2). Within the boundary of the Closed Area, most of the land in Federal trust has been set aside from the development of permanent structures by the Yakama Nation Tribal Government and reserved for exclusive use by the Yakama people.

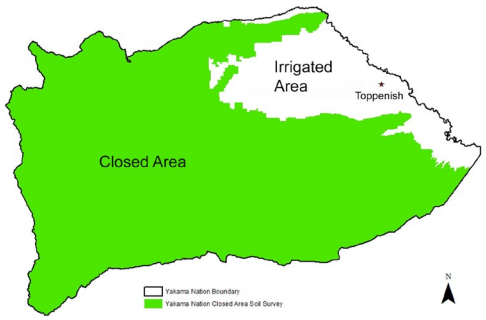


Figure 1.—The Yakama Nation contains within its boundary two soil surveys: Yakama Nation Closed Area and Yakama Nation Irrigated Area.

The Closed Area is in Major Land Resource Areas (MLRAs) 3, 6, 7, and 8. It extends from the top of Mount Adams to approximately 1 mile southwest of Mabton, Washington. It has a great diversity of landforms and geology. Elevation ranges from approximately 12,200 to 1,500 feet, and precipitation ranges from approximately 100 inches (Mount Adams area) to 7 inches (Mabton area).

The original Memorandum of Understanding (MOU) for the Yakama Nation Closed Area soil survey (originally called Yakama Indian Reservation, Washington, Parts of Yakima and Klickitat Counties) was signed in 1981. Fieldwork began soon afterwards and was completed around 1989. The soil scientists who completed the field mapping were contracted by

Figure 2.—Rangeland within the Yakama Nation Closed Area soil survey.

the Yakama Nation, and NRCS was responsible for correlation and quality assurance activities for the project.

The Yakama Nation, the Bureau of Indian Affairs (BIA), and NRCS cooperated to gather the completed field collection data, finish the quality control and assurance of field data, and conduct the workload for project completion, including the final correlation and SSURGO certification of soil survey project, which was achieved in fall of 2014.

During the project, we were able to create more than 40 new soil series. In naming the new series, we took the opportunity to use the Yakama language. As stated by the Deputy Director of the Department of Natural Resources for the Yakama Nation, "Like the link between soil and plants, there is a link between our Yakama natural resources and the Yakama language. I believe a respect for, and the use of, the Yakama language results in improved natural and cultural resource management." So when you see soil names like "Xasya," "Tiicham," "Nchitaak," and "Wakamuticham" in the Official Series Description, make sure to look in the "Series Proposed" section to find information about the meaning of the Yakama word.

To obtain soil survey information about the Yakama Nation Closed Area project, please contact the natural resource department of the Yakama Nation.

"Ixwi mash k'inuta."

(See you later.) ■

Governor Proclaims June 6th as 2015 International Year of Soils Day in Nebraska

To support NRCS's ongoing promotion of the importance of soils, the State of Nebraska proclaimed June 6th as Nebraska's day to honor 2015 International Year of Soils. Dave Hoover, National Leader for Soil Business Systems, National Soil Survey Center, accepted the proclamation from Nebraska's Lieutenant Governor Mike Foley in a ceremony at the State Capitol. ■

Dave Hoover receiving the proclamation from Nebraska's Lieutenant Governor.

STATE OF NEBRASKA

Proclamation

WHEREAS, The USDA/NRCS National Soil Survey Center recognizes the economic and social significance of good land management, especially soil; and

WHEREAS, Soils constitute the foundation for agricultural development, essential ecosystem functions, and food security, making is the key to sustaining life on Earth; and

WHEREAS, The year of 2015 has been designated by the United Nations as "The International Year of Soils;" and

WHEREAS, The National Soil Survey Center wants to further promote this global initiative with the goal of raising awareness and promoting sustainability of soil resources.

NOW, THEREFORE, I, Pete Ricketts, Governor of the State of Nebraska, DO HEREBY PROCLAIM the 6th day of June, 2015 as

2015 INTERNATIONAL YEAR OF SOILS DAY

in Nebraska, and I do hereby urge all citizens to take due note of the observance.

IN WITNESS WHEREOF, I have hereunto set my hand, and caused the Great Seal of the State of Nebraska to be affixed this Thirteenth day of May, in the year of our Lord Two Thousand Fifteen.

Attest:

Secretary of State

Governor

Yosemite National Park Soil Temperature Study

During the week of March 16, three members of the NRCS Pacific Soil Survey Region and an Earth Team volunteer traveled to Yosemite National Park for maintenance on a long-term soil temperature study. The trip participants were: Dr. Ron Taskey, retired professor of soil scientist at Cal Poly-San Luis Obispo, former soil survey project leader for Yosemite National Park, and current NRCS Earth Team volunteer at Templeton, California; Theresa Kunch, NRCS MSSO leader at Sonora, California; Dylan Beaudette, NRCS digital soil mapping specialist at Sonora, California; and Jennifer Wood, NRCS soil data quality specialist at Davis, California.

Dylan Beaudette and Theresa Kunch finding a sensor from GPS data.

The soil survey of Yosemite National Park was published in 2006. As part of the soil survey activities, 41 soil temperature sites were established in 1998 by Ron Taskey, who was then project leader. The original sites were established to represent a wide variety of elevations, slopes, and aspects, all of which are factors that affect soil temperature. The data were used to construct a soil temperature regime model for the park, and the results were published in the survey manuscript. The sensors were kept in place, and data continued to be collected. The trip in March was part of a year-long effort to install new soil temperature loggers and to thoroughly consolidate and document all site and project information for continuation of this long-term monitoring project. There is a high likelihood of fire at the mid- and lower-elevation sites and also a need to relocate the loggers easily. The new loggers are encased in PVC capsules. They are buried at a depth of 20 cm with the sensor cable protected from soil critters by PVC. The logger is tethered to rebar with a metal chain and marked with a metal tag.

Ron Taskey celebrates finding a sensor, despite an incorrect GPS location.

Yosemite National Park is in MLRA 18 (Sierra Foothills) and MLRA 22A (Sierra Nevada Mountains). The data from the loggers will assist with MLRA soil survey update activities by refining the soil temperature model. The data will also contribute to modeling of climate change impacts. Soil climate monitoring will be increasingly important for climate change studies in the Sierra Nevada Mountains, which are critical to the water supply and storage for much of California. ■

Are You Using NRCS ArcGIS Online for Geospatial Soil Survey Work?

Did you know that if you are an NRCS employee, you can use "NRCS ArcGIS Online for Organizations" for geospatial soil survey work? The staffs of several Soil Survey Regions and State Offices are already doing so. Many of you may already be familiar with ArGIS Online base maps and various communities, such as the ESRI Soils Community, which use the OMB Federal Geographic Data Committee GeoPlatform approach to organizing and sharing geospatial data.

ArcGIS Online (AGOL) for Organizations is a cloud-based, collaborative content management system for maps, apps, data, and other geospatial information for organizations, such as Federal agencies. This software-as-a-service platform extends on-premise ArcGIS resources and allows content to be available in multiple settings, including mobile, tablet, and various desktop environments. With AGOL and terabytes of ready-to-use base maps and content, you can quickly create interactive maps and custom apps and then publish and share them in ESRI's secure cloud. You can share content through groups within your organization, keep content private, or make content public. You are in control of your data and are empowered through easy-to-use, web-enabled content and tools. National Bulletin 270-13-9 outlines how NRCS employees can get started.

See the NRCS GIS Sharepoint site for more details in the NRCS ESRI AGOL Policy document. If you are interested in using NRCS ArcGIS Online, please send an email request to sharon.waltman@usda.gov (Sharon Waltman, Soil Science Division AGOL administrator). She will initiate an email invitation to gain you an NRCS AGOL login account at http://www.arcgis.com. Your login will be based on your email name with the suffix "_nrcs" (e.g., jane.smith_nrcs).

NRCS has a few examples of National- and Global-extent AGOL web maps, map services, and web map applications that you can review. They may help you to develop ideas on how you could use this new tool to make collaborative geospatial soil survey work easier.

NRCS gSSURGO team members Jennifer Sweet and Brian Walker (National Geospatial Center of Excellence, Ft. Worth, Texas) and Bob Dobos (National Soil Survey Center, Lincoln, Nebraska) recently prepared a test-version web map service (wms) of CONUS gSSURGO 10-m using NRCS ArcGIS Online. This wms uses the FY–2014 gSSURGO and can be accessed at https://gistest1.ftw.nrcs.usda.gov/arcgis/rest/services/gssurgo. Selecting the link from this site to "gssurgo/wms_asw" will take you to a page dedicated to the root-zone available water storage (rzaws) interpretation in gSSURGO. The rzaws map can be viewed from this page by several methods, including your desktop ArcGIS software, online at ArcGIS.com (fig. 1), and through Google Earth. Please take a look at the site and send comments to jennifer.sweet@ftw.usda.gov. Your review comments will help refine the FY–2015 gSSURGO wms, which will be prepared for NRCS and eventually for the public.

Another interesting web map application is called "Geo QC Reviewer for KSSL Pedon." It was prepared to test the viability of using NRCS AGOL for reviewing the geographic locations of pedon data within the Kellogg Soil Survey Laboratory collection, which is global in extent. After you have opened an AGOL account, you can find the application from http://nrcs.maps.arcgis.com/apps/SimpleViewer/index.html?appid=b465c775262544ef8793d29e713f7ddb or by searching the NRCS AGOL Gallery. Suspect pedon locations are shown in a pale blue bubble. You can type a State or country name into the search window to locate suspect pedons. The application can help you to follow up with necessary edits and research to improve pedon geography. The full KSSL pedon collection is included with some basic attributes for reference.

Figure 1.—FY–2014 gSSURGO web map service for root zone available water storage. The map shows low-rzaws soils in yellow, orange, and tan (thought to be "droughty") and higher-rzaws soils in green, blue, and purple (more likely to sustain plants during potential drought conditions).

Another example of an NRCS AGOL web map application is the "Newhall Soil Climate (1971–200)" application (fig. 2). It allows you to review weather station java Newhall (soil climate) Simulation Model runs.

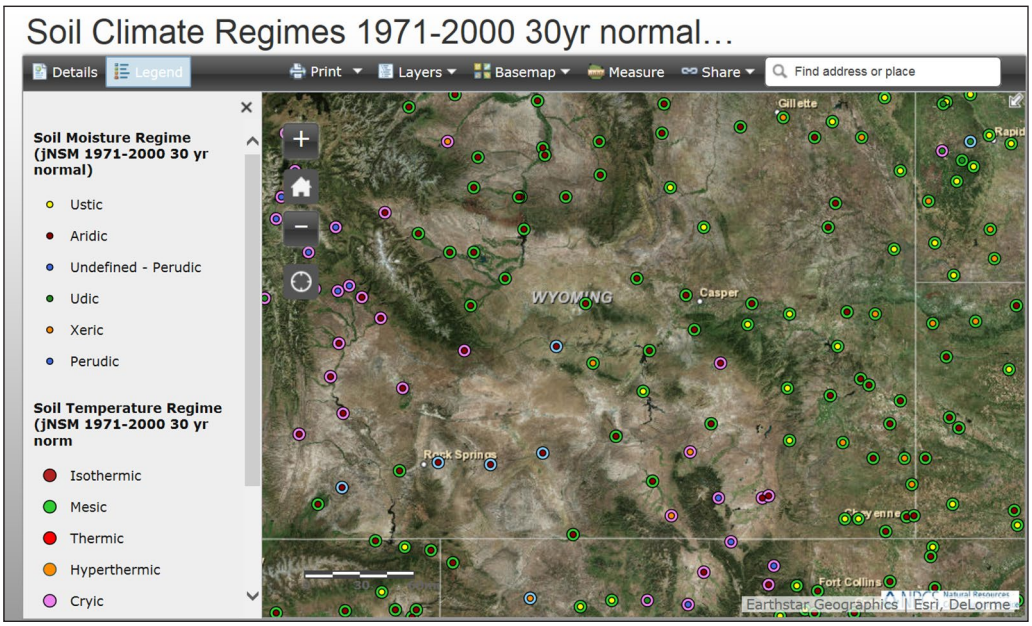


Figure 2.—"Newhall Soil Climate (1971–2000)" results are presented for weather stations based on the 30-year normal records for 1971–2000. The legend shows both soil moisture regime estimates (small dots) and the soil temperature regime estimates (large dots) using connotative colors.

If you have any questions about using NRCS AGOL for soil survey work, please send an email message to Sharon.Waltman@usda.gov. ■

History and Benefits of SDJR

By Paul Finnell, soil scientist, NRCS, National Soil Survey Center, Lincoln, Nebraska.

There are many who think that the Soil Data Join Recorrelation (SDJR) effort is a new concept. The SDJR concept, however, reaches as far back as the 1960s and then reoccurred in the 1990s when the Soil Survey Division migrated to the "MLRA Concept." When the Soil Survey Program began more than 100 years ago, each soil survey area was mapped as an "island," and a manuscript was published based on information from that specific survey area. The intent of the program, however, has always been coordination. On November 21, 1967, Soils Memorandum 67 was sent to all the States. The memorandum, signed by Kenneth Grant, stated:

> *"Coordinating soil survey interpretations is urgent. Many states have made commendable progress, but this task is not completed nationwide. Inter-state coordination in particular is lacking. Within a major land resource area (MLRA) specific interpretations for the same soil should be identical, except for minor differences justified by local differences in climate or other sound reasons. This does not mean that the same sets of interpretations are needed in strictly rural areas that are needed in more densely populated areas… If differences in soil survey interpretations cannot be resolved between Regional Technical Service Centers, refer differences to the deputy administrator for soil survey."*

History Leading to SDJR

In the early 1990s, many States were struggling with the concept of updating soil survey data. The "updates" during this time were typically a remap of the existing county soil surveys and included only small improvements to manuscript publication and virtually no improvement to database population. In 1995, the Soil Conservation Service went through a major reorganization and was renamed to the Natural Resources Conservation Service. The Soils Division reorganized and moved the correlation staffs from the States to new regional offices (MLRA soil survey offices). During the 1990s, the phrases "patchwork quilt of information across the country" and "knitting the quilt together" were coined. The National Soil Survey Center developed the new soil correlation course "MLRA Management and Update of Soil Surveys." The emphasis of the course was on updating the surveys based on the MLRA concept to thereby "knit the quilt." This new training course was taught in State and MLRA offices across the country.

At the 2001 State Soil Scientist meeting in Lawrence, Kansas, the "MLRA Concept" was presented as four new initiatives emphasizing the need for the MLRA approach to soil survey. The first initiative addressed the lack of consistent and seamless soil data needed for the 1985 and subsequent Farms Bills. The second addressed the increasing demand for multi-county and multi-State survey information. The third addressed the implementation of the new NASIS database and the usefulness of the database for management by geographic area. Lastly, the fourth addressed the upcoming completion of the SSURGO digitizing project, which was initiated in the 1990s. The release of the NASIS database and the SSURGO digitizing effort in 1995 enabled the Division to migrate from publishing hard copy manuscripts to publishing databases.

In 2002, the Soil Data Mart became an operational publication database and website. This new website changed the publication mentality from books to databases. Publication of the database properties highlighted the deviations between some manuscripts and the database population. In 2004, National Bulletin 430–5–7 was issued to focus work on improving the soils database in both quality and completeness of population.

In August of 2005, the Web Soil Survey (WSS) became operational as the web portal for soil survey manuscripts. Release of WSS made database publication a reality. From 2005 to 2010, many national bulletins were released with the intent of improving the quality of the soil properties for interpretations, such as erosion factors, and of improving the quality of the WSS publication. The WSS customer had the ability to view soil properties and interpretations as they crossed political boundaries.

In 2010, the planning for the “harmonization” initiative began as an effort to re-enforce the MLRA concept. From 1995 to 2010, the soil survey update was struggling to move away from county updates and to cross political lines. The National Soil Survey Handbook has always stated that the MLRA will be evaluated prior to commencement of update activities. Unfortunately, no incentive was established for the state soil scientists to claim evaluation progress. There was a reluctance to direct staff to work on evaluations. Typically, many update projects were within a short driving distance from the office. The projects rarely crossed State boundaries, were not customer oriented, and were rarely completed to publication. It became apparent that a new initiative was needed. The upcoming retirements of a generation of soil scientists provided a period of transition. The soon-to-be retiring soil scientists would work with the younger employees to teach them about the soils within the MLRA. The intent was to capture the retirees' corporate knowledge into the database before it was lost.

It was during this time that the Rapid Carbon Assessment (RaCA) initiative provided the MLRA soil scientists the opportunity to visit remote areas within the MLRA to sample soils most had never seen. Following this sampling initiative with MLRA evaluations that emphasized reading the manuscripts and correlation documents would help the MLRA soil scientist to understand the map unit concepts.

History of SDJR

The “harmonization” effort, later coined “Soil Data Join Recorrelation,” was developed with three principal objectives:

1. Evaluation of the map units within the MLRA (soil evaluation),
2. Harmonization of data in the attribute database (data join), and
3. Identification of future workload (re-correlation and documentation).

The MLRA evaluation was designed to capture corporate knowledge from older employees and historical documentation (such as manuscripts, correlation documents, point data, and research and lab samplings). This knowledge would be used to harmonize similarly named map units from multiple counties by developing MLRA map unit concepts. As a result, the number of data records to manage would be reduced and the published information improved. The completed evaluation would identify the future MLRA project workload, specifying locations and sampling needs within a given timeframe.

Analysis in 2011 identified almost 700 million acres that included same-named or similarly-named map units in multiple counties. These map units affected the greatest number of customers. The 5-year SDJR initiative focused on selecting specific soil series and harmonizing map units that held the same map unit concept for the series, thereby improving the flow of soil properties and interpretations across political boundaries. There are still approximately 1.6 billion acres remaining that were not part of the original SDJR analysis. The process of evaluation, harmonization, and documentation will continue after the 5-year initiative. The SDJR process will become the standard operating procedure before commencing soil survey update projects that were not part of this 5-year initiative.

SDJR In Progress

The initiative focuses on creating continuous attribute coverage from data harmonization by reviewing the soil series for all high-acre map units. The resulting uniform map unit database supports the interpretations (such as HSG, K, and T factors) needed to produce accurate information across soil survey area boundaries. Large-scale conservation efforts and priorities in the past years drew attention to inconsistencies in the soil survey information between soil survey areas. Providing soil survey information that is consistent across political boundaries will expedite the conservation planning process, support the Conservation Delivery Streamlining Initiative, State Resource Assessments, and provide consistent soils data for Conservation Effects Assessment Project (CEAP) analyses.

The National Soil Survey Center will continue to support SDJR after fiscal year 2017. The current goals for SDJR are set by region to complete 700 million acres by FY–2017. By the end of FY–2015, about 495 million acres will have been improved through the re-correlation effort. Over 3,900 SDJR projects are approved for work on 2.9 million acres during FY–2015. At the end of FY–2015, over 37,000 traditional soil survey map units will have been harmonized to about 7,700 MLRA map units. Of the 3,262 soil surveys, 2,499 surveys have been impacted by the SDJR initiative, leaving only 763 untouched by the SDJR initiative. The analysis comparing the original initiative map units to the completed initiative map units has been done. The remaining SDJR map units will be prioritized by regional offices for completion in FY–2016. Improvements to the quality of the maps and database are evidenced each year when the data is refreshed on the Web Soil Survey. The improvements in the quality of soil interpretations and in the flow of soil properties, qualities, and interpretations across political boundaries are evident from the Web Soil Survey use.

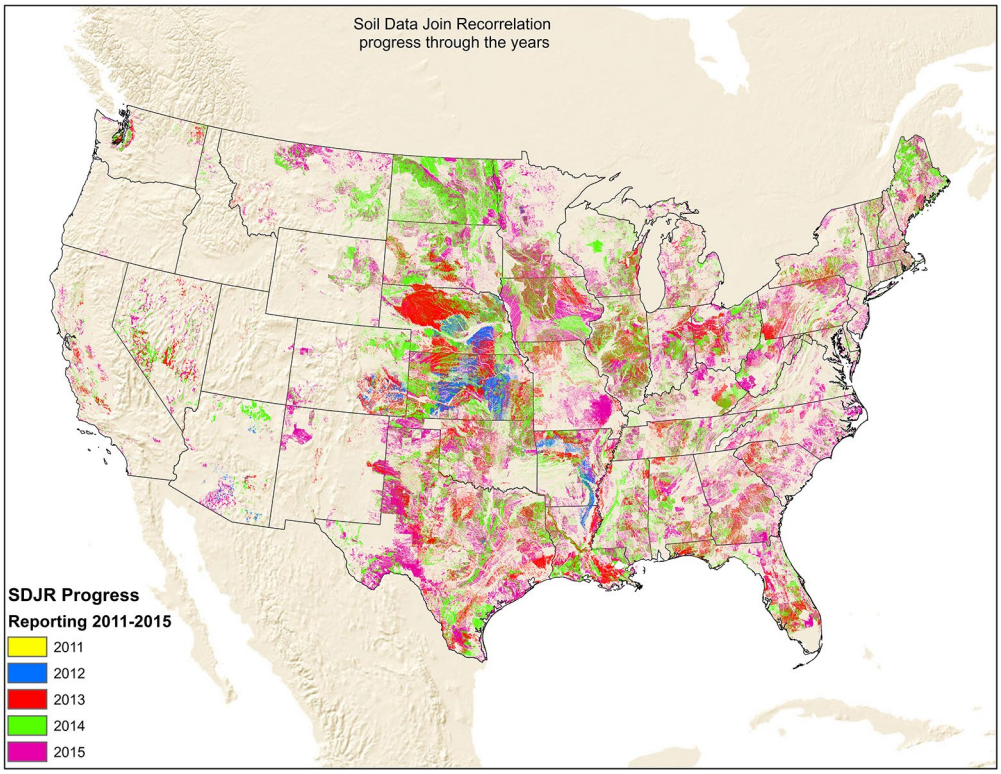


Figure 1.—SDJR progress by year as of May 2015.

The map in figure 1 identifies the annual SDJR progress as of May. Although some work commenced in 2011, the initiative was designed to run from FY–12 through FY–16. As expected, the SDJR production has increased substantially each year.

Why SDJR?

The commonly asked question is “Why are we spending so much time working on SDJR?” The answer: The Soil Data Mart database is now the official repository for all published NRCS soils information. During the decades of producing manuscripts, NRCS never properly maintained the soils database to match the manuscripts. In most cases, the database was an incomplete source of soils information.

Time is being spent on SDJR because NRCS has been losing historical collective corporate knowledge as soil scientists retire. This evaluation period provides the opportunity for newer employees to discuss correlation decisions with older employees and retirees. These discussions will help to gain knowledge on how to improve the information published through the database.

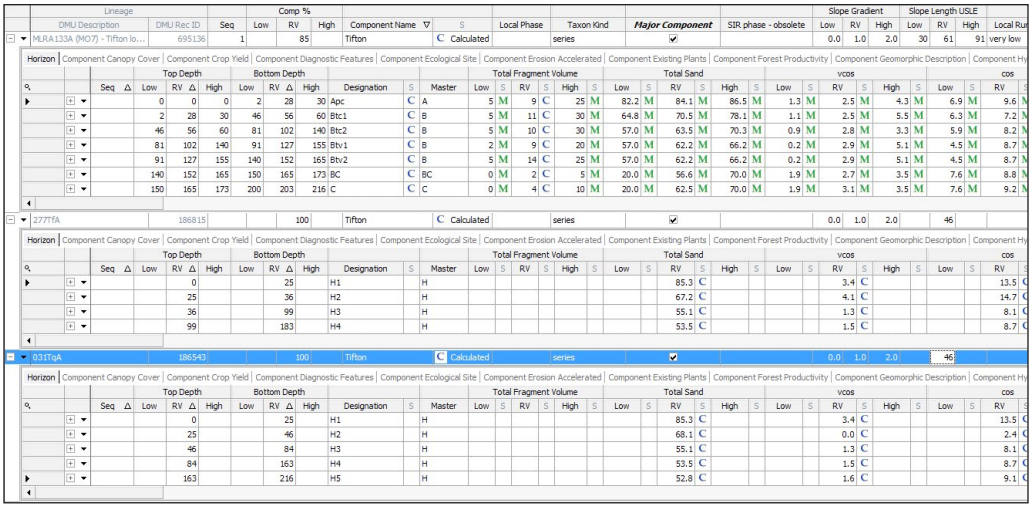
The customer has changed from the traditional users of a single-county manuscript to the current users of regional, State, and national analyses.

Benefits of SDJR

After almost 4 years of the 5-year SDJR initiative, over 300 million acres have been improved.

The SDJR harmonization effort has reduced the number of repetitious map units in the NASIS transactional database. There were approximately 45,000 map units before SDJR that have been harmonized to approximately 14,000 map units. As a result more than 31,000 map units no longer need to be maintained and populated. These figures reflect the number of traditional survey map units (additional) that have been replaced with new MLRA map units (correlated).

The most notable result of the SDJR initiative is the knowledge gained during the improvement in the population of the database. The data being populated is based on soil horizons for which laboratory-analyzed data has been used for soil properties population. Historically, the database included two or three “layers” consisting of a limited number of soil properties. Components that have been through the SDJR process now have 6 to 10 soil horizons for which the soils properties are fully populated.



A screenshot from NASIS showing fully populated soil properties.

The results of SDJR are noticeable improvements in the usability of the properties and the resulting interpretations. The members of the modeling community have recognized these improvements and are the largest supporters of the continued initiative. The movement of the initiative away from layers with abrupt boundary changes to horizons showing the gradation of soil properties has improved the modeling and interpretive results.

Data that has gone through the SDJR process has improved the quality of the calculated and stored interpretive results. Calculated component interpretations are criteria derived using the assigned soil component and horizon properties. Because of the success of this initiative, the publications now provide consistent, uniform, documented, defensible, and interpretive results.

There is still a great deal of work to complete, but with our efficiency is increasing. The SDJR process will become the standard operating procedure for future MLRA updates. The future workload will be focused specifically on *what* work is needed for the map unit, on *why* the work needs to be done, and on *where* data are to be collected. The number of SDJR projects has been increasing each year. In the final SDJR initiative year, the number of SDJR projects in many offices will decrease substantially from the previous year but the number of MLRA projects will increase. ■

Nondiscrimination Statement

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases will apply to all programs and/or employment activities.)

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by email to program.intake@usda.gov or by mail to:

USDA
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, S.W.
Washington, D.C. 20250-9410

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). ■